Final Traffic Operations Study for:

US-50 Silva Valley Interchange

Prepared for:
El Dorado County

Submitted by:

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Introduction

This traffic study examines the traffic operations for the proposed interchange of US-50 with Silva Valley Parkway located within El Dorado County. This traffic report provides information to support project design, environmental review and long range planning by the El Dorado County DOT.

The analysis approach used in this traffic study is intended to be generally consistent with two other traffic studies developed concurrently: 1) Saratoga Way Extension Traffic Study (Dowling Associates Final November 2007) and, 2) El Dorado Hills Blvd. Interchange Traffic Study (Dowling Associates, Final May 2009). Given that these three traffic studies share overlapping study areas, achieving as much consistency in terms of analysis approach and assumptions was desired. A comparison fact sheet that lists key differences between the respective analyses is provided in Appendix A.

The purpose of this analysis is to:

1. Determine the effects of the project on freeway and county road traffic operations for the AM and PM peak hours for the years 2010, 2020, and 2030.
2. Identify any roadway geometric improvements needed to maintain acceptable level of service for the US-50 freeway and key county road intersections in the vicinity of the proposed project.
3. Identify recommended left turn pocket lengths for key study intersections.
4. Determine if any key intersections in the vicinity of the project would meet signal warrants with the project.
5. Calculate Traffic Index (TI) consistent with the Highway Design Manual to determine appropriate pavement design lives for US-50 and the new Silva Valley over-crossing.
6. Confirm most cost efficient interchange design relative to operational performance and determine the appropriate timing of the phases of the project.

Consistent with the Caltrans Traffic Impact Study Guidelines (Caltrans, 2002), only roadway improvements with existing funding commitments were included in future year analysis of traffic impacts. This includes El Dorado County's traffic impact fee projects which are earmarked for developer fee funding. Assumed completion of the latter improvement projects was based on discussions with County DOT staff.

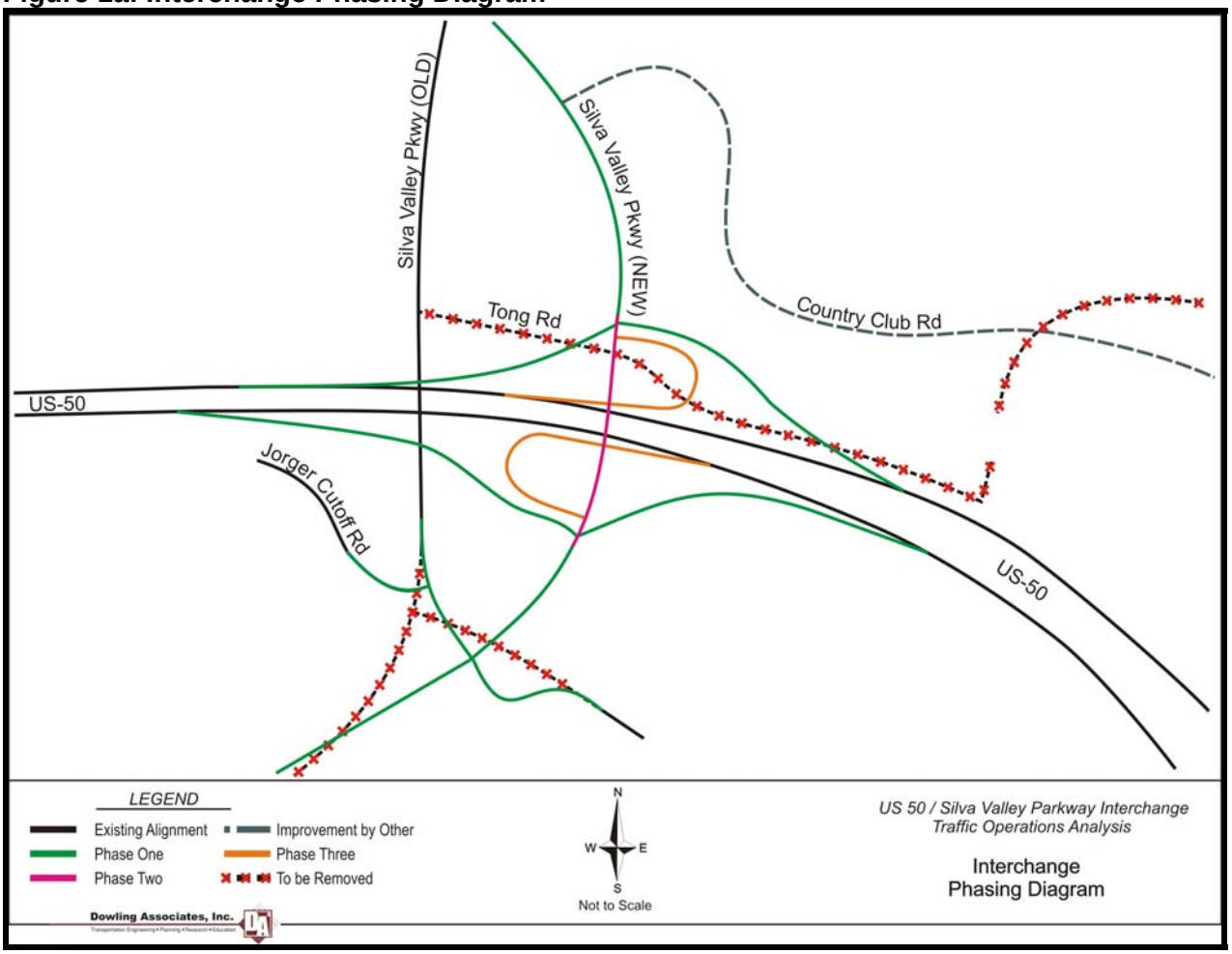
Project Description

The new Silva Valley Parkway to US-50 interchange project consists of a new interchange along a new alignment for Silva Valley Parkway to the east of the current Silva Valley Parkway/White Rock Road alignment. It includes constructing the over-crossing and ramps, and the signalization of the eastbound and westbound on-/off-ramps. The over-crossing is to be constructed after Phase I of the US-50 HOV project.

The proposed project will be constructed in three phases as shown in Figure 1a.

- Phase 1 will consist of the direct freeway on- and off-ramps plus connecting roadways between the new ramps and the existing alignment of Silva Valley Parkway and White Rock Road.
- Phase 2 consists of construction of a new over-crossing for Silva Parkway east of its current alignment.
- Phase 3 consists of construction of additional loop on-ramps at the new over-crossing site. The westbound loop ramp is programmed and will be constructed as part of County's Capital Improvement Program (Project #53120). The westbound diagonal ramp is considered part of the Silva Valley Interchange improvement. For the loop ramp design, both Partial Cloverleaf-A (Parclo-A) and Partial Cloverleaf-B (Parclo-B) designs were examined for operational efficiency.

Figure 1a: Interchange Phasing Diagram



Analysis Approach

The traffic study area spans US-50 mainline and ramp operations for approximately 2.3 miles between the Bass Lake Road Interchange (PM 3.149) and the El Dorado Hills Interchange (PM 0.86). Operations at the following intersections were examined:

1. Silva Valley Parkway and US-50 Eastbound Ramp (future)
2. Silva Valley Parkway and US-50 Westbound Ramp (future)
3. Silva Valley Road and Serrano Parkway (signalized)
4. Silva Valley Parkway and Country Club Drive (future)
5. White Rock Road and Jorger Cuttoff Road (non-signalized)
6. White Rock Road and Valley View Parkway/Vine Street (signalized)
7. White Rock Road and Latrobe Road (signalized)
8. El Dorado Hills Blvd and US-50 Eastbound Ramp (signalized)
9. El Dorado Hills Blvd and US-50 Westbound Ramp (signalized)
10. Bass Lake Road and US-50 Eastbound Ramp (non-signalized)
11. Bass Lake Road and US-50 Westbound Ramp (non-signalized)

Figure 1b shows the location of all study area intersections. Regionally significant improvements that were assumed as part of the future year analyses include: a new US-50 interchange at Empire Ranch Road; widening and reconfiguration of the US-50 interchange with El Dorado Hills Blvd; interchange improvements at US-50 at Bass Lake; and, the realignment/extensions of Saratoga Way, Country Club Drive, Serrano Parkway and Empire Ranch Road. Not shown are several existing and planned local roadways and extensions south of US-50 (e.g., Carson Crossing, Golden Foothill Parkway, Blackstone Parkway/Valley View Road, Town Center West). The circulation impact of these roadways was addressed by adjusting zone connectors in the County DOT traffic model and/or with off model adjustments.

The existing and future lane configuration on mainline US-50 is illustrated in Figure 2. As shown, US-50 will be widened to provide HOV lanes, truck climbing lanes, and auxiliary lanes within the project area. It should be noted that the WB and EB auxiliary lane between the Silva Valley and El Dorado Hills interchange is a component of this project. Table 1 provides the operational analyses approach used for this study. Analysis methods used to perform these analyses are described in the following pages.

Table 1: Analysis Approach

Scenario	Analysis Year	Needed?	Purpose/Explanation
Without Project	2010	Yes	needed for environmental analysis future w/o project
	2020	Yes	needed for environmental analysis future w/o project
	2030	No	not needed for environmental analysis
Phase 1	2010	Contingent	do not perform unless 2020 Phase 1 operates w/o LOS F conditions
	2020	Yes	Needed for phasing - see that I/C operates acceptably until 2020
	2030	No	assumes Phase 1 will not accommodate 2030 traffic
Phase 2	2010	Yes	environmental baseline for with and without project analysis
	2020	Yes	Needed for phasing - see that I/C operates acceptably until 2020
	2030	Contingent	perform only if Phase 2 will operate in 2030 w/o LOS F conditions
Phase 3	2010	No	assumes Phase 2 will operate acceptably at least until 2020
	2020	Contingent	perform only if Phase 2 will not operate acceptably in 2030
	2030	Yes	ultimate buildout

Phase 1 - ramps without overcrossing; Phase 2 - ramps with OC; Phase 3 - loop ramps with OC

Figure 1b: Vicinity Map

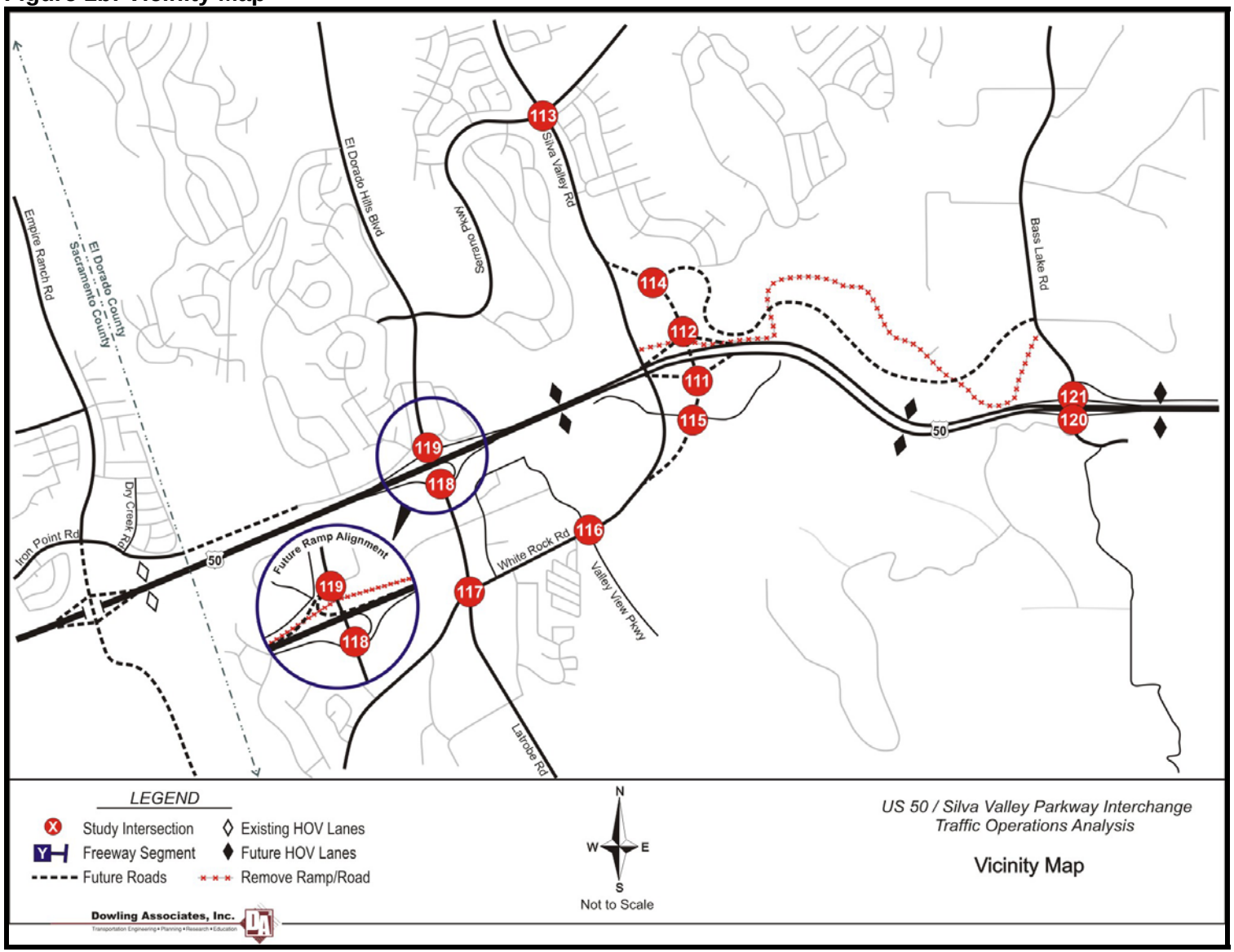
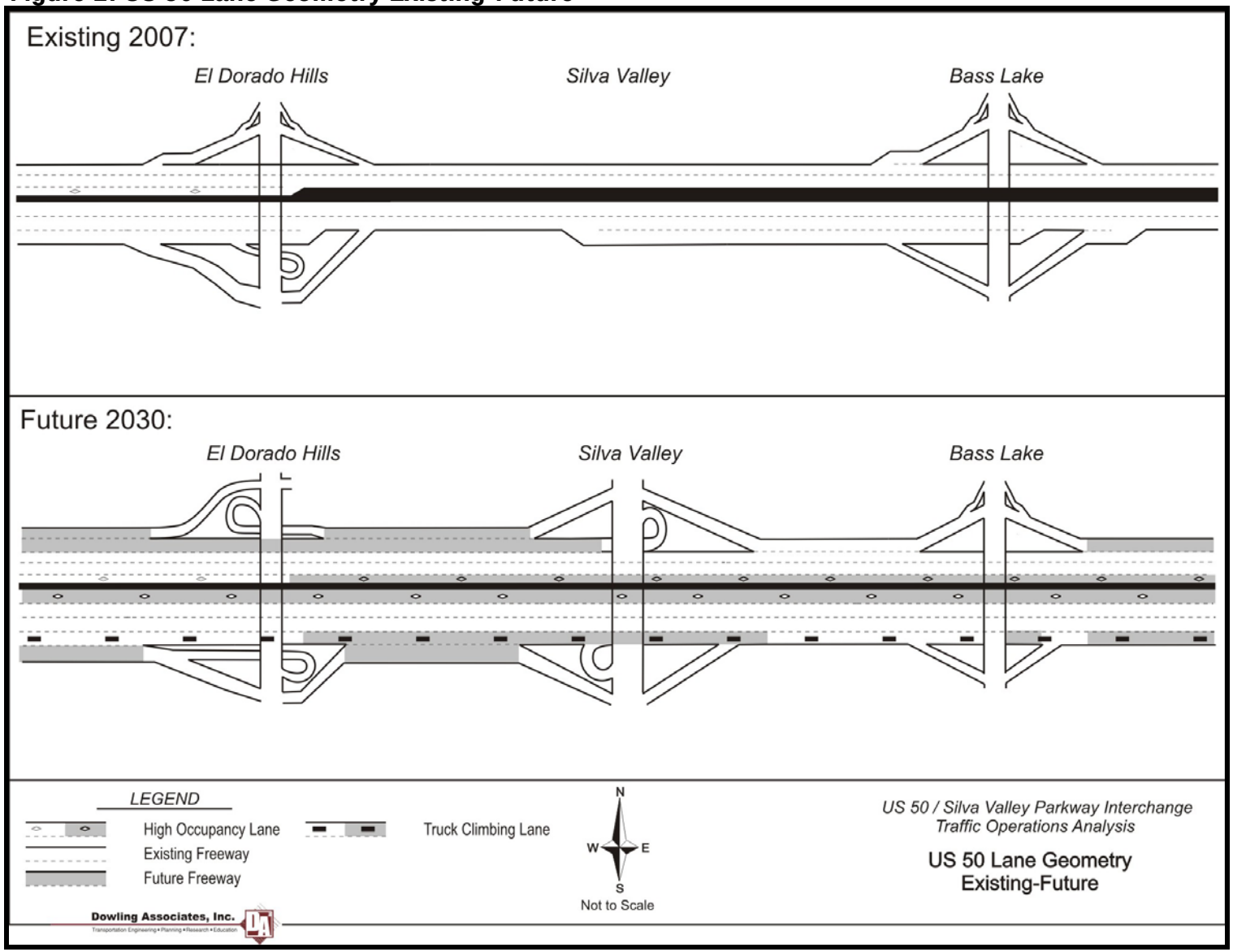


Figure 2: US 50 Lane Geometry Existing-Future



Intersection Level of Service Methodology

Level of service (LOS) is a qualitative indication of the level of delay and congestion experienced by motorists using an intersection. LOS is designated by the letters A through F, with A being the best conditions and F being the worst (high delay and congestion). El Dorado County requires LOS for the signalized intersections to be evaluated using Highway Capacity Manual (HCM) method (Special Report No. 209, Transportation Research Board). Table 2 presents the average delay criteria used to determine the LOS at signalized intersections.

Table 2: LOS Criteria for Signalized Intersections

Level of Service (LOS)	Average Delay (seconds / vehicle)	Description
A	≤ 10	Very Low Delay: This level of service occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all.
B	> 10 and ≤ 20	Minimal Delays: This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	> 20 and ≤ 35	Acceptable Delay: Delay increases due to only fair progression, longer cycle lengths, or both. Individual cycle failures (to service all waiting vehicles) may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	> 35 and ≤ 55	Approaching Unstable Operation/Significant Delays: The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume / capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55 and ≤ 80	Unstable Operation/Substantial Delays: These high delay values generally indicate poor progression, long cycle lengths, and high volume / capacity ratios. Individual cycle failures are frequent occurrences.
F	> 80	Excessive Delays: This level, considered unacceptable to most drivers, often occurs with oversaturation (that is, when arrival traffic volumes exceed the capacity of the intersection). It may also occur at nearly saturated conditions with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

SOURCE: Transportation Research Board, *Highway Capacity Manual,* Washington, D.C., 2000, pages 10-16 and 17-1.

HCM criteria for computing an average LOS for non-signalized intersections does not exist. Hence, the intersection capacity utilization (ICU) as computed by the SYNCHRO-7 software was used to compute an overall LOS. The ICU equivalents are given in Table 3.

Table 3: SYNCHRO-7 ICU to LOS Correspondence

Intersection Capacity Utilization	Level of Service Grade
< 55%	A
55 to < 64%	B
64 to < 73%	C
73 to < 82%	D
82 to < 91%	E
>= 91%	F

Adapted from: D. Husch and J. Albeck, Synchro 7 Studio Users Manual, Trafficware 2006

Intersection Queuing Analysis Methodology

As stated in section 405.2 (2) (e) Left Turn Channelization of the Caltrans Highway Design Manual, "At signalized intersections, the storage length may be based on one and one-half to two times the average number of vehicles that would store per signal cycle depending on cycle length, signal phasing, and arrival and departure rates. As a minimum, storage length should be calculated in the same manner as a non-signalized intersection. At non-signalized intersections, storage length may be based on the number of turning vehicles likely to arrive in an average 2-minute period during the peak hour. As a minimum, space for 2 passenger cars should be provided at 7.5 meter per car." Using the customary unit measurement equivalent of 25 feet per vehicle in place of 7.5 meters results in the following equation for the required storage length:

Storage Length (1) = 25 ft/veh x Maximum of (2, or vph/lane/30, or 1.5 x Mean Queue/lane)
Where: vph = the peak hour arrival rate in vehicles per hour.

Estimation of the mean queue per lane requires a traffic operations analysis of the intersection to compute the appropriate signal cycle length, signal phasing, and green times per cycle. However, this analysis can be avoided by conservatively assuming a long cycle length of 140 seconds and then assuming that all arriving vehicles during that cycle must be stored (in other words, the signal is assumed to stay red for a full 140 seconds), and multiplying the number of stored vehicles by 1.5 rather than 2.0. The result is a moderately conservative estimate of the required storage.

Applying this moderately conservative assumption to the Caltrans requirements results in the following equation for estimating the required storage length:

Storage Length (2) = 25 ft/veh x Maximum of (2 or vph/lane/30, or 1.5 x 140 sec x vph/lane/3600)

The above methodology was applied to estimate left turn storage length requirements for the US-50/Silva Valley Parkway interchange ramp intersections.

Freeway Level of Service Methodology

The HCM/HCS analysis method was used to evaluate US-50 mainline and ramp operations (basic, weave, and merge-diverge) from Bass Lake Road to Empire Ranch Road. Freeway and ramp merge-diverge LOS criteria are based on vehicle density expressed in passenger cars per mile per lane (pc/mi/ln) per hour. LOS criterion for freeways and ramps are shown in Table 4.

All highway segment volumes were adjusted to reflect passenger car equivalents based on the Caltrans truck classification data. Ideal hourly lane capacities were based on the HCM 2000 maximum flow rates for basic freeway segments with design speeds of 70 mph. Per HCM, average on- and off-ramp speeds of 30 mph and 35 mph respectively were assumed. A peak hour factor of .92 was applied as part of the base year analysis.

Table 4: Freeway and Ramp LOS Criteria

Level of Service Criteria For Basic Freeway Segments				
Level of Service	**Density pc/mi/ln FFS = 70**	**Density pc/mi/ln FFS = 65**	**Density pc/mi/ln FFS = 60**	**Density pc/mi/ln FFS = 55**
A	11	11	11	11
B	18	18	18	18
C	26	26	26	26
D	35	35	35	35
E	45	45	45	45
F	-	-	-	-

Level of Service Criteria For Ramp Merge-Diverge Areas	
Level of Service	**Density pc/mi/ln**
A	≤ 10
B	> 10-20
C	> 20-28
D	> 28-35
E	> 35
F	-

For merge diverge areas, HCM LOS criteria for LOS A through LOS E reflects vehicle densities operating at stable flow, with no breakdowns within the merge influence area (defined as 1,500 ft downstream from ramp juncture) or diverge influence area (1,500 ft upstream from ramp juncture). LOS F conditions reflect unstable flow – turbulence that causes freeway speeds to drop below 35 mph within the merge-diverge influence area. Weave sections exist where ramp distances are less than 1,500 ft.

As stated in Chapter 25 of the HCM 2000 (Ramps and Ramp Junctions), the HCM methodology does not take into account nor is it applicable to (without modifications by the analyst) special lanes such as: HOV lanes; Truck Only Lanes; or, Auxiliary Lanes. Given that US-50 will be widened to provide HOV lanes, truck climbing lanes, and auxiliary lanes all within the study area – assumptions were required to reflect the operational impact of these special lane types at ramp junctures. How these special lanes are addressed in this analysis is described below.

HOV Lanes:
Existence of an HOV lane was controlled for by removing the number of HOV vehicles using the mixed flow lanes. The percent of US-50 traffic volume that is comprised of high occupancy vehicles is 11.5 percent (Source: PEMs). For US 50 freeway segments with an HOV lane, the peak hour volume on the mixed flow lanes can be reduced by 11.5 percent and the HOV lane removed from the analysis.

Truck Climbing Lanes:
Given that truck climbing lanes are available to all vehicles, they can operate as mixed flow lanes for analysis. To counter-balance the fact that a truck climbing lane will have a lower maximum flow rate than a mixed flow lane, the percentage of heavy duty trucks should be retained for all lanes – even though the existence of a truck climbing lane will likely result in most trucks exiting the mixed flow lanes to utilize the truck climbing lane on sections characterized by uphill grades.

Auxiliary Lanes:
Auxiliary lanes are planned for both directions connecting three interchanges (future Empire Ranch I/C, El Dorado Hills I/C and future Silva Valley I/C) spanning approximately 2.5 miles in length. Given this 2.5 mile continuous stretch of ramp to ramp capacity, the auxiliary lanes were defined as an additional mixed flow lane for analysis purposes.

Criteria of Significance

County Facilities

El Dorado County's desired level of service (LOS) is LOS D, although the General Plan allows LOS E with the "community areas" like El Dorado Hills. The County's LOS threshold is based on the average of each all movements within the intersection.

State Facilities

For purposes of this study, an LOS standard of LOS D is assumed for all state facilities (freeway mainline, merge-diverge ramp influence areas and ramp intersections).

Significant Impact

Consistent with El Dorado County's General Plan Policy TC-Xe, a significant project impact results when LOS is degraded from acceptable (LOS A – E) to unacceptable conditions (LOS F). For facilities already operating below the County's desired LOS, a significant impact occurs when a project adds:

1) 10 AM or PM peak hour trips; or,
2) 100 daily trips; or,
3) 2% of the total of all intersection approach volumes.

Traffic Forecast Methodology

The traffic forecasts for the 2010, 2020 and 2030 analysis years were based on the El Dorado County DOT traffic model. For 2010 and 2020, travel forecasts were performed for both the on-project and with-project conditions. For the 2030 analysis year, traffic forecasts were performed for only the with-project condition.

The traffic volumes for the 2020 interim year analysis were linearly interpolated between the 2010 and 2030 forecasts.

Traffic forecasts for the 2030 analysis were based on the 2025 El Dorado County DOT traffic model. The 2027 SACMET model was also applied to ascertain the relative trip diversion impact of roadway improvements located outside of the El Dorado DOT modeling domain. These include the Empire Ranch interchange, the Empire Ranch Extension from US-50 down to White Rock and Saratoga Way Extension. The relative changes resulting from these improvements were used to post process the County DOT model volumes. All model volumes were extrapolated based model and link specific annual average growth factors to reflect 2030 traffic conditions. For each forecast, model post-processing adjustments were applied as follows.

NCHRP-255 Adjustment

To address systematic modeling error, post-processing based on the NCHRP Report 255, 1982 were performed. NCHRP-255 adjustments entail measuring the difference (in absolute and ratio terms) between base year model volumes and the base year traffic counts and applying this mathematical relationship to adjust model forecasts. NCHRP-255 adjustments are applied only to segments that exist in the model base year.

Commercial Truck Adjustment

Given that the El Dorado County DOT traffic model does not directly forecast commercial truck activity, heavy-duty truck volume adjustments were applied to modeled volumes based on published Caltrans truck volume data for US-50.

Seasonal Adjustment

Per direction from El Dorado County DOT, traffic model output was not adjusted to account for seasonal variation. Based on Caltrans count data for US-50, average peak month traffic volumes are generally 8 percent greater than the annual average.

Peak Hour Adjustment

Daily volumes were factored by 8 and 10 percent to generate AM and PM peak hour roadway volumes respectively. These peak hour percentages are slightly more conservative than measured AM/PM peak hour percentages. It is assumed that the existing AM/PM percentages reflect some degree of peak spreading. Assuming higher peak hour percentages in the forecast compensates for this latent demand (motorists who would prefer to travel in the peak hour if adequate peak hour capacity was provided).

Peak Hour Directional Distribution

Peak hour directional factors by facility were based on the AM and PM peak hour El Dorado County DOT travel model and the peak period SACMET model as appropriate.

Peak Hour Intersection Turning Movements

A refinement process called the Furness Method was applied to derive individual turning movements. This is required given that travel models are calibrated to produce accurate results on road segments, not individual turn movements. The Furness Method iteratively adjusts turning movement ground counts until the directional sum of the movements balance to the fully adjusted future link volumes. This factoring process produces forecast turn distributions that resemble the count distribution, but turn movement proportions will change in response to different growth rates on different legs as produced by the El Dorado County DOT Model. For intersections with no available count data, modeled turn movements using the peak hour DOT model were used to “seed” the Furness process.

All future year turn movement volumes were refined and quality controlled to ensure a reasonable balance between intersections. After the balancing checks, all turning movements were input into the intersection operation analysis software SYNCHRO-7 to estimate peak hour intersection level of service and length of queue. A future peak hour factor of .92 was used at all study area locations.

2007 Existing Conditions

Following is a brief description of key roadways located in the study area.

US-50 is an east-west freeway facility serving El Dorado County. East of the El Dorado Hills Blvd/Latrobe Road interchange it is four lanes wide and west of the interchange it is six lanes with four mixed flow and two high occupancy vehicle (HOV) lanes.

El Dorado Hills Blvd/Latrobe Road is a 4- to 6-lane north-south arterial facility serving El Dorado Hills Community. North of US-50, it is named as El Dorado Hills Blvd and south of US-50, it is named as Latrobe Road.

Empire Ranch Road is a north-south arterial serving the City of Folsom. It is a six-lane facility between Iron Point Road and Broadstone Parkway and a four-lane facility north of Broadstone Parkway. Plans are to extend Empire Ranch Road south to a new interchange with US-50 freeway and ultimately extend Empire Ranch Road south of US-50 to a possible connection with White Rock Road.

Silva Valley Parkway is north-south arterial serving El Dorado Hills Community. It is a 4-lane facility south of Harvard Way and a 2-lane facility south of Entrada Way.

Saratoga Way is a two-lane east-west collector serving El Dorado Hills Community. Saratoga Way will be extended to link Empire Ranch Road with El Dorado Hill Blvd north of US-50 to provide secondary access to US-50 from Empire Ranch and El Dorado Hills.

Country Club Drive is a two-lane east-west collector serving El Dorado Hills Community. Country Club Drive will be extended to link Silva Valley Parkway with Bass Lake Road and Cameron Park north of US-50 to provide secondary access to US-50 from Bass Lake Road, Silva Valley Parkway and El Dorado Hills Blvd.

Serrano Parkway is a two-lane east-west collector. Serrano Parkway will extend from El Dorado Hills Blvd to Bass Lake Road north of US 50 to provide secondary access to US 50 from Silva Valley, El Dorado Hills Blvd. and Bass Lake Road.

White Rock is a 2-lane facility that will be widened to 4-lanes from the new Silva Valley Parkway Interchange to Latrobe Road and from Manchester Drive to Sacramento County Line as identified in the 2008 Capital Improvement Program.

2007 Traffic Volumes

State Highway Segment Volumes

Daily traffic volumes for the US-50 freeway mainline and ramps, weekday AM and PM peak hour factors and directional split factors based on published Caltrans data for 2007.

Caltrans annually publishes truck traffic volumes based on a sample of continuous weigh-in-motion traffic count locations that are adjusted for consistency. For each route

segment, AADT by axle group (2-axle to 5+ axle trucks) is reported. Percentage of truck traffic relative to daily traffic volumes for US-50 were based on the most recently published truck volume report by Caltrans.

AM/PM peak hour US-50 mainline volumes were balanced to ramp volumes within the study area. After balancing checks, mainline/ramp volumes were input into the Highway Capacity Software (HCS) operational analysis software to estimate peak hour ramp (merge-diverge) and mainline LOS.

County Roadway Segment Volumes

For non-state local county roadways, the most recent traffic counts from the El Dorado County DOT traffic data base were obtained. Three additional data sources were also examined: The US-50 Strategic Corridor Operations Study (Dowling Associates, March 2006), the Saratoga Way Extension traffic analysis (Dowling Associates) and the El Dorado Hills Traffic Volume Development Final Report (Wilbur Smith Associates, August 2006). More recent traffic counts were used in lieu of these counts if available. Local County roadway segment (mainline and ramp) counts were adjusted based on historical annual average growth rates to reflect 2007 conditions.

Figure 3 presents the 2007 daily traffic volumes within the study area. Figure 4 presents the AM/PM peak hour US-50 freeway mainline and ramp volumes used as inputs to the freeway operations analysis.

Figure 3: 2007 Baseline Segment Average Daily Traffic Volumes

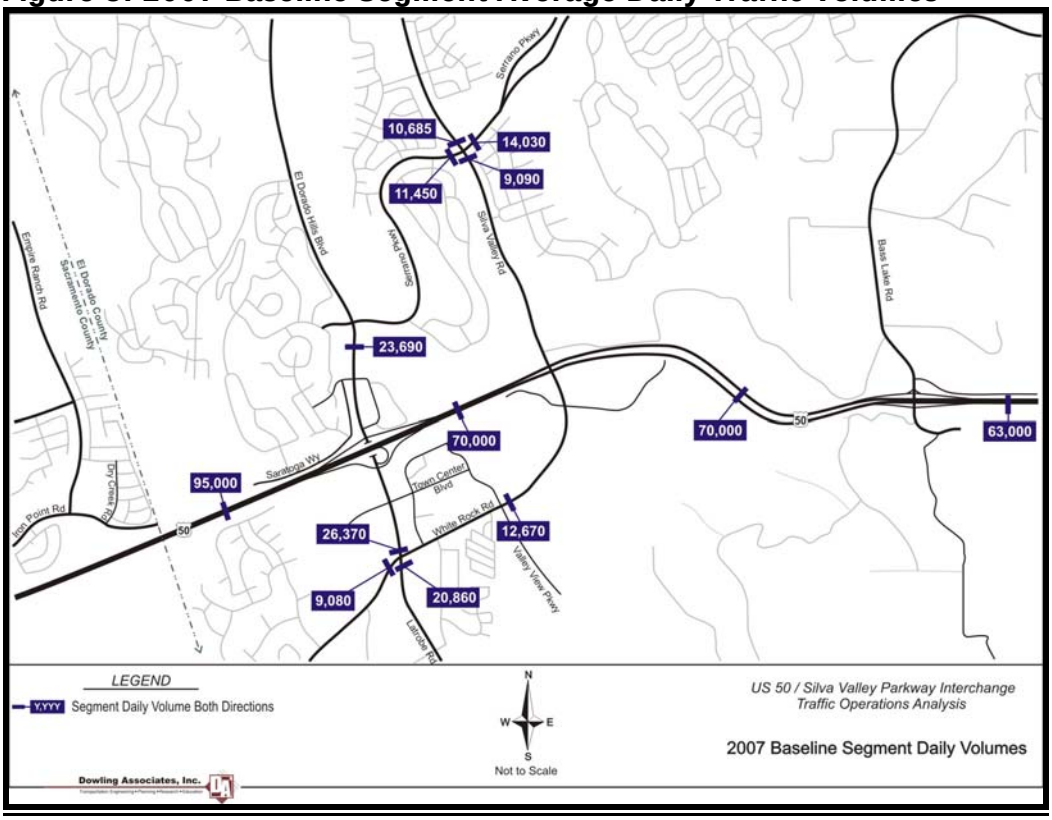
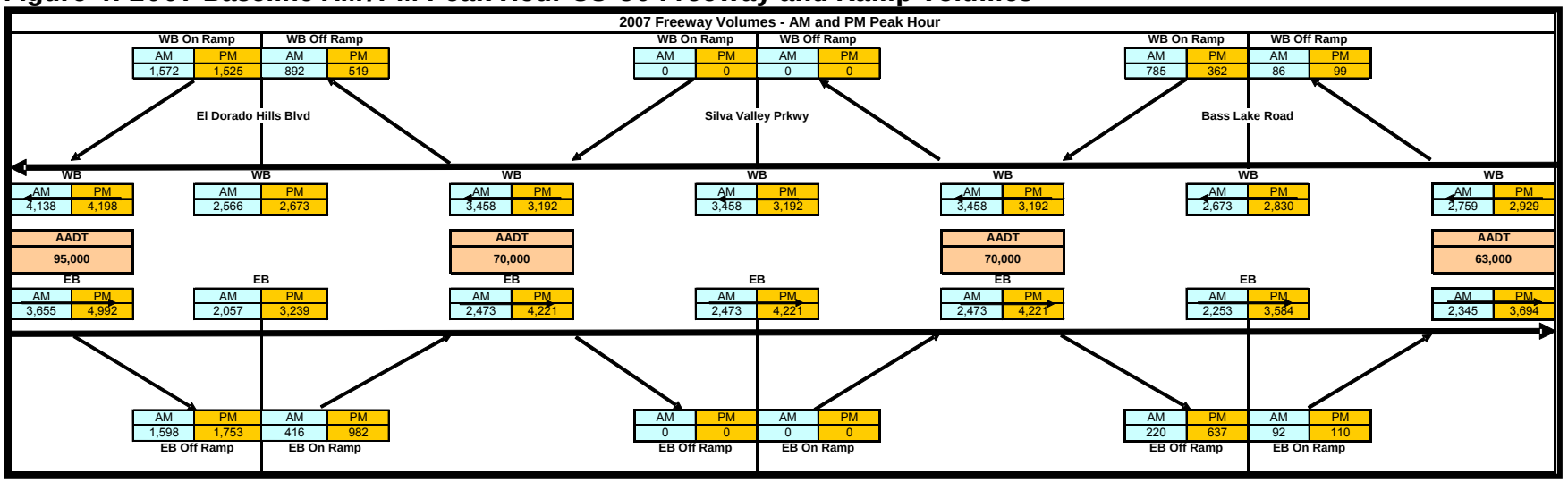


Figure 4: 2007 Baseline AM/PM Peak Hour US-50 Freeway and Ramp Volumes



Intersection Turning Movements

All turning movement counts were adjusted based on historical (or modeled if historical data was not available) annual average growth rates to reflect 2007 conditions. All turning movement volumes were refined and quality controlled to ensure that they balanced between count locations. Between ramp intersections with no intermediate access, perfect balance was maintained. At arterial intersections characterized by limited intermediate access, less than 15 percent imbalance was considered acceptable. After balancing checks, all turning movements were input into the intersection operational analysis software SYNCHRO-7 to estimate peak hour intersection LOS.

Figure 5 provides the 2007 baseline intersection geometry and intersection AM and PM peak hour intersection turning movement volumes.

2007 Traffic Signal Warrants Analysis

At each non-signalized intersection, the potential need for a traffic signal was evaluated. Traffic signal warrants are a series of standards that provide guidelines for determining if a traffic signal is appropriate. If one or more signal warrants are met, signalization of the intersection may be appropriate. However, a signal should not be installed if none of the warrants are met, since the installation of signals would increase delays on the previously uncontrolled major street, and may increase the occurrence of particular types of accidents.

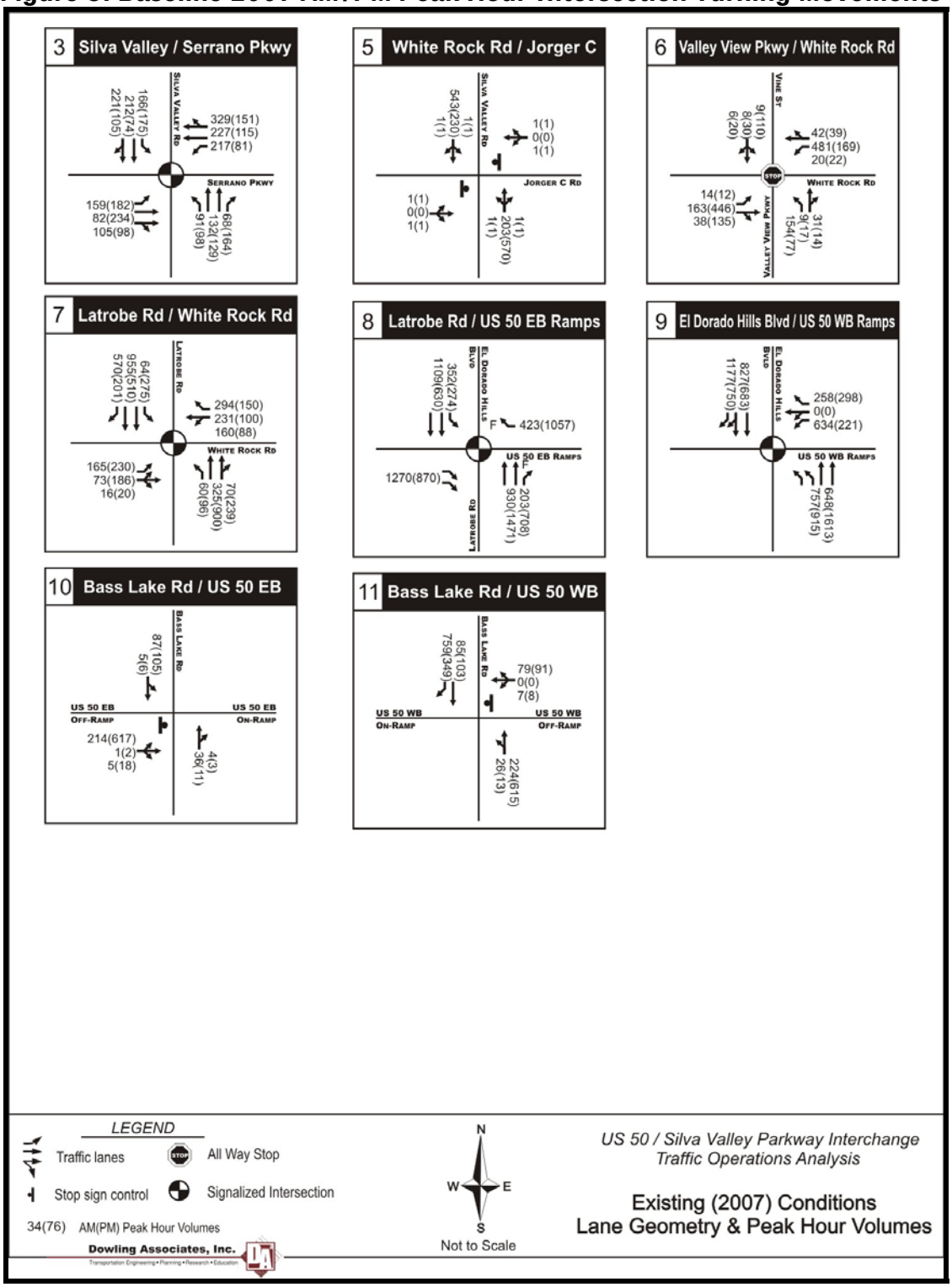
As stated in the 2003 edition of the Manual on Uniform Traffic Control Devices (MUTCD), "An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location. The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location[1]:"

- Warrant 1, Eight-Hour Vehicular Volume;
- Warrant 2, Four-Hour Vehicular Volume;
- Warrant 3, Peak Hour;
- Warrant 4, Pedestrian Volume;
- Warrant 5, School Crossing;
- Warrant 6, Coordinated Signal System;
- Warrant 7, Crash Experience; and,
- Warrant 8, Roadway Network.

"The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal."

[1] (Chapter 4C of the California MUTC, as of September 26, 2006)

Figure 5: Baseline 2007 AM/PM Peak Hour Intersection Turning Movements



This study evaluated only three of the eight warrants, the 8-hour (Warrant #1), 4-hour (Warrant #2), and peak 1-hour (Warrant #3) traffic signal warrants. The results are shown in Table 5.

- The two intersections of Bass Lake Road with US-50 ramps both meet one or more of the volume warrants under existing conditions.

Given available data is limited to peak hour volumes, the 4-hour and 8-hour volumes required for Warrants #1 and #2 were estimated by factoring the forecasted peak one-hour volumes. A factor of 3 was applied to the peak hour volumes to obtain an estimate of the 4-hour volume. An expansion factor of 5 was applied to obtain an estimate of the 8-hour volume.

Note that the MUTCD states that, "The [peak hour] signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time." Consequently, the peak hour signal warrant is being used as an indicator in this analysis.

This traffic analysis is a "planning level" analysis of a selected subset of warrants using estimated data. Many of the intersections evaluated do not yet exist. Consequently, many of the Caltrans warrants could not be computed, since they require historical information or field inspection. Therefore, this planning level analysis of signal warrants should NOT be considered to take the place of a full engineering signal warrant analysis.

Table 5: Baseline Signal Warrant Analysis 2007

		Major Street (Both Approaches)			Minor Street (Single Approach)			Warrant 1	Warrant 2	Warrant 3
	Intersection	Pk Hr vph	4-hr vph	8-hr vph	Pk Hr vph	4-hr vph	8-hr vph	Met?	Met?	Met?
5	White Rock & Jorger C	804	603	503	2	2	1	No	No	No
10	Bass Lake & US-50 EB	125	94	78	637	478	398	No	Yes	Yes
11	Bass Lake & US-50 WB	1094	821	684	99	74	62	Yes	Yes	Yes

Entries are traffic volumes.
Rural (70%) volume warrants used since speed limits are greater than 40 mph.

2007 Existing Conditions Intersection LOS Analysis

Table 6 shows the AM and PM peak hour intersection LOS results.

The results indicate that during AM peak hour conditions, all intersections currently operate at LOS D or better. Individual movements however operate deficiently at the US-50 WB-Ramp/El Dorado Hills Blvd on the westbound and southbound approaches. The northbound left turn movement at the County intersection at White Rock and Latrobe also experiences excessive delay during the AM peak hour. The PM peak hour LOS results show all intersections operating at LOS D or better with the exception of individual movements at some intersections. Detailed LOS worksheets are provided in Appendix B.

Table 6: 2007 Existing Conditions - Intersection Level of Service Summary

#	Node	Intersection	Control	AM Peak Hour			PM Peak Hour		
				v/c	Delay (secs)	LOS	v/c	Delay (secs)	LOS
3	113	Silva Valley Pkwy/Serrano Pkway	Signal	0.55	25	C	0.54	20	B
5	115	Silva Valley Pkwy/Jorger Cutoff	2-Way Stop	0.39	~0	A	0.41	~0	A
6	116	Valley View/White Rock Road	Signal	0.55	26	C	0.58	25	C
7	117	Latrobe Road/White Rock Road	Signal	0.78	30	C	0.89	47	D
8	118	El Dorado Hills-Latrobe/US-50 EB	Signal	0.87	19	B	0.72	15	B
9	119	El Dorado Hills/US-50 WB	Signal	0.83	23	C	0.90	29	C
10	120	Bass Lake Rd/US-50 EB	2-Way Stop	0.31	10	A	0.55	57	A
11	121	Bass Lake Rd/US-50 WB	2-Way Stop	0.76	1	D	0.71	2	C

Average delay for 2-way stops is average of delay for major (unstopped) and minor (stopped) movements.
V/C ratio for 2-way stops is Synchro ICU ratio. All other v/c ratios computed per HCM.
LOS for 2-way stops is based in ICU ratio (per Synchro method). All other LOS results are per HCM

2007 Existing Condition Queue Storage Requirements

The Caltrans Highway Design Manual required storage lengths for 2007 existing conditions are summarized in Table 7. Note that the entries in the table are total "available" and total "required" storage lengths in feet summed over the left turn lanes. Thus the required storage in feet should be divided by the number of left turn lanes to obtain the required storage length per lane.

Table 7: Required Left Turn Storage – 2007 Baseline

Left Turn Pocket Requirements			Existing Conditions - 2007		
Intersection	Control	Dir	Available Storage (ft)	Max AM/PM (vph)	Required Storage (ft)
3.Silva Valley & Serrano	Signal	NB	250	98	150
		SB	150	175	150
		EB	150	182	175
		WB	330	217	200
5.White Rock & Jorger C	2-Way	NB	N/A	N/A	N/A
	Stop	SB	N/A	N/A	N/A
		EB	N/A	N/A	N/A
		WB	N/A	N/A	N/A
6.Valley Vw & White Rock	Signal	NB	100	154	225
		SB	100	110	100
		EB	100	14	50
		WB	100	22	50
7.Latrobe & White Rock	Signal	NB	275	96	150
		SB	250	222	200
		EB	50	230	200
		WB	400	160	150
8.El Dorado & US-50 EB	Signal	NB	N/A	N/A	N/A
		SB	150	274	250
		EB	N/A	N/A	N/A
		WB	N/A	N/A	N/A
9.El Dorado & US-50 WB	Signal	NB	750	915	1350
		SB	N/A	N/A	N/A
		EB	N/A	N/A	N/A
		WB	600	634	550
10.Bass Lake & US-50 EB	2-Way	NB	N/A	N/A	N/A
	Stop	SB	N/A	N/A	N/A
		EB	800	617	525
		WB	N/A	N/A	N/A
11.Bass Lake & US-50 WB	2-Way	NB	N/A	N/A	N/A
	Stop	SB	N/A	N/A	N/A
		EB	N/A	N/A	N/A
		WB	1000	8	50

Note: Intersections 1, 2 and 4 are not applicable for baseline analysis of left turn storage requirements.

2007 Existing Conditions Freeway LOS Analysis

2007 US-50 Basic Freeway Segment LOS

The results of the freeway analysis under 2007 existing conditions are summarized in Table 8 below. The primary measure of effectiveness for estimating basic freeway segment LOS is vehicle density. Density, expressed in passenger cars per mile per lane, is also provided.

Table 8: 2007 Existing Condition – Freeway LOS Summary

US 50	AM Peak		PM Peak	
	Density [1] pc/mi/ln	LOS [2]	Density [1] pc/mi/ln	LOS [2]
2007 No Project Scenario				
Eastbound				
West of El Dorado Hills [3]	19.31	C	63.12	F
El Dorado Hills to Bass Lake	15.34	B	26.68	D
East of Bass Lake	18.58	C	30.92	D
Westbound				
East of Bass Lake	21.88	C	23.28	C
Bass Lake to El Dorado Hills	21.47	C	17.52	B
West of El Dorado Hills	21.88	C	22.20	C

[1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000

[3] Planned future improvements will mitigate to LOS to D or better.

Results indicate that the freeway mainline west of El Dorado Hills interchange currently experiences unstable flow conditions (LOS F) in the eastbound direction during the PM peak hour. All other freeway mainline sections operate at LOS D or better. Highway Capacity Software LOS worksheets are provided in Appendix C.

2007 US-50 Merge-Diverge Segment LOS

Given that the Silva Valley Interchange is not present under existing conditions, an analysis of ramp merge-diverge influence areas was not performed. Freeway operations at the project location can be surmised from the basic freeway segment LOS results.

2010 Conditions Analysis

This section describes roadway network, forecast volumes, signal warrants, level of service analysis, and intersection left turn storage requirements under 2010 conditions.

2010 Roadway Network

The 2010 interim conditions roadway network was assumed to be same as existing conditions, with the following improvements:

- US-50 between the future Empire Ranch interchange and the El Dorado Hills interchange would include four westbound lanes (HOV, 2-mixed, auxiliary lane) and five eastbound lanes (HOV, 2-mixed, truck lane, auxiliary lane).
- US-50 between the El Dorado Hills interchange and east of the future Silva Valley Parkway interchange would include five lanes in each direction (HOV, 2-mixed, truck lane, auxiliary lane), including four lanes in each direction across the El Dorado Hills/Latrobe Road under-crossing.
- US-50 between the east of the future Silva Valley Parkway interchange and east of the Bass Lake interchange would include four lanes in each direction (HOV, 2-mixed, and EB truck lane and a WB auxiliary lane).
- The US-50 El Dorado Hills Blvd/Latrobe over-crossing expanded from a 6 to 10-lane cross-section with free right-turn movements at the ramp intersections.
- The El Dorado Hills Boulevard & US-50 Eastbound Ramps intersection would have one additional through-lane for the northbound movement.
- Country Club Drive will extend to connect Cameron Park with Silva Valley.
- Serrano Parkway will extend to connect Silva Valley and Bass Lake

In the 1991 Silva Valley Interchange EIR, Old Silva Valley Parkway was left assumed open to thru traffic. In the early stages of the Supplemental EIR and revisions to the Project Report, the County explored closing Old Silva Valley Parkway. The County has since decided to keep Old Silva Valley Parkway open to thru traffic. If continued vehicle access on the Old Silva Valley Parkway is allowed, some motorists may choose to use it as a bypass. For instance, southbound direction through traffic may use the Old Silva Valley Parkway given it only requires two right turns.

However, this is not anticipated to be significant. Northbound traffic will, for the most part, avoid using Old Silva Valley as a bypass due to the greater delay that would be experienced having to negotiate two left turns onto the new Silva Valley Parkway. Hence, for facility sizing purposes and for providing a more conservative analysis at the Silva Valley Interchange ramps, the County directed Dowling Associates to keep ramp volumes consistent with the original traffic study and subsequent memos – which assumes non-significant traffic diversion onto the Old Silva Valley Parkway

2010 Traffic Forecast Results

US-50 and County Roadway Segment Volumes

All segment (mainline and ramp) volumes were post-processed as described previously. AM/PM peak hour volumes were balanced to ramp volumes. Mainline volume reductions to reflect HOV utilization (11.5%) was applied as appropriate. The HCM operational analysis method was used to estimate peak hour ramp (weave and merge-diverge) and mainline LOS. All other HCM inputs (e.g., % trucks, geometrics) were held constant to baseline conditions.

Figure 6 and Figure 7 present the 2010 daily traffic volumes forecasts under the no-project and with-project conditions respectively. Figure 8 and Figure 9 show the AM/PM peak hour US-50 freeway mainline and ramp volumes for the no-project and with-project conditions respectively.

Figure 6: 2010 No-Project Segment Average Daily Traffic Volumes

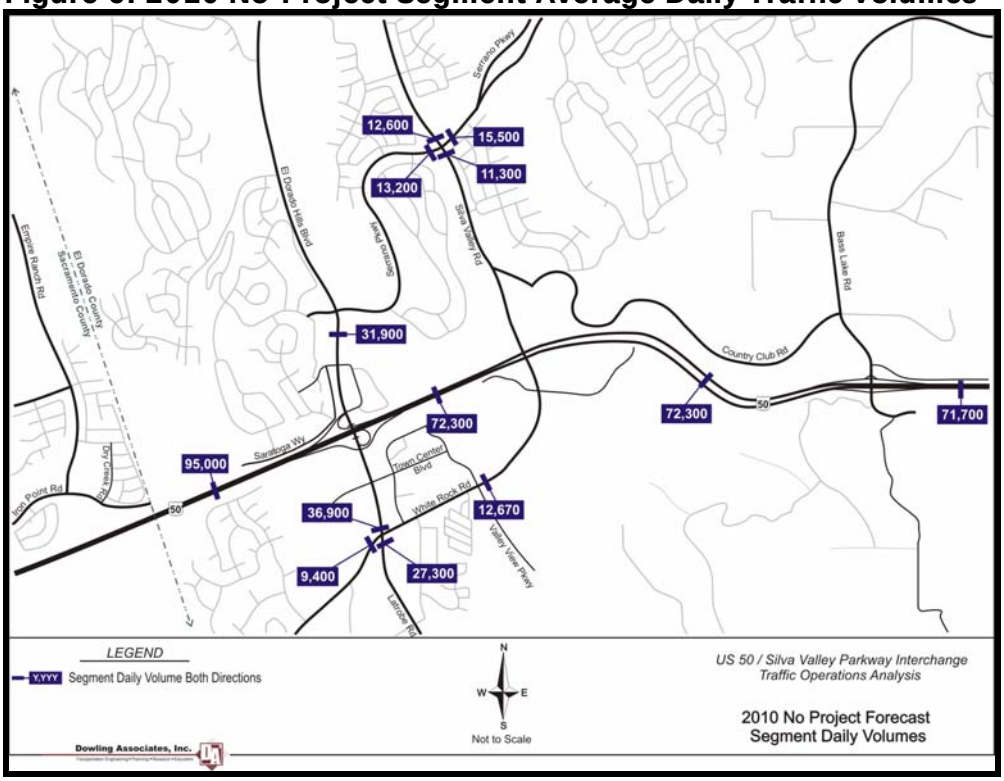


Figure 7: 2010 With-Project Segment Average Daily Traffic Volumes

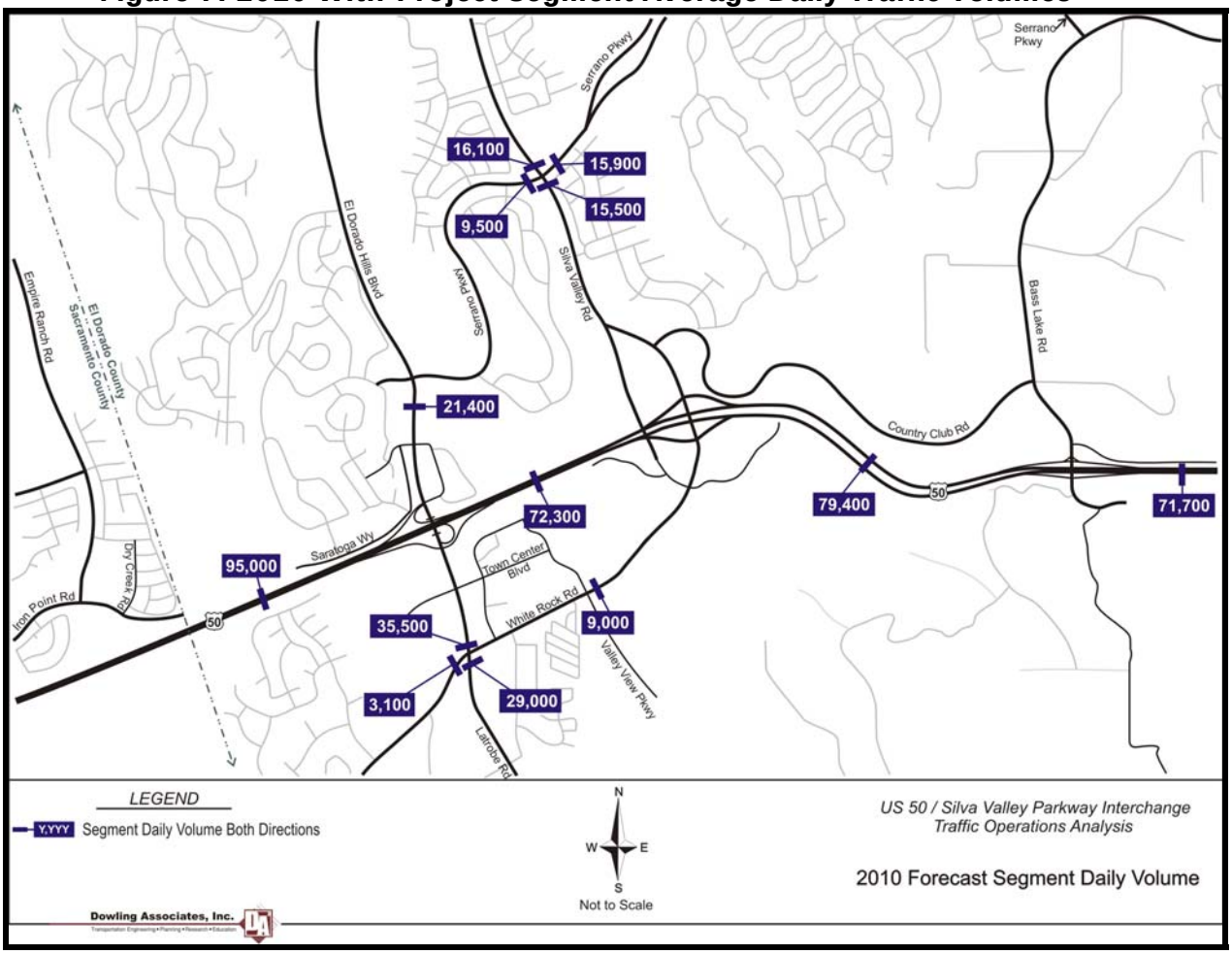


Figure 8: 2010 No-Project AM/PM Peak Hour US-50 Freeway and Ramp Volumes

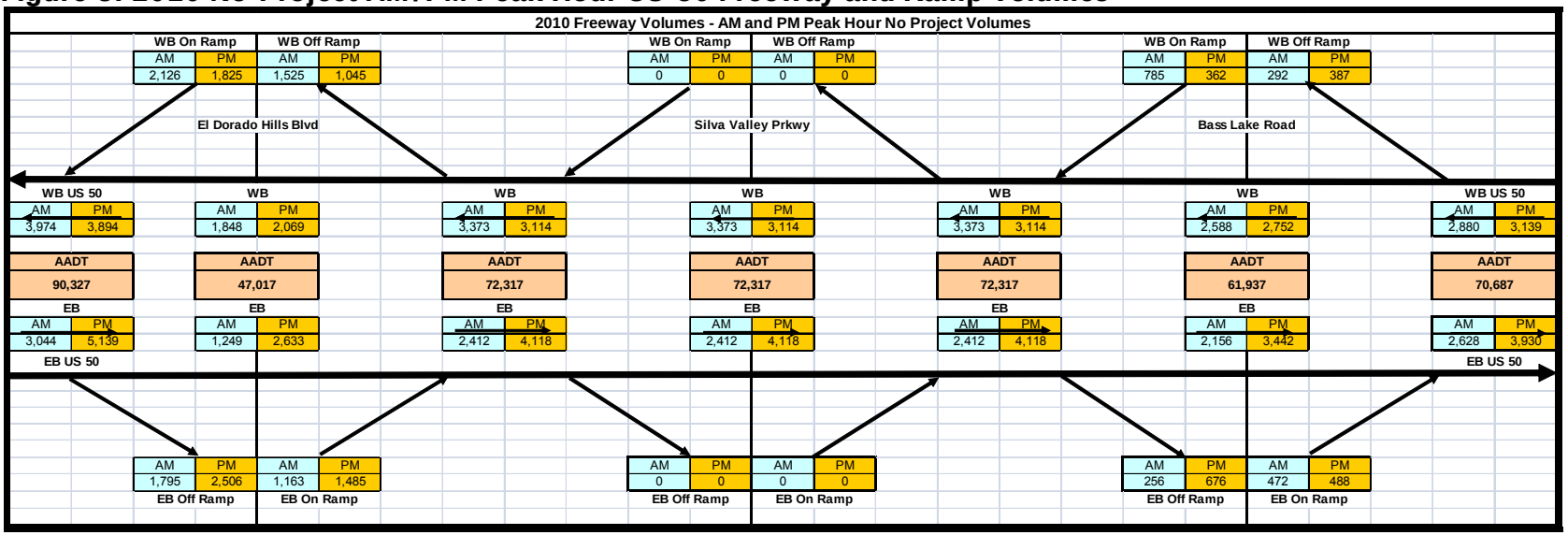
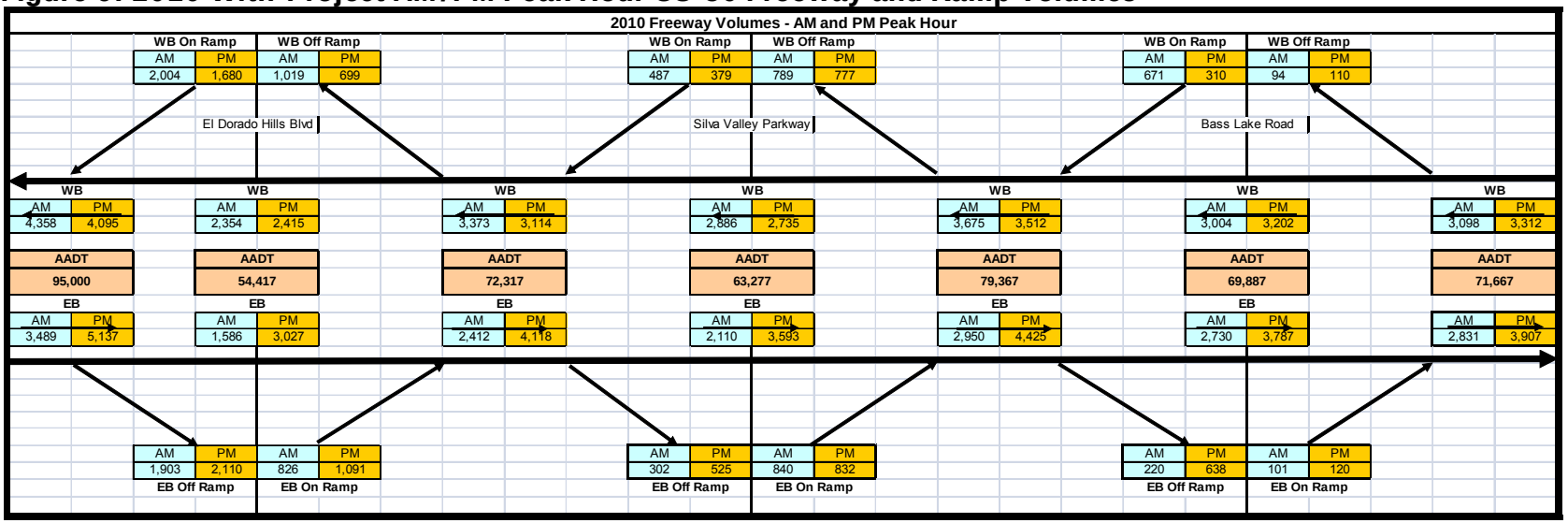


Figure 9: 2010 With-Project AM/PM Peak Hour US-50 Freeway and Ramp Volumes



Intersection Turning Movements

Figure 10 and Figure 11 show the projected 2010 intersection geometry and AM/PM peak hour peak hour turning movement volumes under the no-project and with-project conditions respectively. Intersections presented in order of project phase. Project phases 1, 2 and 3 are denoted with an A, B and C for affected intersections.

Figure 10: 2010 No-Project AM/PM Peak Hour Turning Movements

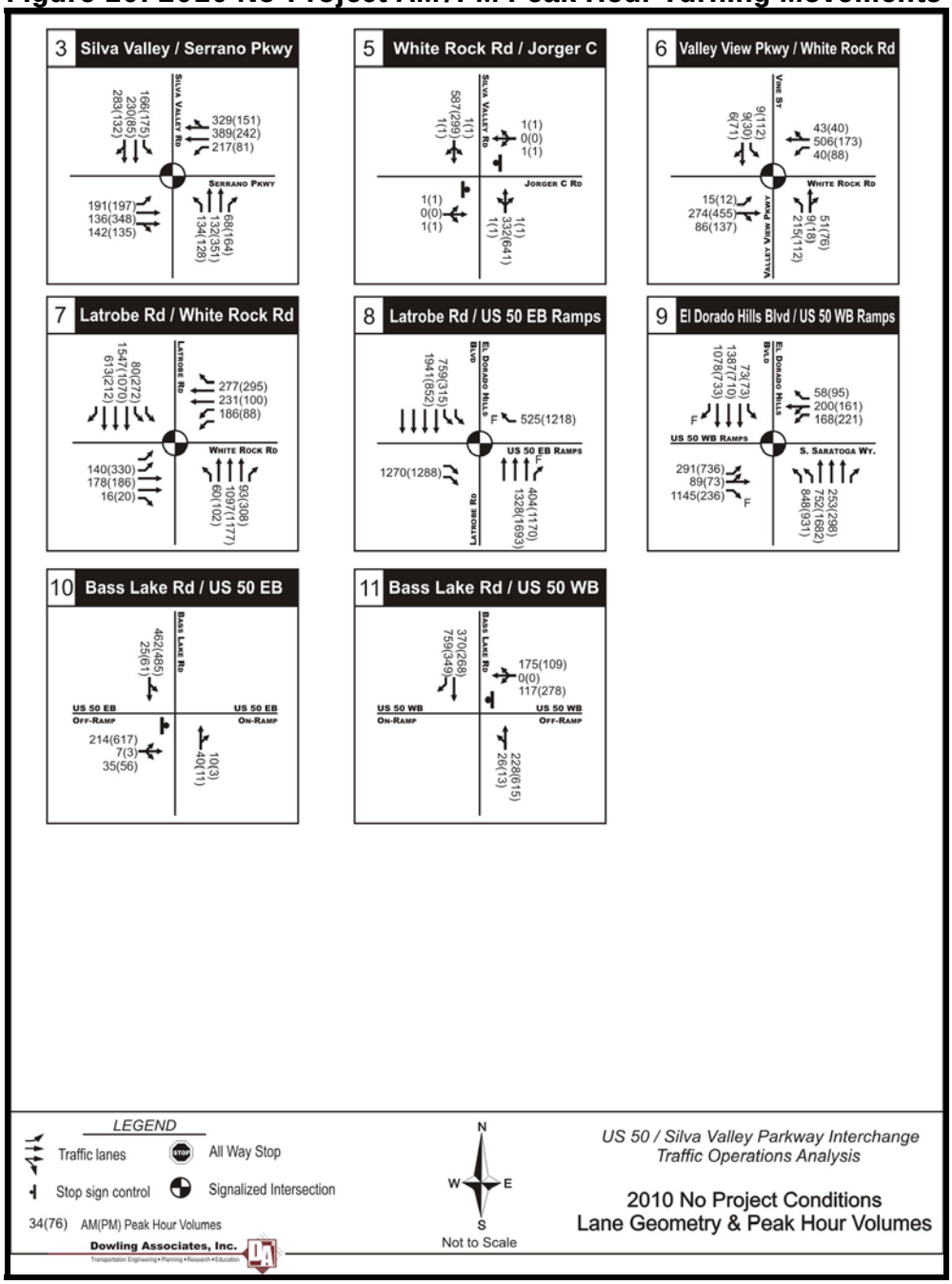
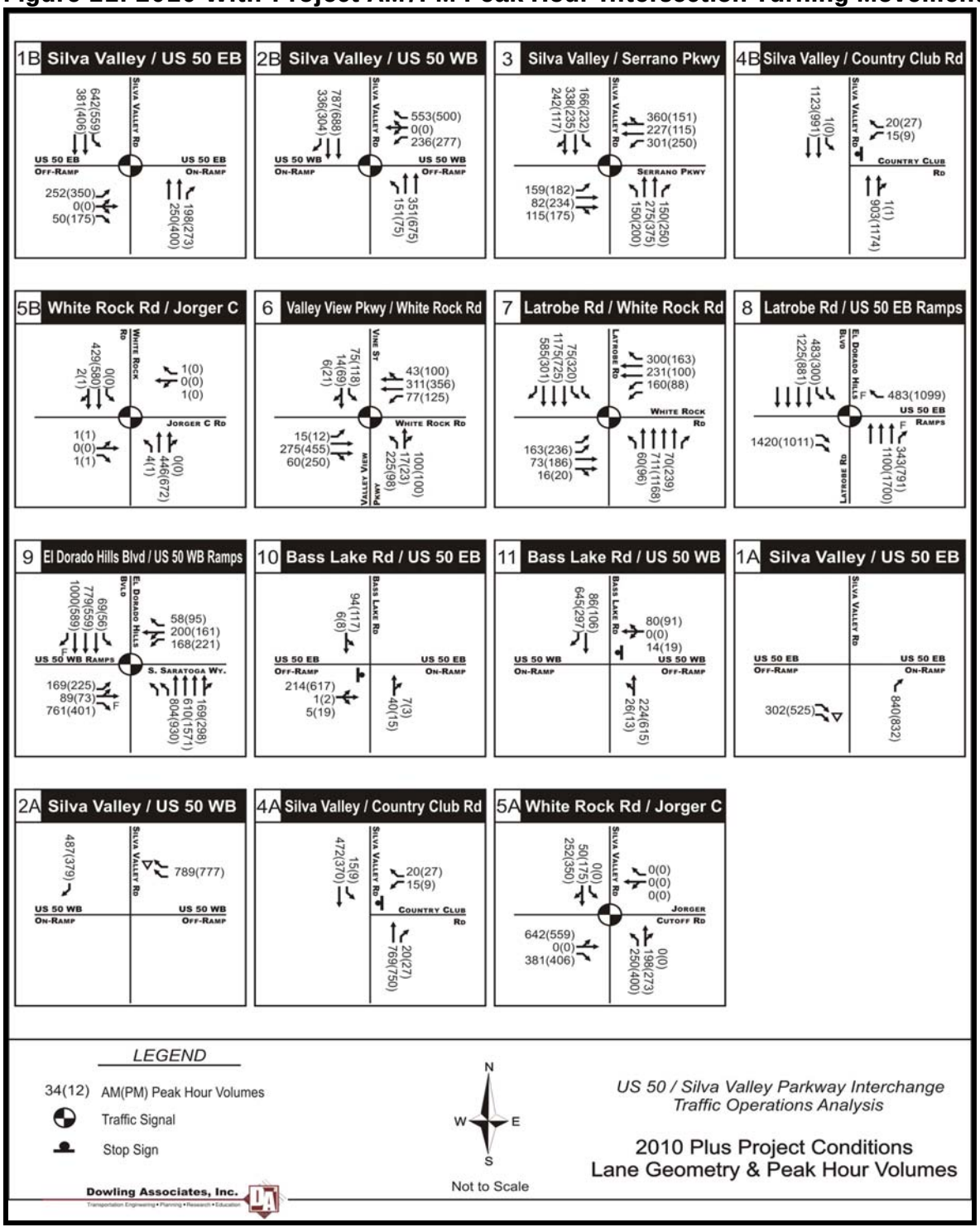


Figure 11: 2010 With-Project AM/PM Peak Hour Intersection Turning Movements



Note: Volumes are identical for Phases 1 and 2 except at Intersections #1, #2, #4, and #5. 1A, 2A, 4A, and 5A show the volumes for Phase 1. 1B, 2B, 4B, and 5B show the volumes for Phase 2.Note: Under Phase 2, Intersection #5 location reflects: Existing Silva Valley / New Silva Valley.

2010 Traffic Signal Warrant Analysis

The 2010 8-hour, 4-hour, and 1-hour traffic signal warrant results are shown in Table 9.

- The two intersections of Bass Lake Road with US-50 ramps both meet one or more of the volume warrants under baseline and 2010 no-project conditions.
- The two future intersections of Silva Valley Pkwy with US-50 both meet one or more of the volume warrants in 2010 for both the Phase 1 project and the Phase 2 project. Hence, warrants will not be recomputed for these intersections for 2020 and 2030.
- The intersection of White Rock with Jorger Cutoff does NOT meet the volume warrants under any of the scenarios evaluated. Although it does not meet the signal warrants, County DOT intends signalize the intersection for sight distance and access reasons (Source: communications with County DOT)

Table 9: Baseline Signal Warrant Analysis 2010

	2010 No-Project	Major Street (Both Approaches)			Minor Street (Single Approach)			Warrant1	Warrant 2	Warrant 3
	Intersection	Pk Hr vph	4-hr vph	8-hr vph	Pk Hr vph	4-hr vph	8-hr vph	Met?	Met?	Met?
1	Silva Valley & US50 EB	Non-existent								
2	Silva Valley & US50 WB	Non-existent								
4	Silva Valley & Cntry Clb	Non-existent								
5	White Rock & Jorger C	944	708	590	2	2	1	No	No	No
10	Bass Lake & US-50 EB	Warrants met in 2007								
11	Bass Lake & US-50 WB	Warrants met in 2007								
	2010 Project	**Major Street (Both Approaches)**			**Minor Street (Single Approach)**			**Warrant1**	**Warrant 2**	**Warrant 3**
	Intersection	**Pk Hr vph**	**4-hr vph**	**8-hr vph**	**Pk Hr vph**	**4-hr vph**	**8-hr vph**	**Met?**	**Met?**	**Met?**
1A	Silva Valley & US50 EB	1198	899	749	1023	767	639	Yes	Yes	Yes
2A	Silva Valley & US50 WB	1912	1434	1195	750	563	469	Yes	Yes	Yes
1B	Silva Valley & US50 EB	1638	1229	1024	525	394	328	Yes	Yes	Yes
2B	Silva Valley & US50 WB	1742	1307	1089	789	592	493	Yes	Yes	Yes
4B	Silva Valley & Cntry Clb	2166	1625	1354	36	27	22	No	No	No
5B	White Rock & Jorger C	944	708	590	2	2	1	No	No	No
10	Bass Lake & US-50 EB	Warrants met in 2007								
11	Bass Lake & US-50 WB	Warrants met in 2007								

Note: 4A and 5A Signal Warrants not computed given that 4B and 5B volumes reflect worst case.

2010 Intersection Level of Service

Table 10 shows the AM and PM peak hour intersection LOS results for the 2010 No-Project Alternative. Table 11 shows the LOS results for 2010 with Phase 2 of the project. Detailed LOS worksheets are provided in Appendix B.

No-Project Results

All of the intersections analyzed for 2010 no-project would operate at acceptable levels of service during the peak hours with the exception of the following:

- #11 Bass Lake Road and US-50 Westbound.

  - The LOS deficiency is caused by high volumes on Bass Lake Road during both peak hours. This intersection meets volume warrants for installing a traffic signal under 2010 no-project conditions. Improvements to the US-50 Bass Lake interchange i.e., the westbound and eastbound ramp intersections are identified in El Dorado County's 10-year long-term Capital Improvement Program. This improvement is reflected in the 2020 and 2030 analysis sections.

- # 10 Bass Lake Road and US-50 Eastbound.

  - This intersection does not exceed the LOS "D" standard for a non-signalized intersection. However the delays are high. The problem is caused by the high eastbound to northbound left turn volume during the PM peak hour at this intersection. This intersection meets volume warrants for installing a traffic signal under 2010 no-project conditions. Improvements to the US-50 Bass Lake interchange i.e., the westbound and eastbound ramp intersections are identified in El Dorado County's Capital Improvement Program. At this time, the improvement is identified as a 10-year long-term CIP project. This improvement is reflected in the 2020 and 2030 analysis sections of this report.

Project Results – Phase 1

All of the intersections analyzed for 2010 Project Phase 1 would operate at an acceptable level of service during the peak hours. In addition, the Silva Valley Interchange project would reduce ramp volumes at Bass Lake Road, causing both intersections to operate at LOS "D" or better in 2010.

Project Results – Phase 2

All of the intersections analyzed for 2010 Project Phase 2 would operate at acceptable levels during the peak hours. In addition, the Silva Valley Interchange project would reduce ramp volumes at Bass Lake Road, causing both intersections to operate at LOS "D" or better in 2010.

Table 10: 2010 No-Project Intersection Level of Service

#	Synch	Intersection	Control	AM Peak Hour			PM Peak Hour		
				V/c	Delay (secs)	LOS	v/c	Delay (secs)	LOS
1	111	Silva Valley Pkwy & US-50 EB	Future						
2	112	Silva Valley Pkwy & US-50 WB	Future						
3	113	Silva Valley Pkwy & Serrano Pkway	Signal	0.62	25	C	0.57	24	C
4	114	Silva Valley Pkwy & Country Club	Future						
5	115	White Rock Rd & Jorger Cutoff	2-Way Stop	0.42	~0	A	0.45	~0	A
6	116	Valley View & White Rock Road	Signal	0.61	25	C	0.66	24	C
7	117	Latrobe Road & White Rock Road	Signal	0.55	19	B	0.60	24	C
8	118	El Dorado Hills/Latrobe & US-50 EB	Signal	0.70	12	B	0.82	6	A
9	119	El Dorado Hills & US-50 WB	Signal	0.88	31	C	0.93	41	D
10	120	Bass Lake Rd & US-50 EB	2-Way Stop	0.55	127	A	0.81	Very Large	F
11	121	Bass Lake Rd & US-50 WB	2-Way Stop	0.88	4	E	0.87	78	E

Average delay for 2-way stops is average of delay for major (unstopped) and minor (stopped) movements.
V/c ratio for 2-way stops is Synchro ICU ratio. All other v/c ratios computed per HCM.

LOS for 2-way stops is based in ICU ratio (per Synchro method). All other LOS results are per HCM
The eastbound left turn coming off of the freeway at Intersection #10, Bass Lake and US-50 EB has very large delay per vehicle (beyond the bounds of validity for the delay estimation method).

Note: LOS for Int #8 assumes NB Approach and NB loop ramp allows free RT.
Note: LOS for Int #9 assumes free EB and SB RT.

Table 11: 2010 Project Intersection Level of Service (Phases 1 & 2)

#	Syn #	Intersection	Control	AM Peak Hour			PM Peak Hour		
				v/c	Delay (secs)	LOS	v/c	Delay (secs)	LOS
1A	111	Silva Valley Pkwy & US-50 EB (Phase 1)	Signal	0.55	2	B	0.55	4	A
2A	112	Silva Valley Pkwy & US-50 WB (Phase 1)	Signal	0.34	7	A	0.31	7	A
1B	111	Silva Valley Pkwy & US-50 EB (Phase 2)	Signal	0.65	22	C	0.73	22	C
2B	112	Silva Valley Pkwy & US-50 WB (Phase 2)	Signal	0.55	20	C	0.52	12	B
3	113	Silva Valley Pkwy & Serrano Pkwy	Signal	0.59	26	C	0.67	27	C
4A	114	Silva Valley Pkwy & Country Club (Phase 1)	2-Way Stop	0.51	~0	A	0.50	1	A
4B	114	Silva Valley Pkwy & Country Club (Phase 2)	2-Way Stop	0.41	~0	A	0.43	~0	A
5A	115	White Rock Rd & Jorger Cutoff (Phase i)	Signal	0.73	34	C	0.99	64	E
5B	115	White Rock Rd & Jorger Cutoff (Phase 2)	Signal	0.42	13	B	0.45	12	B
6	116	Valley View & White Rock Road	Signal	0.37	21	C	0.60	21	C
7	117	Latrobe Road & White Rock Road	Signal	0.56	16	B	0.50	20	B
8	118	El Dorado Hills/Latrobe & US-50 EB	Signal	0.67	6	A	0.78	7	A
9	119	El Dorado Hills & US-50 WB	Signal	0.76	17	B	0.77	22	C
10	120	Bass Lake Rd & US-50 EB	2-Way Stop	0.31	10	A	0.56	72	B
11	121	Bass Lake Rd & US-50 WB	2-Way Stop	0.69	1	C	0.68	2	C

Average delay for 2-way stops is average of delay for major (unstopped) and minor (stopped) movements.
V/c ratio for 2-way stops is Synchro ICU ratio. All other v/c ratios computed per HCM.
LOS for 2-way stops is based in ICU ratio (per Synchro method). All other LOS results are per HCM
Note that the LOS for intersection #6, Valley View and White Rock, has been computed assuming that White Rock remains a 2-lane road even with the proposed project. Thus if the project widens White Rock to 4 lanes, the LOS will be better than that shown here.
Note: LOS for Int #8 assumes NB Approach and NB loop ramp allows free RT.
Note: LOS for Int #9 assumes free EB and SB RT.
Note: Under Phase 2, Intersection #5 location reflects: Existing Silva Valley / New Silva Valley.
* The intersection of Jorger Cut-Off and White Rock Road was analyzed alternatively as a signalized intersection at the request of DOT

• 2010 Queue Storage Requirements

The required queue storage lengths for 2010 project and no-project conditions are presented in Table 12.

Table 12: Required Left Turn Storage – 2010

Left Turn Pocket Requirements			2010 No-Project		2010 Project	
Intersection	Control	Dir	Max AM/PM (vph)	Required Storage (ft)	Max AM/PM (vph)	Required Storage (ft)
1A Silva Valley & US50 EB (Phase 1)	Signal	NB	N/A	N/A	400	350
		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	642	550
		WB	N/A	N/A	N/A	N/A
2A Silva Valley & US50 WB (Phase 1)	Signal	NB	N/A	N/A	675	575
		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	277	250
1B Silva Valley & US50 EB (Phase 2)	Signal	NB	N/A	N/A	N/A	N/A
		SB	N/A	N/A	642	550
		EB	N/A	N/A	350	300
		WB	N/A	N/A	N/A	N/A
2B Silva Valley & US50 WB (Phase 2)	Signal	NB	N/A	N/A	151	150
		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	277	250
3.Silva Valley & Serrano	Signal	NB	134	125	200	175
		SB	175	150	232	200
		EB	197	175	182	175
		WB	217	200	301	275
4.Silva Valley & Cntry Clb	Signal	NB	N/A	N/A	N/A	N/A
		SB	N/A	N/A	1	50
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	1	50
5.White Rock & Jorger C	2-Way Stop	NB	N/A	N/A	4	50
		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	1	50
		WB	N/A	N/A	1	50
6.Valley Vw & White Rock	Signal	NB	215	200	225	200
		SB	112	100	118	100
		EB	15	50	15	50
		WB	88	75	125	125
7.Latrobe & White Rock	Signal	NB	102	100	96	100
		SB	272	250	320	275
		EB	330	275	236	200
		WB	186	175	160	150
8.El Dorado & US-50 EB	Signal	NB	N/A	N/A	N/A	N/A
		SB	759	650	483	425

Left Turn Pocket Requirements			2010 No-Project		2010 Project	
Intersection	Control	Dir	Max AM/PM (vph)	Required Storage (ft)	Max AM/PM (vph)	Required Storage (ft)
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	N/A	N/A
9.El Dorado & US-50 WB	Signal	NB	931	800	930	775
		SB	73	75	69	75
		EB	736	625	225	200
		WB	221	200	221	200
10.Bass Lake & US-50 EB	2-Way	NB	N/A	N/A	N/A	N/A
	Stop	SB	N/A	N/A	N/A	N/A
		EB	617	525	617	525
		WB	N/A	N/A	N/A	N/A
11.Bass Lake & US-50 WB	2-Way	NB	N/A	N/A	N/A	N/A
	Stop	SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A
		WB	278	250	19	50

2010 Freeway Level of Service

US-50 Basic Freeway Segments LOS Results

This analysis assumes that US-50 will be widened to reflect the lane configuration shown previously in Figure 1b. Generally, this includes the following ultimate lane configuration:

- From Future Empire Ranch to El Dorado Hills Interchange:
  - Westbound 5-lanes (HOV, 3-mixed, auxiliary lane)
  - Eastbound 5-lanes (HOV, 2-mixed, truck climbing, auxiliary lane)
- From El Dorado Hills Interchange to just east of future Silva Valley Parkway:
  - Westbound 5-lanes (HOV, 2-mixed, auxiliary lane)
  - Eastbound 5-lanes (HOV, 2-mixed, truck climbing, auxiliary lane)
- From east of future Silva Valley Interchange to east of Bass Lake:
  - Westbound 4-lanes (HOV, 2-mixed, auxiliary lane)
  - Eastbound 4-lanes (HOV, 2-mixed, truck climbing)

Peak hour traffic conditions were evaluated for future 2010 conditions. Based on HCM 2000, downgrade terrain should be treated as "Level" terrain and passenger car equivalent value of 1.5 should be used. To gauge the accuracy of the 6% heavy duty truck assumption at the Bass Lake WB on-ramp, classification counts were performed at all the Bass Lake Road ramps in April 2010. Three day count data (Tuesday – Thursday) indicated less than 1% heavy duty trucks on Bass Lake Road WB on-ramp during the AM and PM peak hours. As such, a 2% heavy duty truck proportion was assumed. Table 13 shows the classification count summary for the Bass Lake ramps.

Table 13: Bass Lake Ramp Classification Counts, April 2010

Location	Dir	Ramp Type	AM % 3+ Axles	PM % 3+ Axles
Bass Lake	EB	Off	2.13%	0.83%
Bass Lake	EB	On	0.80%	0.26%
Bass Lake	WB	Off	1.39%	0.58%
Bass Lake	WB	On	0.42%	0.56%

Table 14 presents the level of service results for the study freeway mainline segments. Detailed HCM level of service worksheets for US-50 basic freeway segments are provided in Appendix C. Under both the no-project and with-project conditions, the results indicate that mainline operations on US-50 will continue to operate at LOS C or better in 2010.

The US-50 EB weave section between the new Silva Valley Pkwy interchange and El Dorado Hills Blvd interchange to operate at LOS C or better during the study peak hours. Detailed HCM level of service worksheets for US-50 weave operations are attached in Appendix C.

Table 14: 2010 Conditions - Freeway Level of Service Summary

US 50	AM Peak Density [1] pc/mi/ln	AM Peak LOS [2]	PM Peak Density [1] pc/mi/ln	PM Peak LOS [2]
2010 No Project Scenario				
Eastbound				
West of El Dorado Hills	10.68	A	18.02	C
El Dorado Hills to Bass Lake	13.25	B	22.62	C
East of Bass Lake	12.29	B	18.37	C
Westbound				
East of Bass Lake	13.46	B	14.68	B
Bass Lake to El Dorado Hills	18.52	C	17.11	B
West of El Dorado Hills	18.58	C	18.20	C
2010 Plus Project Scenario				
Eastbound				
West of El Dorado Hills	12.23	B	18.02	C
El Dorado Hills to Silva Valley [3]	10.43	B	18.47	B
Silva Valley to Bass Lake	14.60	B	21.89	C
East of Bass Lake	13.23	B	18.26	C
Westbound				
East of Bass Lake	14.48	B	15.48	B
Bass Lake to Silva Valley	18.18	C	17.37	B
Silva Valley to El Dorado Hills	12.51	B	11.55	B
West of El Dorado Hills	20.37	C	19.14	C

[1] Density expressed in pc/mi/ln, passenger cars per mile per lane
[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000
[3] Denotes a weave section. LOS based on density as described in Freeway Weave, Chapter 24, HCM 2000

US-50 Basic Ramp Merge-Diverge LOS Results

Table 15 and Table 16 present the ramp merge-diverge LOS results under the no-project and with-project conditions respectively.

For 2010, all ramp merge-diverge influence areas are projected to operate at level of service "D" or better during the AM/PM peak hours.

Table 15: 2010 No-Project US-50 Merge-Diverge Ramp Analysis

2010 Merge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment												Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
	AM Peak Hour																															
Non-Mitigated Conditions	Latrobe to US 50 EB ON	EB	On	3	70	1,106	Right	35	1163	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	11.2	0.2	63	B
	EDH to US 50 WB ON	WB	On	3	70	1,635	Right	35	2126	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	27.6	0.4	59	C
	Bass Lake to US 50 EB ON	EB	On	3	70	1,908	Right	35	472	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	15.7	0.3	61	B
	Bass Lake to US 50 WB ON	WB	On	2	70	2,290	Right	35	785	1	1500		1	1	0	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	No	20.3	0.3	61	C
	PM Peak Hour																															
Non-Mitigated Conditions	Latrobe to US 50 EB ON	EB	On	3	70	2,330	Right	35	1485	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	20.5	0.3	61	C
	EDH to US 50 WB ON	WB	On	3	70	1,831	Right	35	1825	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	26.2	0.4	59	C
	Bass Lake to US 50 EB ON	EB	On	3	70	3,046	Right	35	488	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	21.6	0.3	61	C
	Bass Lake to US 50 WB ON	WB	On	2	70	2,435	Right	35	362	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	No	18.3	0.3	62	B

2010 Diverge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment												Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
	AM Peak Hour																															
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	2,694	Right	35	1795	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	-4.6	0.6	53.1	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	2,985	Right	35	1525	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	11.0	0.6	53.8	B
	US 50 EB Off to Bass Lake	EB	Off	3	70	2,135	Right	35	256	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	14.3	0.5	57.3	B
	US 50 WB Off to Bass Lake	WB	Off	3	70	2,549	Right	35	292	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	6.9	0.5	57.3	A
	PM Peak Hour																															
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	4,548	Right	35	2506	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	4.8	0.7	51.1	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	2,756	Right	35	1045	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	7.5	0.5	55.1	A
	US 50 EB Off to Bass Lake	EB	Off	3	70	3,644	Right	35	676	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	23.5	0.5	56.2	C
	US 50 WB Off to Bass Lake	WB	Off	3	70	2,778	Right	35	387	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	8.4	0.5	57.0	A

Table 16: 2010 With-Project US-50 Merge-Diverge Ramp Analysis

2010 Merge Analysis

ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Freeway-Ramp Components and Characteristics: Freeway Data: Number of Lanes on Freeway (Each Direction), N	Freeway Data: S_{FF} (mph)	Freeway Data: Volume (vph)	On-Ramp Data: Side of Ramp (Left or Right)	On-Ramp Data: S_{FR} (mph)	On-Ramp Data: Volume, V_R (vph)	On-Ramp Data: Lanes on Ramp, N	On-Ramp Data: Length of 1st Acceleration Lane, LA1 (ft.)	On-Ramp Data: Length of 2nd Acceleration Lane, LA2 (ft.)	Volume Adjustment: Volume Components: Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Terrain: Type (Level, Rolling, Mountainous, Grade, Composite)	Volume Composition: Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Results of Merge Area: Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
AM Peak Hour																																
Non-Mitigated Conditions	EDH to US 50 WB ON	WB	On	3	70	2,083	Right	35	2004	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	28.8	0.4	58	D
	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	1,868	Right	35	840	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	17.6	0.3	61	B
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	2,554	Right	35	151	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	No	No	17.7	0.3	62	B
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	2,554	Right	35	336	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	11.8	0.2	63	B
	Bass Lake to US 50 EB ON	EB	On	3	70	2,416	Right	35	101	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	15.3	0.3	61	B
	Bass Lake to US 50 WB ON	WB	On	2	70	2,658	Right	35	671	1	1500		1	1	0	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	No	22.4	0.3	61	C
PM Peak Hour																																
Non-Mitigated Conditions	EDH to US 50 WB ON	WB	On	3	70	2,137	Right	35	1680	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	26.5	0.4	59	C
	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	3,180	Right	35	832	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	23.7	0.3	60	C
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	2,420	Right	35	75	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	No	No	16.1	0.3	63	B
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	2,420	Right	35	304	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	10.4	0.2	63	B
	Bass Lake to US 50 EB ON	EB	On	3	70	3,351	Right	35	120	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	20.2	0.3	61	C
	Bass Lake to US 50 WB ON	WB	On	2	70	2,834	Right	35	310	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	No	21.1	0.3	61	C

2010 Diverge Analysis

ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Freeway-Ramp Components and Characteristics: Freeway Data: Number of Lanes on Freeway (Each Direction), N	Freeway Data: S_{FF} (mph)	Freeway Data: Volume (vph)	On-Ramp Data: Side of Ramp (Left or Right)	On-Ramp Data: S_{FR} (mph)	On-Ramp Data: Volume, V_R (vph)	On-Ramp Data: Lanes on Ramp, N	On-Ramp Data: Length of 1st Deceleration Lane, LD1 (ft.)	On-Ramp Data: Length of 2nd Deceleration Lane, LD2 (ft.)	Volume Adjustment: Volume Components: Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Terrain: Type (Level, Rolling, Mountainous, Grade, Composite)	Volume Composition: Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Results of Merge Area: Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
AM Peak Hour																																
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	3,088	Right	35	1903	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	-2.9	0.6	52.8	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	2,985	Right	35	1019	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	8.3	0.5	55.2	A
	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	3,252	Right	35	789	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	11.7	0.5	56.0	B
	US 50 EB Off to Bass Lake	EB	Off	3	70	2,611	Right	35	220	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	17.0	0.4	57.4	B
	US 50 WB Off to Bass Lake	WB	Off	3	70	2,742	Right	35	94	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	7.6	0.4	57.8	A
PM Peak Hour																																
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	4,546	Right	35	2110	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	2.1	0.6	52.2	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	2,756	Right	35	699	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	5.7	0.5	56.1	A
	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	3,108	Right	35	777	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	10.9	0.5	56.0	B
	US 50 EB Off to Bass Lake	EB	Off	3	70	3,916	Right	35	638	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	24.8	0.5	56.3	C
	US 50 WB Off to Bass Lake	WB	Off	3	70	2,931	Right	35	110	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	8.7	0.4	57.7	A

2010 Ramp Metering and Queue Spill-Back Analysis

Ramp metering/queue spill-back analysis was performed for US 50 EB and WB on-ramps at El Dorado Hills Boulevard, Silva Valley Parkway and Bass Lake Road for 2010 peak hour conditions.

Metering analysis was performed using guidelines provided in Chapter 500 (section 504.3) of Highway Design Manual (HDM), 6th Edition. All traffic volumes were adjusted to reflect passenger car equivalents based on the truck classification data collected at each ramp location. Ramp meter discharge rates were iteratively tested to determine the lowest rate that would not compromise available ramp storage capacity (i.e., preclude queue spill back at ramp intersection). Based on HDM, discharge rate for ramp meters varies from 240 to 900 vehicles per hour per lane (vphpl).

The available storage on the ramp is estimated from engineering design drawings provided by the County. For queue spillback, two storage assessments were performed at Silva Valley Parkway interchange. One assuming that available storage ends at the ramp intersection (Min Storage) and another that assumes that available storage extends beyond the ramp intersection and along dedicated right turn lanes – including those on the over-crossing (Max Storage).

Given that the El Dorado and Silva Valley interchange will provide an HOV bypass lane for on-ramps, the forecasted traffic volumes were reduced by 11.5% to account for utilization of an HOV bypass lane. Ramp meter discharge rates were determined using peak 15 and 5-minute arrival flow rate (vph) and available storage length at an on-ramp. The peak 15 and 5-minute arrival flow rate was computed based on hourly adjusted traffic volumes, Peak Hour Factor (PHF) of 0.92 and % of heavy vehicles/RVs. The ramp meter discharge flow rate was then iteratively adjusted downwards until any further reduction would result in queue spillbacks conditions at the upstream ramp intersection. The resultant peak 15 and 5-minute discharge flow rates were then converted into hourly volumes for input into the merge-diverge analysis if desired.

Table 17 presents the ramp metering analysis for 2010. Ramp metering/queue spillback analysis indicated the minimum value of discharge rate at the ramp meter that would not result in queue spill-backs into the through traffic for the peak 15 and 5-minute periods. No locations are anticipated to experience potential queue spill-back problems if the proposed meter rate is maintained.

Table 17: 2010 Ramp Meter Discharge Rate and Queue Spillbacks Analysis Results

Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
El Dorado Hills I/C									
WB On-Ramp	1,774	1,487	1545	1258	1,695	1,697	1,700	OK	OK
EB On-Ramp	731	966	481	717	1,851	1,837	1,850	OK	OK
Silva Valley I/C									
WB On-Ramp	431	335	363	270	504	484	500	OK	OK
EB On-Ramp	743	736	557	549	1,380	1,390	1,400	OK	OK
Bass Lake I/C									
WB On-Ramp	709	327	616	241	649	601	650	OK	OK
EB On-Ramp	101	120	241	241	0	0	650	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization
2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

2020 Conditions Analysis

This section describes roadway network, forecast volumes, level of service analysis, and intersection queuing analysis under 2020 conditions.

2020 Roadway Network

Table 18 compares the 2020 traffic forecast analysis roadway network assumptions with those assumed for 2010. Differences between these two analysis years are described below.

- El Dorado Hills Boulevard will consist of three through lanes in each direction, dual left turn lanes at each ramp intersection.
- Construction of Empire Ranch Road interchange would be completed.
- Empire Ranch Road will be extended from the US-50/Empire Ranch Road Interchange down to White Rock
- Reconfigure US-50 westbound on/off ramp at El Dorado Hills Boulevard from Type L-1 to Type L-8. Additionally, Type L-8's west leg would be aligned with Saratoga Way (south).
- Saratoga Way will be extended to connect Empire Ranch Road with El Dorado Hill Blvd. Saratoga Way will be a 2-lane roadway.
- White Rock Road will be widened from 2 to 6-lanes between Silva Valley and Latrobe Road.
- Silva Valley will be widened from 2- to 4-lanes north of US-50
- US-50 Bass Lake interchange - westbound and eastbound ramp intersections will be signalized and modified for left turn storage as appropriate. Improvement is identified as a 10-year long-term El Dorado County CIP project.

Table 18: Comparison of 2010 and 2020 County Roadway Network Assumptions

Roadway	2010 Analysis	2020 Analysis
Saratoga Way Extension	No	Yes (2 lanes)
Country Club Dr btw Bass Lake and Cameron Park	Yes (2 lanes)	Yes (2 lanes)
Country Club Dr btw Silva Valley and Bass Lake	Yes (2 lanes)	Yes (2 lanes)
Serrano Parkway btw El Dorado Hills and Silva Valley	Yes (2 lanes)	Yes (2 lanes)
Serrano Parkway btw Silva Valley and Bass Lake	Yes (4 lanes btw Silva Valley and Villagio Dr and 2 lanes btw Villagio Dr and Bass Lake)	Yes (4 lanes btw Silva Valley and Villagio Dr and 2 lanes btw Villagio Dr and Bass Lake)
White Rock btw Silva Valley and Latrobe	2 lanes	4 lanes
White Rock section west of Latrobe	2 lanes	4 lanes
Silva Valley sections north of US 50	2 lanes	4 lanes
White Rock section south of US 50	2 lanes	4 lanes
Empire Ranch Interchange*	No	Yes
Empire Ranch Road extension to White Rock*	No	Yes

2020 Traffic Forecast Results

2020 US-50 and County Roadway Segment Volumes

Figure 12 and Figure 13 present the 2020 daily traffic volumes forecasts for the no-project and with-project conditions respectively. Similarly, Figure 14 and Figure 15 show the AM/PM peak hour US-50 freeway mainline and ramp volumes under the no-project and with-project conditions.

2020 Intersection Turning Movements

Intersection lane geometry and AM/PM peak hour volumes for 2020 no-project are shown in Figure 16. Peak hour volumes for project Phases 1-3 in 2020 are shown in Figure 17.

Peak hour turning movements reflect an assumed 50-50 split of traffic using Valley View and Latrobe being generated by the Blackstone subdivision. Only traffic generated by the planned Blackstone subdivision destined to areas west of Latrobe were subject to this off-model assumption. The approved Blackstone subdivision is located south of US-50 and just east of Latrobe Road. The off-model adjustment was required to remedy an unreasonable model assignment (100% trip utilization) onto Valley View – a neighborhood roadway versus the higher functional classification roadway Latrobe.

2020 Traffic Signal Warrant Analysis

This study evaluated the 8-hour, 4-hour, and peak 1-hour traffic signal warrants. The 2020 results are shown in Table 19.

- The two future intersections of Silva Valley Pkwy with US-50 both meet one or more of the volume warrants in 2010 for both the Phase 1 project and the Phase 2 project. The warrants were not recomputed for these intersections for 2020.
- Given that the intersection of White Rock with Jorger Cutoff does NOT meet the volume warrants under either the 2010 or 2030 (see 2030 analysis), no additional warrant tests were conducted at this intersection for 2020.
- The future intersection of Silva Valley Pkwy with Country Club will meet one or more of the volume warrants in 2020.

Table 19: Signal Warrant Analysis 2020

	2020 Project Intersection	Major Street (Both Approaches) Pk Hr vph	4-hr vph	8-hr vph	Minor Street (Single Approach) Pk Hr vph	4-hr vph	8-hr vph	Warrant1 Met?	Warrant 2 Met?	Warrant 3 Met?
1	Silva Valley & US50 EB	Warrants met in 2010								
2	Silva Valley & US50 WB	Warrants met in 2010								
4	Silva Valley & Cntry Clb	3021	2266	1888	334	251	209	Yes	Yes	Yes
5	White Rock & Jorger C	Warrants not met in 2030								

Entries are traffic volumes.
Rural (70%) warrants were used since the speed limits for these roads exceed 40 mph.

Figure 12: 2020 No-Project Segment Average Daily Traffic Volumes

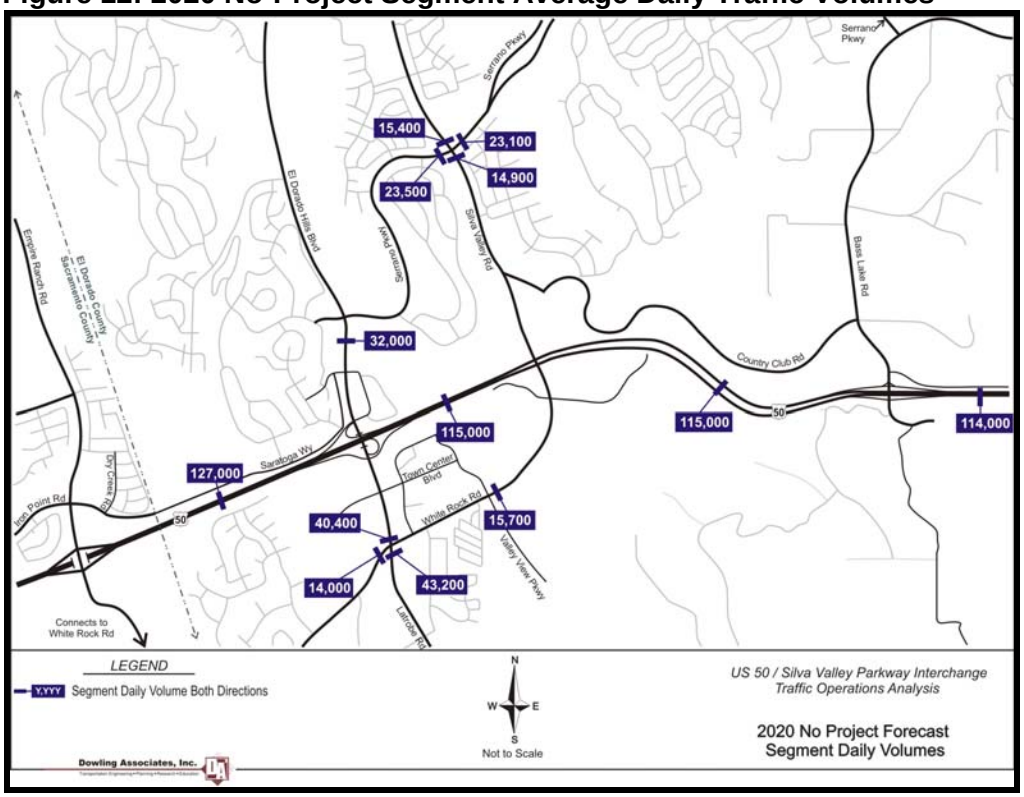


Figure 13: 2020 With-Project Segment Average Daily Traffic Volumes

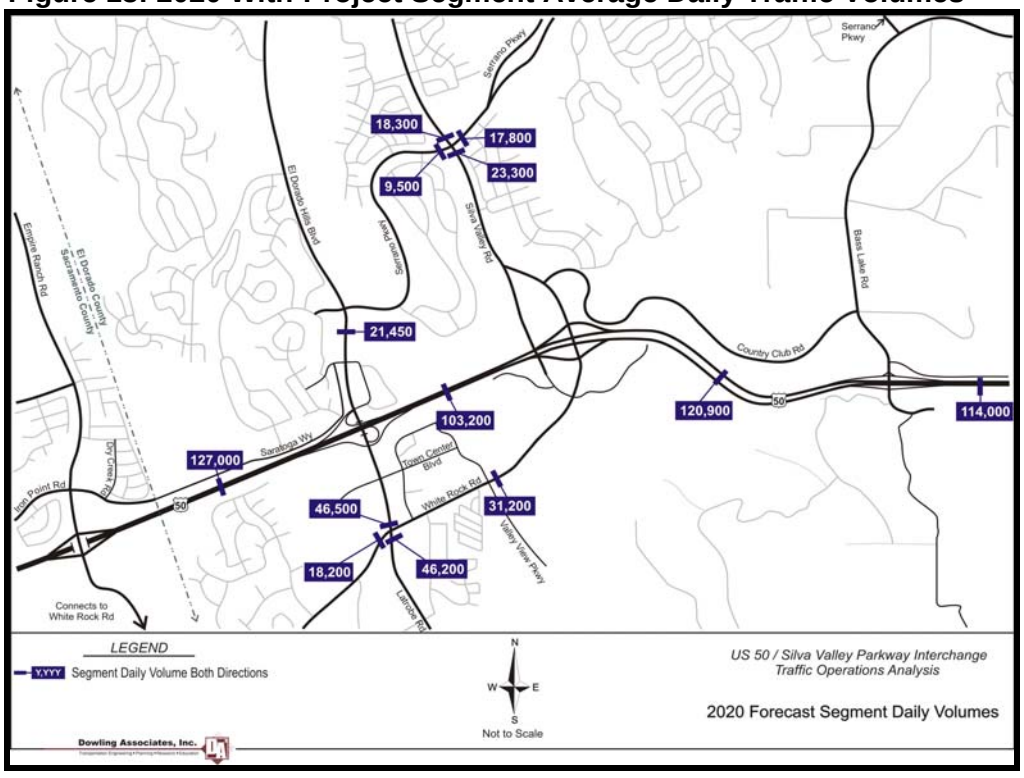


Figure 14: 2020 No-Project AM/PM Peak Hour US-50 Freeway and Ramp Volumes

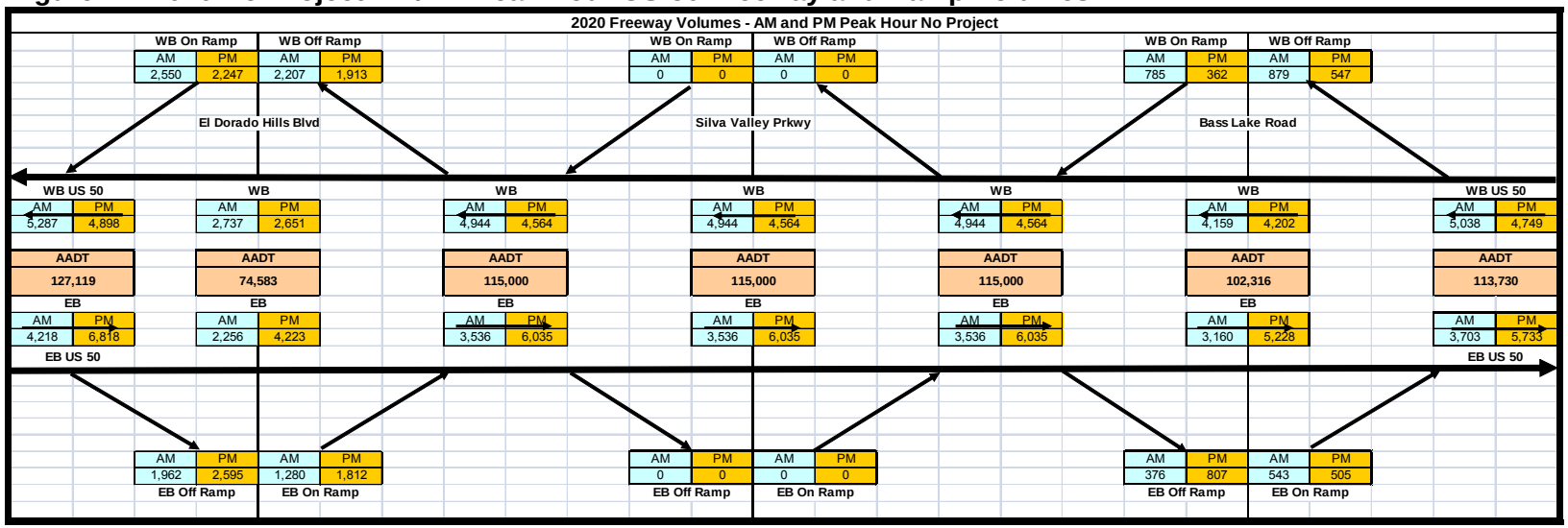


Figure 15: 2020 With-Project AM/PM Peak Hour US-50 Freeway and Ramp Volumes

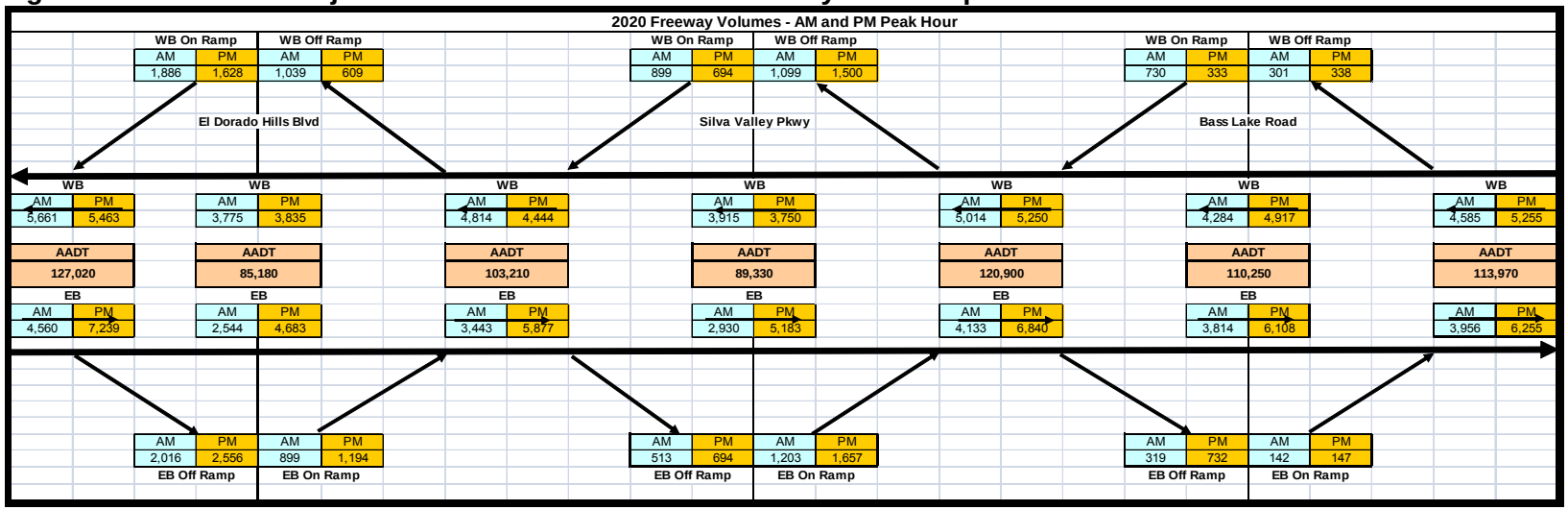


Figure 16: 2020 No-Project AM/PM Peak Hour Intersection Turning Movements

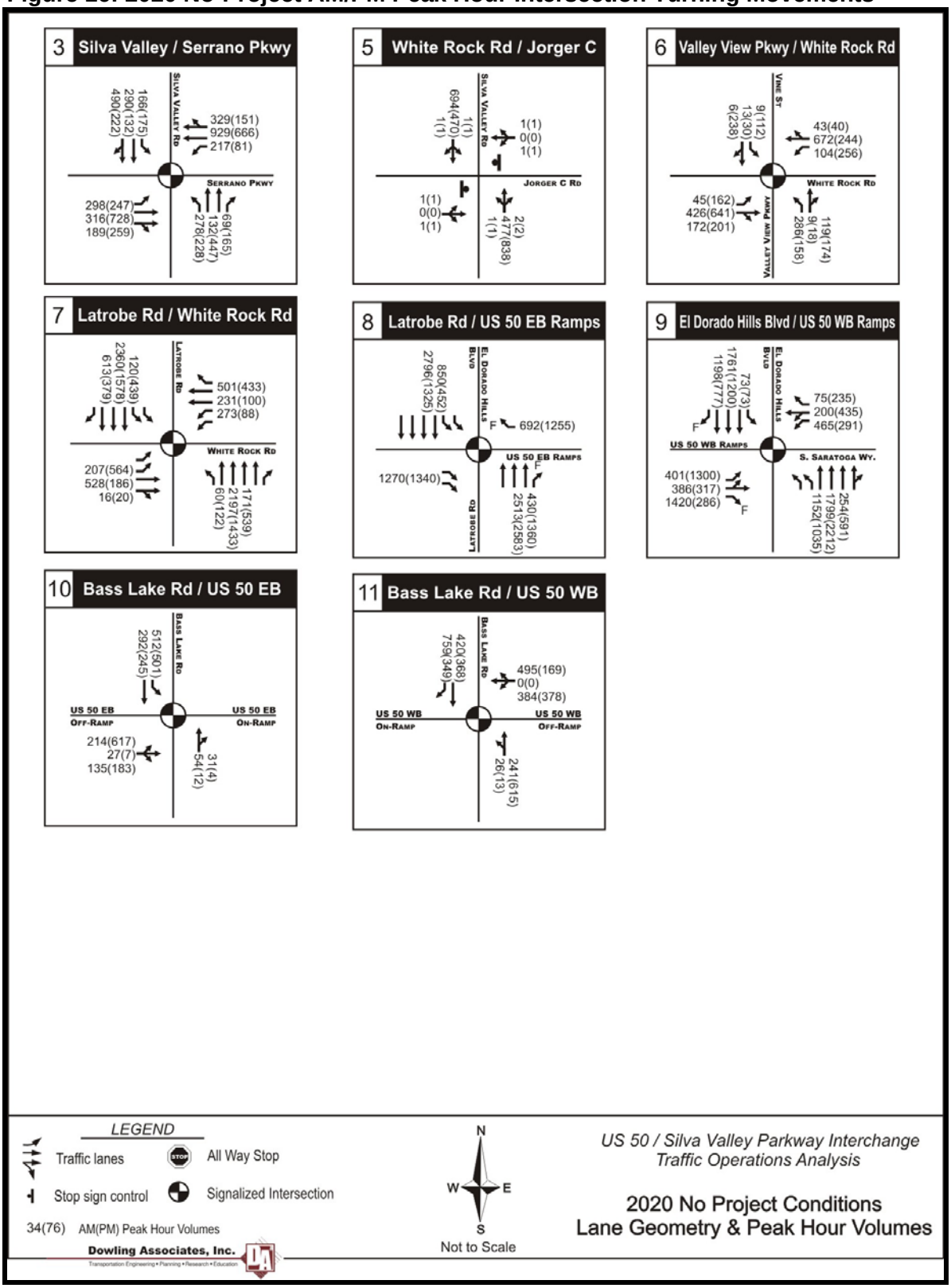
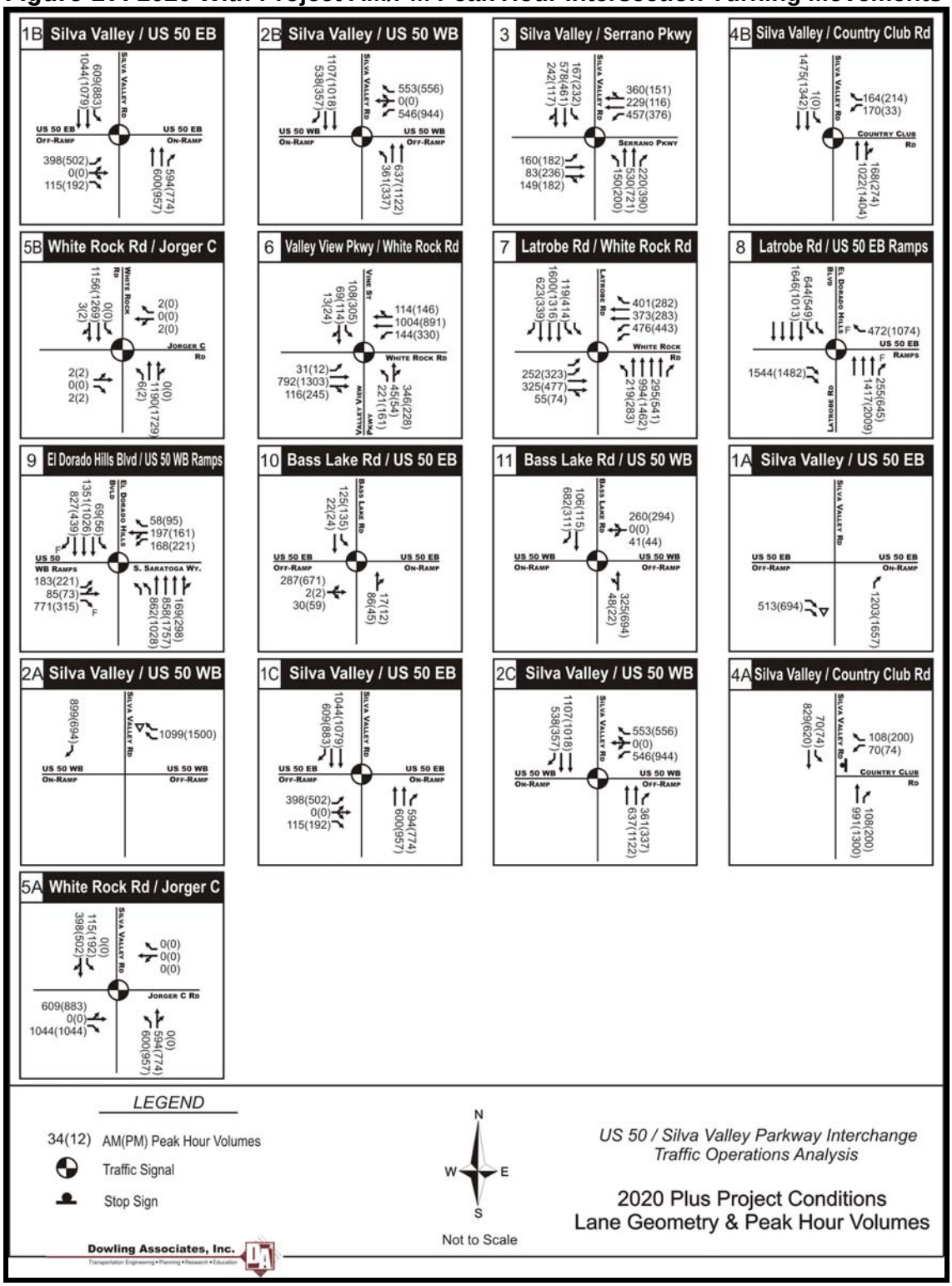


Figure 17: 2020 With-Project AM/PM Peak Hour Intersection Turning Movements



Note: Volumes are identical for Phases 1, 2 and 3 except at Intersections #1, #2, #4, and #5. 1A, 2A, 4A, and 5A show the volumes for Phase 1. 1B and 2B show the volumes for Phase 2. 1C and 2C show the volumes for Phase 3. 4B and 5B show the volumes for Phase 2 and 3.

2020 Intersection Level of Service

Table 20 and Table 21 show the AM/PM peak hour intersection LOS results for the 2020 no-project and with-project conditions respectively. Detailed LOS worksheets are provided in Appendix B.

Table 20: 2020 No-Project Intersection Level of Service

#	Synch	Intersection	Control	AM Peak Hour			PM Peak Hour		
				V/c	Delay (secs)	LOS	v/c	Delay (secs)	LOS
1	111	Silva Valley Pkwy & US-50 EB	Future						
2	112	Silva Valley Pkwy & US-50 WB	Future						
3	113	Silva Valley Pkwy & Serrano Pkway	Signal	1.14	86	F	0.78	38	D
4	114	Silva Valley Pkwy & Country Club	Future						
5	115	White Rock Rd & Jorger Cutoff	2-Way Stop	0.47	~0	A	0.55	~0	A
6	116	Valley View & White Rock Road	Signal	0.71	26	C	0.90	53	D
7	117	Latrobe Road & White Rock Road	Signal	1.14	70	E	1.03	60	E
8	118	El Dorado Hills/Latrobe & US-50 EB	Signal	1.02	26	C	1.14	26	C
9	119	El Dorado Hills & US-50 WB	Signal	1.36	112	F	1.55	230	F
10	120	Bass Lake Rd & US-50 EB	Signal	0.73	15	B	0.98	47	D
11	121	Bass Lake Rd & US-50 WB	Signal	0.87	31	C	0.77	17	B

V/c ratio for 2-way stops is Synchro ICU ratio. All other v/c ratios computed per HCM. LOS for 2-way stops is based in ICU ratio (per Synchro method). All other LOS results are per HCM. Results are identical for all phases for all intersections except intersections #1 and #2.

Note: LOS for Int #8 assumes NB Approach and NB loop ramp allows free RT.
Note: LOS for Int #9 assumes free EB and SB RT.

Table 21: 2020 Project Intersection Level of Service (Phase 1, 2 and 3)

#	Syn	Intersection	Control	AM Peak Hour			PM Peak Hour		
				v/c	Delay (secs)	LOS	v/c	Delay (secs)	LOS
1A	111	Silva Valley Pkwy & US-50 EB (Phase 1)	Signal	0.78	3	D	1.06	3	F
2A	112	Silva Valley Pkwy & US-50 WB (Phase 1)	Signal	0.59	7	B	0.56	12	B
1B	111	Silva Valley Pkwy & US-50 EB (Phase 2)	Signal	0.85	24	B	1.25	95	F
2B	112	Silva Valley Pkwy & US-50 WB (Phase 2)	Signal	0.97	36	D	0.99	43	D
1C	111	Silva Valley Pkwy & US-50 EB (Phase 3)	Signal	0.54	9	A	0.63	12	B
2C	112	Silva Valley Pkwy & US-50 WB (Phase 3)	Signal	0.69	11	B	0.81	16	B
3	113	Silva Valley Pkwy & Serrano Pkway	Signal	0.76	36	D	0.84	39	D
4A	114	Silva Valley Pkwy & Country Cl (Phase1)	Signal	0.80	15	B	0.94	32	C
4B	114	Silva Valley Pkwy & Country Cl (Phase 2&3)	Signal	0.62	10	A	0.66	9	A
5A	115	White Rock Rd & Jorger Cutoff (Phase 1)	Signal	1.23	116	F	1.86	306	F
5B	115	White Rock Rd & Jorger Cutoff Phase 2&3)	Signal	0.48	11	B	0.57	13	B
6	116	Valley View & White Rock Road	Signal	0.76	30	C	1.12	89	F
7	117	Latrobe Road & White Rock Road	Signal	1.02	49	D	0.93	54	D
8	118	El Dorado/Latrobe & US-50 EB	Signal	0.95	21	C	0.81	12	B
9	119	El Dorado Hills & US-50 WB	Signal	1.03	40	D	0.87	32	C
10	120	Bass Lake Rd & US-50 EB	Signal	0.34	16	B	0.64	18	B
11	121	Bass Lake Rd & US-50 WB	Signal	0.45	8	A	0.63	9	A

V/c ratio for 2-way stops is Synchro ICU ratio. All other v/c ratios computed per HCM. LOS for 2-way stops is based in ICU ratio (per Synchro method). All other LOS results are per HCM. Results are identical for all phases for all intersections except intersections #1 and #2.
Note: LOS for Int #8 assumes NB Approach and NB loop ramp allows free RT.
Note: LOS for Int #9 assumes free EB and SB RT.
* The intersection of Jorger Cut-Off and White Rock Road was analyzed alternatively as a signalized intersection at the request of DOT

No-Project Results

All of the intersections analyzed for 2020 no-project would operate at acceptable levels of service during the peak hours with the exception of the following:

- # 3 Silva Valley Pkwy and Serrano Pkwy.

  - The LOS deficiency results from high volumes on the left turn movement for eastbound and northbound during the AM peak hour peak hours. The recommended mitigation is to add a left turn to these approaches.

- #9 El Dorado Hills and US-50 Westbound.

  - This intersection would exceed LOS standards during both peak hours. The LOS deficiency is caused by the heavy left turn movements and opposing through movements at this intersection. Adding a third northbound left turn lane and a right-turn lane, adding a fourth southbound through lane, adding a second exclusive left turn lane eastbound, and a similar second exclusive through lane westbound would mitigate this intersection to LOS E. The alternative mitigation would be constructing a Silva Valley Rd interchange.

With-Project Results – Phase 1

All of the intersections analyzed for 2020 with the Phase 1 project would operate at acceptable levels of service during the peak hours except for the following:

- # 6 Valley View and White Rock.

  - This LOS deficiency (LOS F) occurs during the PM peak hour. Providing dual left turn lanes on the westbound approach will allow the intersection to operate at LOS E or better. Improvements to this intersection are currently identified in future County CIP projects.

- # 5A White Rock and Jorger Cutoff.

  - Poor operating conditions are caused by the heavier volumes on White Rock and Jorger Cutoff due to the proposed Phase 1 project. It can be mitigated to LOS E or better by: providing dual left turn lanes and a shared thru-right lane on the eastbound approach; providing dual left turn lanes and a shared thru-right lane on the northbound approach; and, providing a shared left-thru lane and a right turn lane on the southbound approach.

- # 1A Silva Valley Pkwy and US-50 Eastbound.

  - Poor operating conditions are caused by the heavy volumes on Silva Valley Pkwy traveling on a single lane on-ramp. It is recommended that the northbound lane on Silva Valley Pkwy be widened to accommodate dual receiving lanes to US-50 Eastbound. Ramp would be narrowed back down to one lane at ~300 ft.

With-Project Results – Phase 2

All of the intersections analyzed for 2020 with the Phase 2 project would operate at acceptable levels of service during the peak hours except for the following:

- # 6 Valley View and White Rock.

  - This LOS deficiency (LOS F) occurs during the PM peak hour. Providing dual left turn lanes on the westbound approach will allow the intersection to operate at LOS E or better. Improvements to this intersection are currently identified in future County CIP projects.

- # 1B Silva Valley and US-50 Eastbound.

  - This LOS deficiency occurs only in the PM peak hour, due to the heavy southbound left turns. This can be mitigated to LOS D or better by constructing a second exclusive southbound left turn lane and widening the eastbound US-50 on-ramp to two-lanes for a portion of its length (so as to receive the dual left turn volumes).

With-Project Results – Phase 3

All of the intersections analyzed for 2020 with the Phase 3 project would operate at acceptable levels of service during the peak hours except for the following:

- # 6 Valley View and White Rock.

  - This LOS deficiency (LOS F) occurs during the PM peak hour. Providing dual left turn lanes on the westbound approach will allow the intersection to operate at LOS E or better. Improvements to this intersection are currently identified in future County CIP projects.

2020 Queue Storage Requirements

The required queue storage lengths for 2020 project and no-project conditions are presented in Table 22.

Table 22: Required Left Turn Storage – 2020

Left Turn Pocket Requirements			2020 No-Project		2020 Project	
Intersection	Control	Dir	Max AM/PM (vph)	Required Storage (ft)	Max AM/PM (vph)	Required Storage (ft)
1A Silva Valley & US50 EB	Signal	NB	N/A	N/A	957	800
(Phase 1)		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	883	750
		WB	N/A	N/A	N/A	N/A
2A Silva Valley & US50 WB	Signal	NB	N/A	N/A	1122	950
(Phase 1)		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	944	800
1B Silva Valley & US50 EB	Signal	NB	N/A	N/A	N/A	N/A
(Phase 2)		SB	N/A	N/A	883	750
		EB	N/A	N/A	502	425
		WB	N/A	N/A	N/A	N/A
2B Silva Valley & US50 WB	Signal	NB	N/A	N/A	361	325
(Phase 2)		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	944	800
1C Silva Valley & US50 EB	Signal	NB	N/A	N/A	N/A	N/A
(Phase 3)		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	502	425
		WB	N/A	N/A	N/A	N/A
2C Silva Valley & US50 WB	Signal	NB	N/A	N/A	N/A	N/A
(Phase 3)		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	944	800
3.Silva Valley & Serrano	Signal	NB	278	250	200	175
		SB	175	150	232	200
		EB	298	250	182	175
		WB	217	200	457	400
4.Silva Valley & Country Cl	Signal	NB	N/A	N/A	N/A	N/A
		SB	N/A	N/A	1	50
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	170	150
5AWhite Rock & Jorger Cut	Signal	NB	N/A	N/A	957	800
		SB	N/A	N/A	0	0
		EB	N/A	N/A	0	0
		WB	N/A	N/A	883	750
5B.White Rock & Jorger Cut	2-Way	NB	N/A	N/A	N/A	N/A
	Stop	SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A

Left Turn Pocket Requirements			2020 No-Project		2020 Project	
Intersection	Control	Dir	Max AM/PM (vph)	Required Storage (ft)	Max AM/PM (vph)	Required Storage (ft)
		WB	N/A	N/A	N/A	N/A
6.Valley View & White Rock	Signal	NB	204	350	221	375
		SB	112	200	305	525
		EB	162	275	31	50
		WB	256	425	330	550
7.Latrobe & White Rock	Signal	NB	167	275	285	475
		SB	439	650	415	625
		EB	564	825	325	475
		WB	273	400	480	700
8.El Dorado Hill & US-50 EB	Signal	NB	N/A	N/A	N/A	N/A
		SB	2116	1775	644	550
		EB	N/A	N/A	N/A	N/A
		WB	N/A	N/A	N/A	N/A
9.El Dorado Hill & US-50 WB	Signal	NB	1152	975	1028	875
		SB	73	75	69	75
		EB	2196	1850	221	200
		WB	465	400	221	200
10.Bass Lake & US-50 EB	Signal	NB	N/A	N/A	N/A	N/A
		SB	512	875	135	225
		EB	617	525	671	575
		WB	N/A	N/A	N/A	N/A
11.Bass Lake & US-50 WB	Signal	NB	N/A	N/A	N/A	N/A
		SB	N/A	N/A	N/A	N/A
		EB	N/A	N/A	N/A	N/A
		WB	384	325	44	50

2020 Freeway Level of Service

US-50 Basic Freeway Segments LOS Results

Table 21 presents the freeway mainline segment LOS results under the no-project and with-project conditions. Detailed HCM level of service worksheets for US-50 basic freeway segments are provided in Appendix C.

During the AM peak hour and under both, without and with project conditions, US-50 mainline operations for both directions will be characterized by stable flow conditions (LOS D or better). The results indicate that during the PM peak hour, US-50 mainline operations on the mixed flow lanes will operate at LOS D or better in the westbound direction with or without the project. In the eastbound direction and without the project, US-50 mainline segment from El Dorado Hills Blvd and Bass Lake Rd will operation at its capacity i.e. LOS E and with densities exceeding 35 passenger cars per lane per mile. Under with project traffic conditions, LOS E will persist between new Silva Valley Rd interchange and Bass Lake Rd. Although traffic flow will still operate over 55 mph on these segments, vehicle densities ranging from 32 to 38 passenger cars per lane per mile will make traffic flow highly susceptible to interruptions from platoons of vehicles entering the traffic stream from non-metered on-ramps or vehicles changing lanes. At these densities, such interruptions can cause unstable flow and delays that will propagate throughout the upstream US-50 traffic flow. Traffic along this section of US-50 will be unable to dissipate even the most minor disruptions and any incident can be expected to produce extensive queuing.

A weave section along US-50 EB from El Dorado Hills to Silva Valley was evaluated using the methodology described in 2000 Highway Capacity Manual. During the AM and PM peak hours, the US 50 EB weave section from El Dorado Hills to Silva Valley section is projected to operate at an acceptable LOS C or better. Detailed HCM level of service worksheets for US-50 weave operations are attached in Appendix C.

Table 23 also presents mitigation to allow all mainline sections to operate at or below capacity. It should be noted that identified mitigation for the mainline analysis is simply redefining the HOV lane as a mixed flow lane. This results in an additional mixed flow lane in each direction on US-50 from El Dorado Hill Blvd. to just east of Bass Lake Rd interchange. To quantify the mitigated condition, the number of high occupancy vehicles (i.e., 11.5% of peak hour volume) must then be added back to the US-50 mainline volume. Alternatively, the other obvious mitigation would be addition of a new mixed flow lane in the deficient sections of US-50. HCM level of service worksheets for US-50 basic freeway segments are provided in Appendix C.

Although not presented, HOV lane operations will operate between 40 and 70 percent of HOV lane capacity (i.e., LOS B to D range). This is based on a 1,650 HOV lane saturation flow rate (i.e., capacity) while assuming that the existing measured percentage of high occupancy vehicles on US-50 of 11.5 percent will not change in the future. This assumes no behavioral response or mode shift to high occupant vehicles by motorists taking advantage of the residual HOV lane capacity despite saturated conditions on the mixed flow lanes by 2020.

Table 23: 2020 Condition - Freeway Level of Service Summary

US 50	AM Peak Density [1] pc/mi/ln	AM Peak LOS [2]	PM Peak Density [1] pc/mi/ln	PM Peak LOS [2]	Mitigation Measure	Mitigated LOS AM	Mitigated LOS PM
2020 No Project Scenario						**AM**	**PM**
Eastbound							
West of El Dorado Hills	14.78	B	23.92	C		---	---
El Dorado Hills to Bass Lake	19.42	C	36.98	E	Convert HOV lane to Mixed Flow Lane	B	D
East of Bass Lake	17.31	B	27.09	D		---	---
Westbound							
East of Bass Lake	23.56	C	22.20	C		---	---
Bass Lake to El Dorado Hills	27.51	D	25.14	C		---	---
West of El Dorado Hills	24.76	C	22.89	C		---	---
2020 Plus Project Scenario							
Eastbound							
West of El Dorado Hills	15.98	B	25.48	C		---	---
El Dorado Hills to Silva Valley [3]	15.50	B	26.97	C		---	---
Silva Valley to Bass Lake	20.45	C	38.53	E	Convert HOV lane to Mixed Flow Lane	B	D
East of Bass Lake	18.49	C	30.23	D		---	---
Westbound							
East of Bass Lake	21.43	C	24.61	C		---	---
Bass Lake to Silva Valley	24.86	C	26.13	D		---	---
Silva Valley to El Dorado Hills	17.86	B	16.49	B		---	---
West of El Dorado Hills	26.69	D	25.65	C		---	---

[1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000

[3] Denotes a weave section. Level of Service is based on density as described in Freeway Weave, Chapter 24, HCM 2000

US-50 Basic Ramp Merge-Diverge LOS Results

Table 24 and Table 25 present the LOS results for the study freeway ramp merge-diverge influence area segments under the no-project and with-project conditions respectively.

In 2020 without the project, all ramp merge-diverge influence areas are projected to operate at level of service "D" or better during the AM/PM peak hours with the exception of the US-50 westbound traffic at the Bass Lake Road on-ramps during the AM peak hour which will operate at LOS F. Under 2020 with project conditions, Bass Lake Rd westbound on-ramp will experience unstable flow conditions (LOS F) during both peak hours. In addition, Silva Valley Rd eastbound on-ramp will function at its capacity i.e. LOS E during the PM peak hour.

It should be noted again that identified mitigation for the ramp merge-diverge analysis is simply redefining the HOV lane as a mixed flow lane. This result in an additional mixed flow lane at US-50 deficient merge-diverge sections. To quantify the mitigated condition, the number of high occupancy vehicles (i.e., 11.5% of peak hour volume) must then be added back to the US-50 mainline volume. No mitigation beyond redefining the HOV lane as a mixed flow lane is identified. All deficient merge-diverge sections as described above are anticipated to function at LOS D or better with this improvement.

Table 24: 2020 No-Project US-50 Merge-Diverge Ramp Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment												Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
	AM Peak Hour																															
Non-Mitigated Conditions	Latrobe to US 50 EB ON	EB	On	3	70	1,997	Right	35	1280	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	16.8	0.3	62	B
	EDH to US 50 WB ON	WB	On	3	70	2,422	Right	35	2550	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	34.9	0.6	54	D
	Bass Lake to US 50 EB ON	EB	On	3	70	2,797	Right	35	543	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	20.7	0.3	61	C
	Bass Lake to US 50 WB ON	WB	On	2	70	3,681	Right	35	785	1	1500		1	1	0	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	No	31.5	0.6	53	D
	PM Peak Hour																															
Non-Mitigated Conditions	Latrobe to US 50 EB ON	EB	On	3	70	3,737	Right	35	1812	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	30.6	0.6	54	D
	EDH to US 50 WB ON	WB	On	3	70	2,346	Right	35	2247	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	32.1	0.5	56	D
	Bass Lake to US 50 EB ON	EB	On	3	70	4,627	Right	35	505	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	29.6	0.4	58	D
	Bass Lake to US 50 WB ON	WB	On	2	70	3,719	Right	35	362	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	No	28.6	0.5	57	D

				Freeway-Ramp Components and Characteristics									Volume Adjustment												Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
	AM Peak Hour																															
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	3,733	Right	35	1962	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	-0.9	0.6	52.6	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	4,375	Right	35	2207	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	20.3	0.6	52.0	C
	US 50 EB Off to Bass Lake	EB	Off	3	70	3,129	Right	35	376	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	20.2	0.5	57.0	C
	US 50 WB Off to Bass Lake	WB	Off	3	70	4,459	Right	35	879	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	17.6	0.5	55.8	B
	PM Peak Hour																															
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	6,034	Right	35	2595	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	Yes	No	9.1	0.7	50.9	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	4,039	Right	35	1913	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	17.4	0.6	52.8	B
	US 50 EB Off to Bass Lake	EB	Off	3	70	5,341	Right	35	807	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	31.7	0.5	55.8	D
	US 50 WB Off to Bass Lake	WB	Off	3	70	4,203	Right	35	547	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	15.8	0.5	56.6	B

Table 25: 2020 With-Project US-50 Merge-Diverge Ramp Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment															Results of Merge Area						
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																		
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Percent Trucks and Buses on Adjacent Ramp (%)	E_T (adjacent ramp)	Percent Recreational Vehicles on Adjacent Ramp (%)	E_R (adjacent ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
AM Peak Hour																																			
Non-Mitigated Conditions	EDH to US 50 WB ON	WB	On	3	70	3,341	Right	35	1886	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	34.2	0.5	55	D
	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	2,593	Right	35	1203	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	23.8	0.4	60	C
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	3,465	Right	35	0	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	No	No	23.9	0.4	60	C
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	3,465	Right	35	899	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	20.8	0.3	61	C
	Bass Lake to US 50 EB ON	EB	On	3	70	3,376	Right	35	142	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	20.5	0.3	61	C
	Bass Lake to US 50 WB ON	WB	On	2	70	3,791	Right	35	685	1	1500		1	1	0	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	No	31.6	0.6	53	D
Mitigated Conditions	Bass Lake to US 50 WB ON	WB	On	3	70	4,284	Right	35	685	1	1500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	22.6	0.3	61	C
PM Peak Hour																																			
Non-Mitigated Conditions	EDH to US 50 WB ON	WB	On	3	70	3,270	Right	35	1628	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	31.8	0.5	57	D
	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	4,587	Right	35	1657	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	36.7	0.6	52	E
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	3,195	Right	35	0	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	No	No	21.7	0.3	61	C
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	3,195	Right	35	694	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	17.2	0.3	62	B
	Bass Lake to US 50 EB ON	EB	On	3	70	5,406	Right	35	147	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	30.7	0.4	58	D
	Bass Lake to US 50 WB ON	WB	On	2	70	4,228	Right	35	333	2	500	1500	1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	No	Yes	26.2	0.6	54	F
Mitigated Conditions	Silva Valley Pkwy to US 50 EB ON	EB	On	4	70	5,183	Right	35	1657	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	9600	4600	No	No	21.7	0.3	61	C
	Bass Lake to US 50 WB ON	WB	On	3	70	4,777	Right	35	333	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	27.6	0.4	59	C
	Mitigated Conditions treats HOV, truck and auxiliary lanes as mixed flow lanes																																		

				Freeway-Ramp Components and Characteristics									Volume Adjustment													Results of Merge Area						
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
AM Peak Hour																																
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	4,036	Right	35	2016	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	0.2	0.6	52.5	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	4,260	Right	35	1039	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	13.7	0.5	55.2	B
	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	4,437	Right	35	1099	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	18.0	0.5	55.2	B
	US 50 EB Off to Bass Lake	EB	Off	3	70	3,658	Right	35	319	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	22.9	0.5	57.1	C
	US 50 WB Off to Bass Lake	WB	Off	3	70	4,058	Right	35	301	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	15.9	0.5	57.2	B
PM Peak Hour																																
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	6,407	Right	35	2556	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	Yes	No	9.7	0.7	51.0	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	3,933	Right	35	609	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	10.1	0.5	56.3	B
	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	4,646	Right	35	1500	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	19.9	0.6	54.1	B
	US 50 EB Off to Bass Lake	EB	Off	3	70	6,053	Right	35	732	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	34.5	0.5	56.0	D
	US 50 WB Off to Bass Lake	WB	Off	3	70	4,651	Right	35	338	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	18.8	0.5	57.1	B

2020 Ramp Metering and Queue Spill-Back Analysis

Ramp metering/queue spill-back analysis was performed for US 50 EB and WB on-ramps at El Dorado Hills Boulevard, Silva Valley Parkway and Bass Lake Road for 2020 peak hour conditions.

Ramp meter discharge rates were determined using peak 15 and 5-minute arrival flow rate (vph) and available storage length at an on-ramp. The peak 15 and 5-minute arrival flow rate was computed based on hourly adjusted traffic volumes, Peak Hour Factor (PHF) of 0.92 and % of heavy vehicles/RVs. The ramp meter discharge flow rate was then iteratively adjusted downwards until any further reduction would result in queue spillbacks conditions at the upstream ramp intersection. The resultant peak 15 and 5-minute discharge flow rates were then converted into hourly volumes for input into the merge-diverge analysis if desired.

Table 26 presents the ramp metering analysis for 2020 phase 2 of Silva Valley Interchange. Ramp metering/queue spillback analysis indicated the minimum value of discharge rate at the ramp meter that would not result in queue spill-backs into the through traffic for the peak 15 and 5-minute periods. No locations are anticipated to experience potential queue spill-back problems if the meter rate is maintained anywhere between estimated minimum value and peak hour traffic volumes.

Table 26: 2020 Phase 2 - Ramp Meter Discharge Rate and Queue Spillbacks Results

2020 Ramp Metering/Queue Spillback Analysis Results - Min Storage									
	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
Location	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
El Dorado Hills I/C									
WB On-Ramp	1,669	1,441	1443	1215	1,672	1,669	1,700	OK	OK
EB On-Ramp	796	1,057	549	810	1,829	1,825	1,850	OK	OK
Silva Valley I/C									
WB On-Ramp	796	614	730	549	485	486	500	OK	OK
EB On-Ramp	1,065	1,466	878	1,279	1,384	1,390	1,400	OK	OK
Bass Lake I/C									
WB On-Ramp	730	333	545	241	1,296	643	1,300	OK	OK
EB On-Ramp	142	147	241	241	0	0	650	OK	OK
2020 Ramp Metering/Queue Spillback Analysis Results - Max Storage									
	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
Location	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
WB On-Ramp	796	614	663	481	985	986	1,000	OK	OK
EB On-Ramp	1,065	1,466	823	1,224	1,790	1,796	1,800	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization
2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

2030 Conditions Analysis

This section describes the roadway network, traffic volumes, traffic signal warrants, level of service analysis, and left turn storage analysis under 2030 future conditions.

2030 Roadway Network

Table 27 compares the 2030 analysis roadway network assumptions with those assumed for 2010. Differences between these two analysis years are described below.

- El Dorado Hills Boulevard will consist of three through lanes in each direction, dual left turn lanes at each ramp intersection.
- Construction of Empire Ranch Road interchange would be completed.
- Empire Ranch Road will be extended from the US-50/Empire Ranch Road Interchange down to White Rock
- Reconfigure US-50 westbound on/off ramp at El Dorado Hills Boulevard from Type L-1 to Type L-8. Additionally, Type L-8's west leg would be aligned with Saratoga Way (south).
- Saratoga Way will be extended to connect Empire Ranch Road with El Dorado Hill Blvd. Saratoga Way is assumed to be widened from 2- to 4-lanes.
- White Rock Road will be widened from 2- to 6-lanes between Silva Valley and Latrobe Road.
- Silva Valley will be widened from 2- to 4-lanes north of US-50
- US-50 Bass Lake interchange - WB and EB ramp intersections will be signalized and modified for left turn storage. Project is identified in the 10-year County CIP.

Several improvements included in the 2030 analysis will provide new primary and secondary access to US-50 ostensibly diffusing traffic and relieving demand at the US-50/El Dorado Hill Blvd and US-50/Silva Valley Parkway interchanges.

Table 27: Comparison of 2020 and 2030 County Roadway Network Assumptions

Roadway	2020 Analysis	2030 Analysis
Saratoga Way Extension	Yes (2 lanes)	Yes
Country Club Dr btw Bass Lake and Cameron Park	Yes (2 lanes)	Yes (2 lanes)
Country Club Dr btw Silva Valley and Bass Lake	Yes (2 lanes)	Yes (2 lanes)
Serrano Parkway btw El Dorado Hills and Silva Valley	Yes (2 lanes)	Yes (2 lanes)
Serrano Parkway btw Silva Valley and Bass Lake	Yes (4 lanes btw Silva Valley and Villagio Dr and 2 lanes btw Villagio Dr and Bass Lake)	Yes (4 lanes btw Silva Valley and Villagio Dr and 2 lanes btw Villagio Dr and Bass Lake)
White Rock btw Silva Valley and Latrobe	4 lanes	6 lanes
White Rock section west of Latrobe	4 lanes	4 lanes
Silva Valley sections north of US 50	4 lanes	4 lanes
White Rock section south of US 50	4 lanes	4 lanes
Empire Ranch Interchange*	Yes	Yes
Empire Ranch Road extension to White Rock*	Yes	Yes

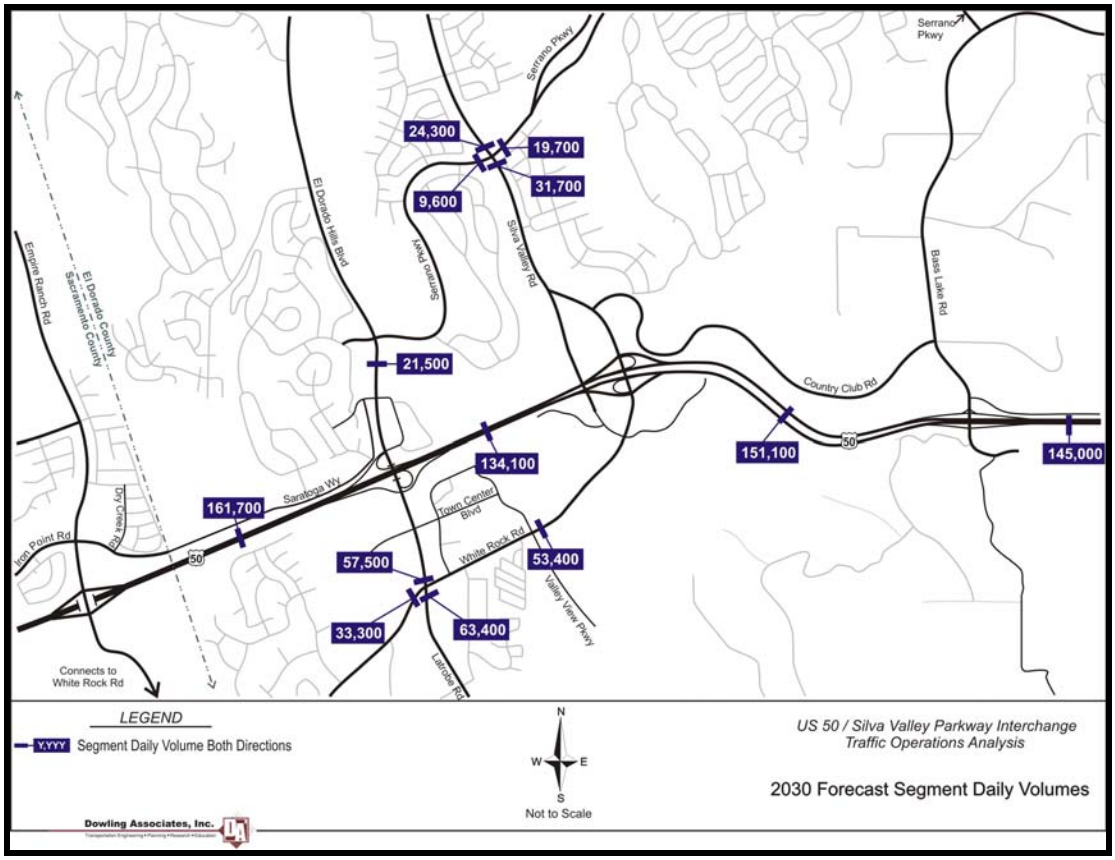
2030 Traffic Forecast Results

2030 US-50 and County Roadway Segment Volumes

2030 AM/PM peak hour volumes were balanced to ramp volumes. After balancing checks, mainline/ramp volumes were input into the Highway Capacity Software (HCS) operational analysis software to estimate peak hour ramp (weave and merge-diverge) and mainline level of service. All other HCS inputs (e.g., percent of trucks, geometric conditions) were held constant at baseline conditions.

Figure 18 presents the 2030 daily traffic volumes within the study area. As shown, traffic diverting to the new Silva Valley Parkway and Empire Ranch interchanges results in volumes dropping at El Dorado Hills Blvd. Figure 19 and Figure 20 shows the 2030 peak hour mainline and ramp volumes for US-50 with and without Silva Valley Interchange.

Figure 18: 2030 With-Project Segment Average Daily Traffic Volumes



2030 Intersection Turning Movements

Similar to the 2010 analysis, AM/PM peak hour turning movements were derived by applying the Furness Method to the final adjusted segment volumes. All future year turning movement volumes were then refined and quality controlled for balancing. After the balancing checks, all turning movements were input into the intersection operation

analysis software SYNCHRO-7 to estimate peak hour intersection level of service and length of queue. A future peak hour factor of .92 will be used at all study area locations.

Peak hour turning movements reflect an assumed 50-50 split of traffic using Valley View and Latrobe being generated by the Blackstone subdivision. Only traffic generated by the planned Blackstone subdivision destined to areas west of Latrobe were subject to this off-model assumption. The approved Blackstone subdivision is located south of US-50 and just east of Latrobe Road. The off-model adjustment was required to remedy an unreasonable model assignment (100% trip utilization) onto Valley View – a neighborhood roadway versus the higher functional classification roadway Latrobe.

Figure 21 provides the 2030 AM and PM peak hour intersection turning movement volumes. Comparing between the 2030 turn movements with 2010, several movements show either show no growth or negative growth – particularly the ramp movements at El Dorado Hills (#118 and #119). This is the result of diversion caused by the future improvements described above – particularly the addition of the Empire Ranch interchange. With three interchange choices and better connectivity between them via east-west county roadway extensions, future traffic will diffuse resulting in less demand at the El Dorado Hills interchange.

2030 Traffic Signal Warrant Analysis

This study evaluated the 8-hour, 4-hour, and peak 1-hour traffic signal warrants. The 2030 results are shown in Table 28.

- The two future intersections of Silva Valley Pkwy with US-50 both meet one or more of the volume warrants in 2010 for both the Phase 1 project and the Phase 2 project. The warrants were not recomputed for these intersections for 2020 and 2030 because these intersections already met the warrants in 2010.
- The intersection of White Rock with Jorger Cutoff does NOT meet the volume warrants under any of the scenarios evaluated.
- The future intersection of Silva Valley Pkwy with Country Club will meet one or more of the volume warrants in 2020 and 2030, but not in 2010.

Table 28: Signal Warrant Analysis 2030

	2030 Project	Major Street (Both Approaches)			Minor Street (Single Approach)			Warrant 1	Warrant 2	Warrant 3
	Intersection	Pk Hr vph	4-hr vph	8-hr vph	Pk Hr vph	4-hr vph	8-hr vph	Met?	Met?	Met?
1	Silva Valley & US50 EB	Warrants met in 2010								
2	Silva Valley & US50 WB	Warrants met in 2010								
4	Silva Valley & Cntry Clb	Warrants met in 2020								
5	White Rock & Jorger C	4746	3560	2966	4	3	3	No	No	No

Entries are traffic volumes.
Rural (70%) warrants were used since the speed limits for these roads exceed 40 mph.

Figure 19: 2030 Without-Project AM/PM Peak Hour US-50 Freeway and Ramp Volumes

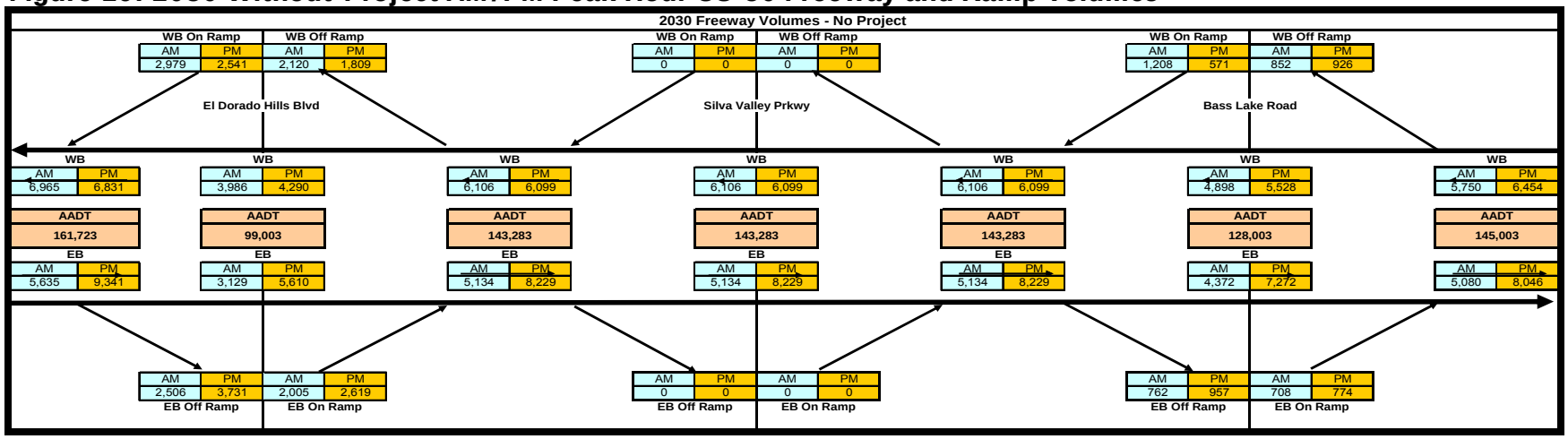


Figure 20: 2030 With-Project AM/PM Peak Hour US-50 Freeway and Ramp Volumes

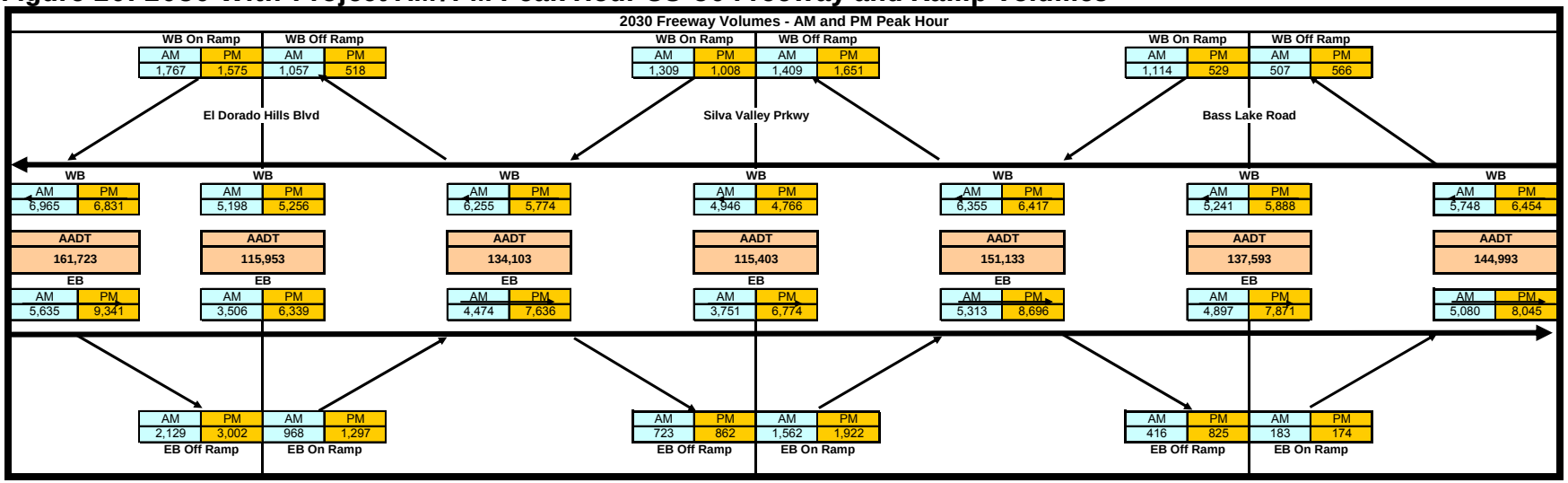
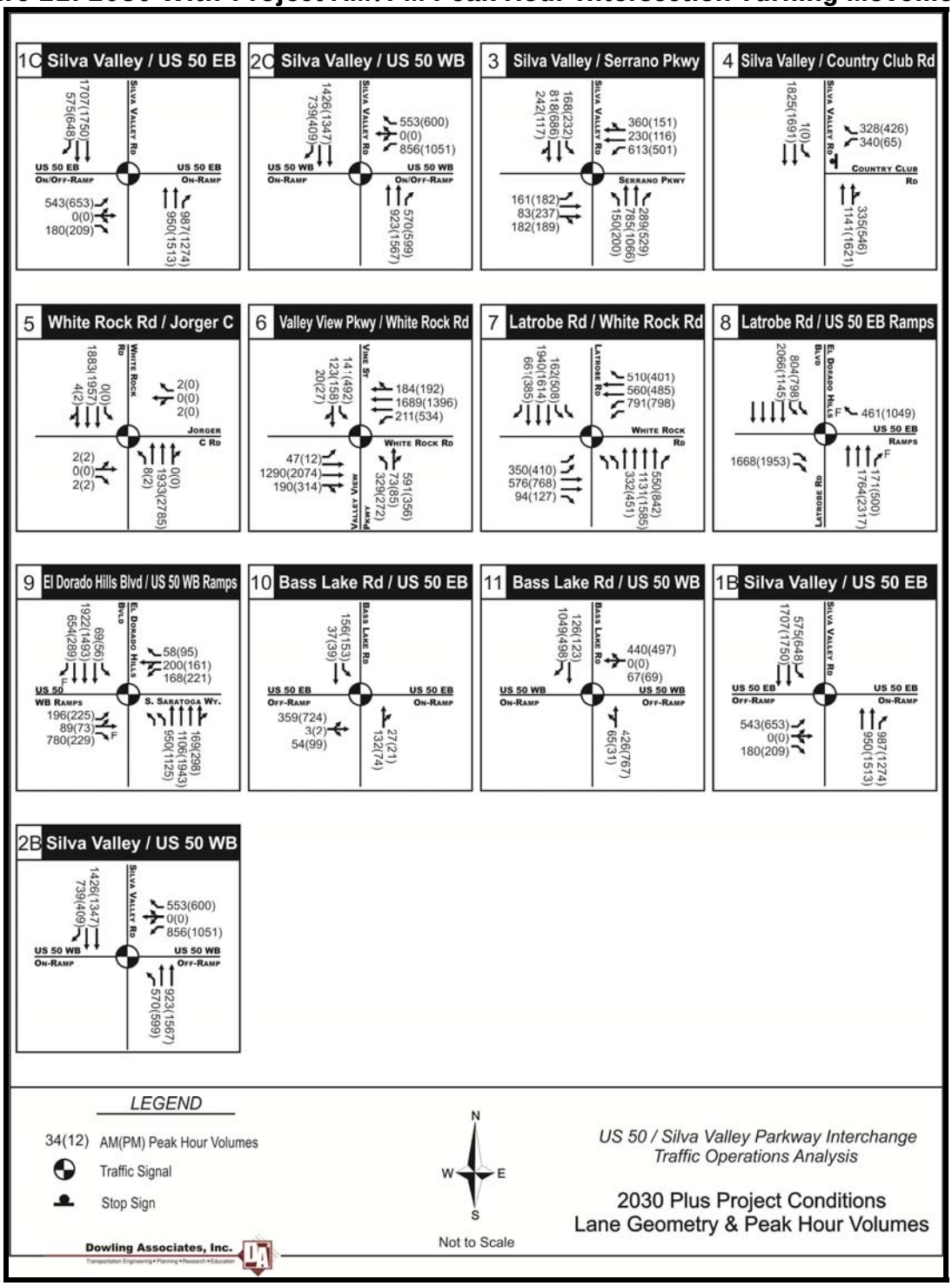


Figure 21: 2030 With-Project AM/PM Peak Hour Intersection Turning Movements



Note: Volumes are identical for Phases 1, 2 and 3 except at Intersections #1 and #2. 1B and 2B show the volumes for Phase 2. 1C and 2C show the volumes for Phase 3.

2030 Intersection Level of Service

Table 26 shows the 2030 AM and PM peak hour intersection LOS results. Detailed LOS worksheets are provided in Appendix B.

Table 29: 2030 Project Intersection Level of Service

#	Syn	Intersection	Control	AM Peak Hour			PM Peak Hour		
				v/c	Delay (secs)	LOS	v/c	Delay (secs)	LOS
1B	111	Silva Valley Pkwy & US-50 EB (Phase 2)	Signal	1.21	71.1	E	1.50	138	F
2B	112	Silva Valley Pkwy & US-50 WB (Phase 2)	Signal	1.26	105	F	1.30	120	F
1C	111	Silva Valley Pkwy & US-50 EB (Phase 3)	Signal	0.83	12	B	0.99	24	C
2C	112	Silva Valley Pkwy & US-50 WB (Phase 3)	Signal	0.87	15	B	0.96	27	C
3	113	Silva Valley Pkwy & Serrano Pkway	Signal	0.91	61	E	0.98	66	E
4	114	Silva Valley Pkwy & Country Club	Signal	0.87	17	B	1.02	24	C
5	115	White Rock Rd & Jorger Cutoff	2-Way Stop	0.54	~0	A	0.64	~0	B
6	116	Valley View & White Rock Road	Signal	1.02	64	E	1.50	197	F
7	117	Latrobe Road & White Rock Road	Signal	1.18	90	F	1.26	114	F
8	118	El Dorado Hills/Latrobe & US-50 EB	Signal	0.78	11	B	0.8	7	A
9	119	El Dorado Hills & US-50 WB	Signal	1.06	51	D	1.00	40	D
10	120	Bass Lake Rd & US-50 EB	Signal	0.44	18	B	0.72	19	B
11	121	Bass Lake Rd & US-50 WB	Signal	0.72	14	B	0.89	22	C

Average delay for 2-way stops is average of delay for major (unstopped) and minor (stopped) movements.
V/c ratio for 2-way stops is Synchro ICU ratio. All other v/c ratios computed per HCM.
LOS for 2-way stops is based in ICU ratio (per Synchro method). All other LOS results are per HCM

LOS results are identical for phases 2 and 3 for all intersections except intersections #1 and #2.

Note: LOS for Int #8 assumes NB Approach and NB loop ramp allows free RT.
Note: LOS for Int #9 assumes free EB and SB RT.

With-Project Results – Phase 2

All of the intersections analyzed for Phase 2 of the project for 2030 would operate at acceptable levels of service during the peak hours except for the following:

- # 7 Latrobe and White Rock.

  - This intersection would exceed LOS standards during both peak hours. Providing a northbound right and left-turn lane and a dedicated eastbound right-turn lane will improve LOS from F to E during both peak hours. These improvements are currently identified in future County CIP projects.

- # 6 Valley View and White Rock.

  - This intersection operates at LOS F during the PM peak hour. Widening the northbound approach to provide a left turn, a shared left-through and a dedicated right turn lane as well as providing dual left turn lanes on the westbound approach and a dedicated right turn on the eastbound approach will allow the intersection to operate at LOS E or better. The improvements to White Rock Road are currently identified in future County CIP projects.

- # 1B Silva Valley and US-50 Eastbound.

  - This LOS deficiency occurs only in the PM peak hour - due to the heavy southbound left turns. This can be mitigated to LOS D or better by constructing a second exclusive southbound left turn lane and widening the eastbound US-50 on-ramp to two-lanes for a portion of its length (so as to receive the dual left turn volumes).

- # 2B Silva Valley and US-50 Westbound

  - This LOS deficiency occurs in both peak hours - due to the heavy northbound and westbound left turns. This can be mitigated to LOS D or better by constructing a second exclusive northbound left turn lane and widening the westbound US-50 on-ramp to two-lanes for a portion of its length (so as to receive the dual left turn volumes).

With-Project Results – Phase 3

All of the intersections analyzed for Phase 2 of the project for 2030 would operate at acceptable levels of service during the peak hours except for the following:

- # 7 Latrobe and White Rock.

  - This intersection would exceed LOS standards during both peak hours. Providing a northbound right and left-turn lane and a dedicated eastbound right-turn lane will improve LOS from F to E during both peak hours. These improvements are currently identified in future County CIP projects.

- # 6 Valley View and White Rock.

  - This intersection operates at LOS F during the PM peak hour. Widening the northbound approach to provide a left turn, a shared left-through and a dedicated right turn lane as well as providing dual left turn lanes on the westbound approach and a dedicated right turn on the eastbound approach will allow the intersection to operate at LOS E or better. Improvements at this intersection are currently identified in future County CIP projects.

2030 Queue Storage Requirements

The required queue storage lengths for 2030 project conditions are presented below.

Table 30: Required Left Turn Storage –2030

Left Turn Pocket Requirements			2030 Project	
Intersection	Control	Dir	Max AM/PM (vph)	Required Storage (ft)
1A Silva Valley & US50 EB	Signal	NB	N/A	N/A
(Phase 1)		SB	N/A	N/A
		EB	N/A	N/A
		WB	N/A	N/A
2A Silva Valley & US50 WB	Signal	NB	N/A	N/A
(Phase 1)		SB	N/A	N/A
		EB	N/A	N/A
		WB	N/A	N/A
1B Silva Valley & US50 EB	Signal	NB	N/A	N/A
(Phase 2)		SB	648	550
		EB	653	550
		WB	N/A	N/A
2B Silva Valley & US50 WB	Signal	NB	599	500
(Phase 2)		SB	N/A	N/A
		EB	N/A	N/A
		WB	1051	900
1C Silva Valley & US50 EB	Signal	NB	N/A	N/A
(Phase 3)		SB	N/A	N/A
		EB	653	550
		WB	N/A	N/A
2C Silva Valley & US50 WB	Signal	NB	N/A	N/A
(Phase 3)		SB	N/A	N/A
		EB	N/A	N/A
		WB	1051	900
3.Silva Valley & Serrano	Signal	NB	200	175
		SB	232	200
		EB	182	175
		WB	613	525
4.Silva Valley & Country Cl	Signal	NB	N/A	N/A
		SB	1	50
		EB	N/A	N/A

Left Turn Pocket Requirements			2030 Project	
Intersection	Control	Dir	Max AM/PM (vph)	Required Storage (ft)
		WB	340	300
5.White Rock & Jorger Cut	2-Way	NB	8	50
	Stop	SB	0	50
		EB	2	50
		WB	2	50
6.Valley View & White Rock	Signal	NB	329	550
		SB	492	825
		EB	47	100
		WB	534	900
7.Latrobe & White Rock	Signal	NB	451	675
		SB	373	550
		EB	410	600
		WB	798	1175
8.El Dorado Hill & US-50 EB	Signal	NB	N/A	N/A
		SB	804	675
		EB	N/A	N/A
		WB	N/A	N/A
9.El Dorado Hill & US-50 WB	Signal	NB	1125	950
		SB	69	75
		EB	216	200
		WB	221	200
10.Bass Lake & US-50 EB	Signal	NB	160	275
		SB	N/A	N/A
		EB	724	625
		WB	N/A	N/A
11.Bass Lake & US-50 WB	Signal	NB	N/A	N/A
		SB	N/A	N/A
		EB	N/A	N/A
		WB	69	75

2030 Freeway Level of Service

2030 US-50 Basic Freeway Segments LOS Results

Table 28 presents the level of service results for the study freeway mainline segments, weaving sections, and ramp junctions under 2030 future conditions. A No-Build Freeway analysis was performed for basic freeway segment only at the request of DOT.

Results indicate that during the AM peak hour, US-50 mainline operations on the mixed flow lanes will operate at LOS D or better in the eastbound direction. In the westbound direction, US-50 mixed flow lanes will also operate at LOS D or better except for the mainline segment west of El Dorado Hills, which will function at LOS E.

During the PM peak hour, eastbound US-50 mainline operations between Silva Valley and El Dorado Hills Boulevard will operate acceptably. East of Silva Valley, the eastbound mixed flow lanes will be characterized by unstable flow conditions with vehicle densities exceeding 45 passenger cars per lane per mile (i.e., LOS F). In addition, US-50 eastbound mainline segment west of El Dorado Hills will operate at LOS E. In the westbound direction, mainline operations will operate in the LOS C-D range.

A weave section along US 50 EB from El Dorado Hills to Silva Valley was evaluated using the methodology described in 2000 Highway Capacity Manual. During the AM and PM peak hours, the US 50 EB weave section from El Dorado Hills to Silva Valley section is projected to operate at LOS D or better. Installation of a ramp meter with a metering rate of 800 vph will improve operations by a full LOS grade improvement (LOS C) during the PM peak hour.

Although not presented, HOV lane operations will operate between 40 and 70 percent of HOV lane capacity (i.e., LOS B to D range). This is based on a 1,650 HOV lane saturation flow rate (i.e., capacity) while assuming that the existing measured percentage of high occupancy vehicles on US-50 of 11.5 percent will not change in the future. Again, this assumes no behavioral response or mode shift to high occupant vehicles despite saturated conditions on the mixed flow lanes by 2030.

Given the latter conservative assumption, Table 31 also presents what would be required in terms of new lane capacity to allow all mainline to operate at or below mixed flow lane capacity. Generally, this will require adding an additional mixed flow lane and/or redefining the HOV lane as a mixed flow lane in the eastbound direction on US-50 between Empire Ranch (PM 22.11 - approximately 1-mile west of El Dorado Hills Interchange) and just east of the Bass Lake Interchange. The estimated mitigation improvements in the westbound direction is to add a mixed flow lane or redefine existing HOV lane just west of El Dorado Hills interchange.

Detailed HCM level of service worksheets for US-50 basic freeway segments and ramp weave operations are provided in Appendix C.

Table 31: 2030 Future Condition - Freeway Level of Service Summary

US 50	AM Peak Density [1] pc/mi/ln	AM Peak LOS [2]	PM Peak Density [1] pc/mi/ln	PM Peak LOS [2]	Mitigation Measure	Mitigated LOS AM	Mitigated LOS PM
2030 No Project Scenario						**AM**	**PM**
Eastbound							
West of El Dorado Hills	19.75	C	36.17	E		---	---
El Dorado Hills to Bass Lake	28.81	D	164.49	F	Convert HOV lane to Mixed Flow Lane	C	F
East of Bass Lake	23.77	C	50.50	F		---	---
Westbound							
East of Bass Lake	27.18	D	31.59	D		---	---
Bass Lake to El Dorado Hills	37.86	E	37.75	E		---	---
West of El Dorado Hills	35.77	E	34.56	D		---	---
2030 Plus Project Scenario							
Eastbound							
West of El Dorado Hills	19.75	C	36.17	E		---	---
El Dorado Hills to Silva Valley [3]	20.11	C	34.67	D		---	---
Silva Valley to Bass Lake	26.48	D	97.72	F	Convert HOV lane to Mixed Flow Lane	C	F
East of Bass Lake	23.77	C	50.50	F		---	---
Westbound							
East of Bass Lake	27.18	D	31.59	D		---	---
Bass Lake to Silva Valley	33.67	D	34.22	D		---	---
Silva Valley to El Dorado Hills	23.22	C	21.42	C		---	---
West of El Dorado Hills	35.77	E	34.56	D		---	---

[1] Density expressed in pc/mi/ln, passenger cars per mile per lane

[2] Level of service is based on density as described in Basic Freeway Segment, Chapter 23, HCM 2000

[3] Denotes a weave section. Level of Service is based on density as described in Freeway Weave, Chapter 24, HCM 2000

2030 US-50 Basic Ramp Merge-Diverge LOS Results

Table 32 presents the level of service results for the study freeway ramp merge-diverge influence area segments.

In 2030 AM peak hour, all ramp merge-diverge influence areas are projected to operate at level of service "D" or better with the except for three merge areas in the westbound direction, such as Bass Lake Rd, Silva Valley Pkwy loop, El Dorado Hills Blvd will operate with unstable flow conditions, i.e. LOS F.

In the PM peak hour, merge sections in both directions are characterized by unstable flow conditions (LOS F) except for the Silva Valley Pkwy SB to WB on-ramp which is estimate to function at LOS C. The eastbound and westbound US-50 diverge sections are anticipated to be operating with stable flows (LOS D or better) with the exception of Bass Lake Rd EB off-ramp which will function at LOS F.

Identified mitigation for the ramp merge-diverge analysis is simply redefining the HOV lane as a mixed use lane. Bass Lake Rd WB on-ramp and EB off-ramp were identified where additional capacity at mixed flow lane and ramp would be required to achieve LOS D or better.

Table 32: 2030 US-50 Merge-Diverge Ramp Analysis

2030 Merge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment												Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
	AM Peak Hour																															
Non-Mitigated Conditions	EDH to US 50 WB ON	WB	On	3	70	4,600	Right	35	1767	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	Yes	39.6	0.8	47	F
	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	3,320	Right	35	1562	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	29.9	0.4	58	D
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,377	Right	35	570	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	Yes	Yes	35.5	0.9	46	F
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	4,882	Right	35	739	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	26.9	0.4	58	C
	Bass Lake to US 50 EB ON	EB	On	3	70	4,334	Right	35	183	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	No	25.6	0.4	60	C
	Bass Lake to US 50 WB ON	WB	On	2	70	4,638	Right	35	1114	1	1500		1	1	0	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	Yes	Yes	41.6	1.6	24	F
Mitigated Conditions	EDH to US 50 WB ON	WB	On	4	70	5,198	Right	35	1767	1	500		1	1	0	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	9600	4600	No	No	22.5	0.3	60	C
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	3	70	4,946	Right	35	570	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	26.0	0.4	59	C
	Bass Lake to US 50 WB ON	WB	On	4	70	5,241	Right	35	1114	1	1500		1	1	0	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	9600	4600	No	No	27.7	0.5	57	C
	PM Peak Hour																															
Non-Mitigated Conditions	EDH to US 50 WB ON	WB	On	3	70	4,651	Right	35	1575	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	No	Yes	38.3	0.7	50	F
	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	5,995	Right	35	1922	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	Yes	Yes	45.4	1.4	31	F
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,218	Right	35	599	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	Yes	Yes	34.5	0.8	48	F
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	4,748	Right	35	409	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	22.8	0.3	61	C
	Bass Lake to US 50 EB ON	EB	On	3	70	6,966	Right	35	174	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	7200	4600	Yes	Yes	38.8	0.7	50	F
	Bass Lake to US 50 WB ON	WB	On	2	70	5,211	Right	35	529	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4800	4600	Yes	Yes	41.9	1.6	24	F
Mitigated Conditions	EDH to US 50 WB ON	WB	On	4	70	5,256	Right	35	1575	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	9600	4600	No	No	22.2	0.3	60	C
	Silva Valley Pkwy to US 50 EB ON	EB	On	4	70	6,774	Right	35	1922	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	9600	4600	No	No	23.9	0.4	60	C
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	3	70	4,766	Right	35	599	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	24.3	0.4	60	C
	Bass Lake to US 50 EB ON	EB	On	4	70	7,871	Right	35	174	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	9600	4600	No	No	27.4	0.4	59	C
	Bass Lake to US 50 WB ON	WB	On	4	70	5,888	Right	35	529	2	1500	100	1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	9600	4600	No	No	-0.2	0.1	66	A

2030 Diverge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment												Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
	AM Peak Hour																															
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	4,987	Right	35	2129	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	3.3	0.6	52.2	A
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	5,536	Right	35	1057	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	19.0	0.5	55.1	B
	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	5,624	Right	35	1409	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	23.7	0.6	54.4	C
	US 50 EB Off to Bass Lake	EB	Off	3	70	4,702	Right	35	416	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	28.2	0.5	56.9	D
	US 50 WB Off to Bass Lake	WB	Off	3	70	5,087	Right	35	507	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	19.8	0.5	56.7	B
	PM Peak Hour																															
Non-Mitigated Conditions	US 50 EB OFF to Latrobe/EDH	EB	Off	4	70	8,267	Right	35	3002	2	1500	100	1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	Yes	No	17.3	0.7	49.8	B
	US 50 WB OFF to EDH-Latrobe	WB	Off	4	70	5,110	Right	35	518	1	1500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	14.4	0.5	56.6	B
	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	5,679	Right	35	1651	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	24.5	0.6	53.7	C
	US 50 EB Off to Bass Lake	EB	Off	3	70	7,696	Right	35	825	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	Yes	Yes	Yes	40.3	0.5	55.8	F
	US 50 WB Off to Bass Lake	WB	Off	3	70	5,712	Right	35	566	1	1500		1	1	1	Level	6%	1.5	0%	1.2	2%	1.5	0%	1.2	4400	No	No	No	22.5	0.5	56.6	C
Mitigated Conditions	US 50 EB Off to Bass Lake	EB	Off	5	70	8,696	Right	35	825	1	500		1	1	1	Rolling	6%	2.5	0%	2	6%	2.5	0%	2	4400	No	No	No	32.5	0.5	55.8	D

Mitigated Conditions treats HOV, truck and auxiliary lanes as mixed flow lanes

2030 Ramp Metering and Queue Spill-Back Analysis

Ramp metering/queue spill-back analysis was performed for US 50 EB and WB on-ramps at El Dorado Hills Boulevard, Silva Valley Parkway and Bass Lake Road for 2030 peak hour conditions.

Ramp meter discharge rates were determined using peak 15 and 5-minute arrival flow rate (vph) and available storage length at an on-ramp. The peak 15 and 5-minute arrival flow rate was computed based on hourly adjusted traffic volumes, Peak Hour Factor (PHF) of 0.92 and % of heavy vehicles/RVs. The ramp meter discharge flow rate was then iteratively adjusted downwards until any further reduction would result in queue spillbacks conditions at the upstream ramp intersection. The resultant peak 15 and 5-minute discharge flow rates were then converted into hourly volumes for input into the merge-diverge analysis if desired.

Table 33 presents the ramp metering analysis for 2030. Ramp metering/queue spillback analysis indicated the minimum value of discharge rate at the ramp meter that would not result in queue spill-backs into the through traffic for the peak 15 and 5-minute periods. No locations are anticipated to experience potential queue spill-back problems if the meter rate is maintained anywhere between estimated minimum value and peak hour traffic volumes.

Table 33: 2030 Ramp Meter Discharge Rate and Queue Spillbacks Analysis Results

Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
El Dorado Hills I/C									
WB On-Ramp	1,564	1,394	1338	1165	1,673	1,696	1,700	OK	OK
EB On-Ramp	857	1,148	608	899	1,844	1,843	1,850	OK	OK
Silva Valley I/C									
NB to WB On-Ramp	504	530	439	464	485	488	500	OK	OK
SB to WB On-Ramp	654	362	587	295	499	493	500	OK	OK
NB to EB On-Ramp (TPM)	873	1,127	688	941	1,374	1,380	1,400	OK	OK
SB to EB On-Ramp (TPM)	509	573	430	498	581	559	580	OK	OK
EB On-Ramp (SPM)	1,382	1,701	1,068	1,346	875	896	1,000	OK	OK
Bass Lake I/C									
WB On-Ramp	1,114	529	929	429	1,295	702	1,300	OK	OK
EB On-Ramp	183	174	241	241	0	0	650	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization
2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

2030 Ramp Metering/Queue Spillback Analysis Results

Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
NB to WB On-Ramp	504	530	338	363	1,235	1,238	1,250	OK	OK
SB to WB On-Ramp	654	362	519	241	999	899	1,000	OK	OK
NB to EB On-Ramp (TPM)	873	1,127	633	886	1,781	1,786	1,800	OK	OK
SB to EB On-Ramp (TPM)	509	573	342	405	1,237	1,247	1,250	OK	OK
EB On-Ramp (SPM)	1,382	1,701	1,068	1,346	875	896	1,000	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization
2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

Traffic Index – Pavement Life Analysis

To facilitate design considerations pertaining to minimum pavement thickness, a Traffic Index (TI) analysis consistent with the Highway Design Manual was developed. TI provides an estimate of traffic loading during the pavement design life. The primary factor for determining pavement load is the projected average annual daily truck volumes (ESAL). TI calculations are presented by lane.

Table 34 shows the projected average annual daily truck volumes and TI results for US-50 at the El Dorado Hills and Bass Lake Road interchanges under 2010 conditions. Table 35 presents the same information under 2030 conditions.

Lane distribution factors, total equivalent single axle load (ESAL) factors and lane distributions used to compute the 2030 TI results above are presented in Appendix D.

Table 36 shows the projected average annual daily truck volumes and TI results for the Silva Valley Parkway over-crossing structure under 2030 conditions.

Table 34: 2010 US-50 ESAL and TI Calculations

Traffic Index Calculations for Construction Year 2010

		US 50 Eastbound					US 50 Westbound				
Location	**Traffic Index**	**Lane 1 - HOV Lane**	**Lane 2 - MU Lane**	**Lane 3 - MU Lane**	**Lane 4 -Truck Climbing**	**Lane 5 - Aux Lane**	**Lane 1 - HOV Lane**	**Lane 2 - MU Lane**	**Lane 3 - MU Lane**	**Lane 4 - MU Lane**	**Lane 5 - Aux Lane**
US 50 West of El Dorado Hills Blvd											
	TI_{10}	10.00	10.00	11.50	12.00	11.50	10.00	10.00	11.50	11.50	11.50
	TI_{20}	10.50	10.50	12.50	13.00	12.50	10.50	10.50	12.50	12.50	12.50
US 50 West of Silva Valley Prkwy											
	TI_{10}	9.50	9.50	11.00	11.50	11.00	9.50	9.50	11.00	11.00	11.00
	TI_{20}	10.50	10.50	12.00	12.50	12.00	10.50	10.50	12.00	12.00	12.00
US 50 West of Bass Lake											
	TI_{10}	9.50	11.50	11.50	11.50	NA [1]	9.50	11.50	11.50	NA	11.50
	TI_{20}	10.50	12.50	12.50	12.50	NA	10.50	12.50	12.50	NA	12.50
US 50 East of Bass Lake											
	TI_{10}	9.50	11.50	11.50	11.50	NA	9.50	11.50	11.50	NA	11.00
	TI_{20}	10.50	12.50	12.50	12.50	NA	10.50	12.50	12.50	NA	12.00

Note 1: NA is used for sections that may not consist of the corresponding functional lane.

Table 35: 2030 US-50 TI Calculations

Traffic Index Calculations for Design Year 2030

		US 50 Eastbound					US 50 Westbound				
Location	**Traffic Index**	**Lane 1 - HOV Lane**	**Lane 2 - MU Lane**	**Lane 3 - MU Lane**	**Lane 4 -Truck Climbing**	**Lane 5 - Aux Lane**	**Lane 1 - HOV Lane**	**Lane 2 - MU Lane**	**Lane 3 - MU Lane**	**Lane 4 - MU Lane**	**Lane 5 - Aux Lane**
US 50 West of El Dorado Hills Blvd											
	TI_{10}	10.50	10.50	12.50	12.50	12.50	10.50	10.50	12.50	12.50	12.50
	TI_{20}	11.50	11.50	13.50	14.00	13.50	11.50	11.50	13.50	13.50	13.50
US 50 West of Silva Valley Prkwy											
	TI_{10}	10.00	10.00	12.00	12.50	12.00	10.00	10.00	12.00	12.00	12.00
	TI_{20}	11.00	11.00	13.00	13.50	13.00	11.00	11.00	13.00	13.00	13.00
US 50 West of Bass Lake											
	TI_{10}	10.50	12.50	12.50	12.50	NA [1]	10.50	12.50	12.50	NA	12.50
	TI_{20}	11.50	13.50	13.50	13.50	NA	11.50	13.50	13.50	NA	13.50
US 50 East of Bass Lake											
	TI_{10}	10.50	12.50	12.50	12.50	NA	10.50	12.50	12.50	NA	12.00
	TI_{20}	11.00	13.50	13.50	13.50	NA	11.00	13.50	13.50	NA	13.00

Note 1: NA is used for sections that may not consist of the corresponding functional lane.

Table 36: 2030 Silva Valley Over-crossing ESAL and TI Calculations

Traffic Index Calculations for Design Year 2030

Location	ESALS NB	ESALS SB	Northbound Lane 1	Northbound Lane 2	Southbound Lane 1	Southbound Lane 2
Lane Distribution Factors			1	1	1	1
Silva Valley Parkway						
10 Year Design Constant - TI 10	5,048,550	5,047,860	5,048,550	5,048,550	1,009,572	1,009,572
20 Year Design Constant - TI 20	10,097,100	10,095,720	10,097,100	10,097,100	2,019,144	2,019,144

Traffic Index Calculations for Design Year 2030

Location	Traffic Index	Northbound Lane 1	Northbound Lane 2	Southbound Lane 1	Southbound Lane 2
	TI_{10}	11.00	11.00	9.00	9.00
	TI_{20}	12.00	12.00	10.00	10.00

Notes

Lane distribution factors based factors used or multi-lane highways.

Peak hour volumes converted to AADT by assuming PM peak hour volumes are 10% of AADT volumes.

Based on 2030 design year volumes assuming 2 lanes in each direction

Interchange Design

Typical attributes considered when evaluating alternative service interchange designs include:

- Traffic Operations
- Safety
- Physical impacts – including right-of-way and environmental issues
- Construction Costs (width, length and span of bridge structure)
- Constructability – including maintenance of traffic.

For purposes of this analysis, the traffic operational and design attributes of two different service interchange types were compared and contrast.

Based on the construction of Phase 1, the diamond interchange "footprint" allows for the construction of loop ramps within the four available interchange quadrants. The preferred quadrant loop ramps design is either a Partial Cloverleaf-A (Parclo-A) or Partial Cloverleaf-B (Parclo-B) design. These designs are shown in Figure 22. To facilitate traffic operations comparison, the forecast 2030 AM peak hour turning movements and LOS are also included in Figure 22 and the 2030 PM peak hour turning movements and LOS are shown in Figure 23. Critical left turns are circled for reference.

A comparative assessment of each of these designs is provided in Table 37 below.

Table 37: Interchange Design Comparison

Attribute	Parclo-A Design	Parclo-B Design
Design	► Applicable to high volume arterial ► Left turn lanes not needed along over-crossing - allows narrower bridge structure. ► Intersection operates without free rights at loop on-ramp intersections - allows narrower bridge ► Left turns onto freeway replaced by right turn loops ► Over-crossing through traffic must stops twice	► Applicable to high volume arterial ► Capacity slightly higher than Parclo-A - however crossing width must accommodate left turn lanes ► Requires free right on EB loop off-ramp - crossing width must accommodate accepting lane. ► Left turns from Freeway replaced by right turn loops ► Over-crossing through traffic stops only once
Traffic Operations	► 2-Phase Signals ► Spreads on-ramp volume in Merge Influence Area ► Per Figure - 2030 Left Turn Volume = 1,704 ► Ramp Intersections Operate at B-D	► 2-Phase Signals ► Spreads off-ramp volume in Diverge Influence Area ► Per Figure - 2030 Left Turn Volume = 1,257 ► Ramp Intersections Operate at B-E

Based on the comparative assessment above, the recommended interchange design for the Silva Valley/US-50 interchange is a Parclo-A. This recommendation is based on:

- With a Parclo-A design, ramp intersections operate at better LOS – despite serving greater number of left turning movements;
- Parclo-A will be cheaper to construct given that the Parclo-B design will require left turn storage and free right turn accepting lanes on the bridge structure.

To examine whether a 4-lane bridge structure is required, a 2020 operational analysis was performed assuming a 2-lane bridge. LOS results indicate that both ramp intersections will operate at LOS F in the PM peak hour. During the AM peak hour, the westbound on-ramp intersection will also operate at LOS F while the eastbound ramp will operate at LOS C.

Figure 22: Parclo-A vs. Parclo-B Service Interchange Design: 2030 AM Peak Hour

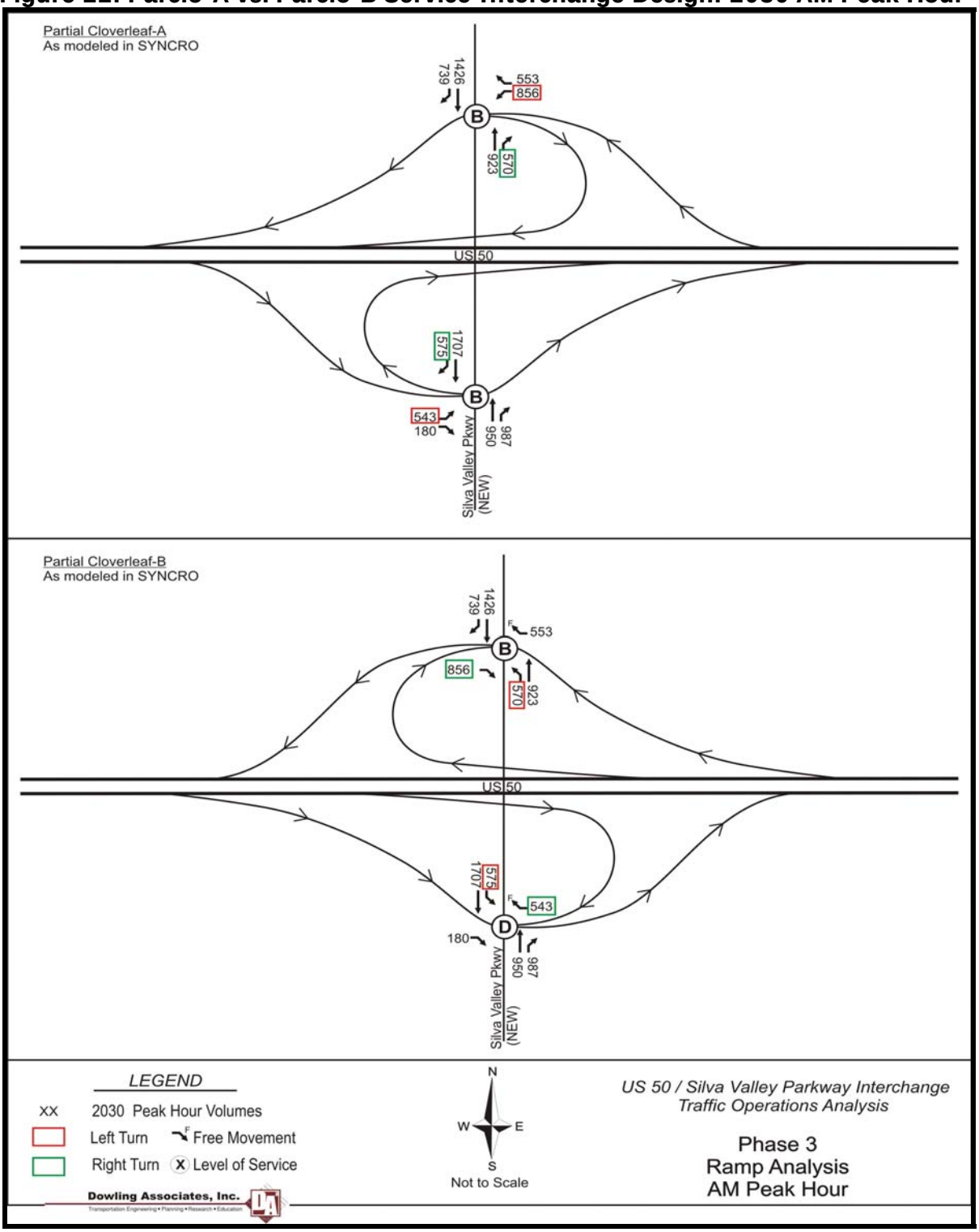
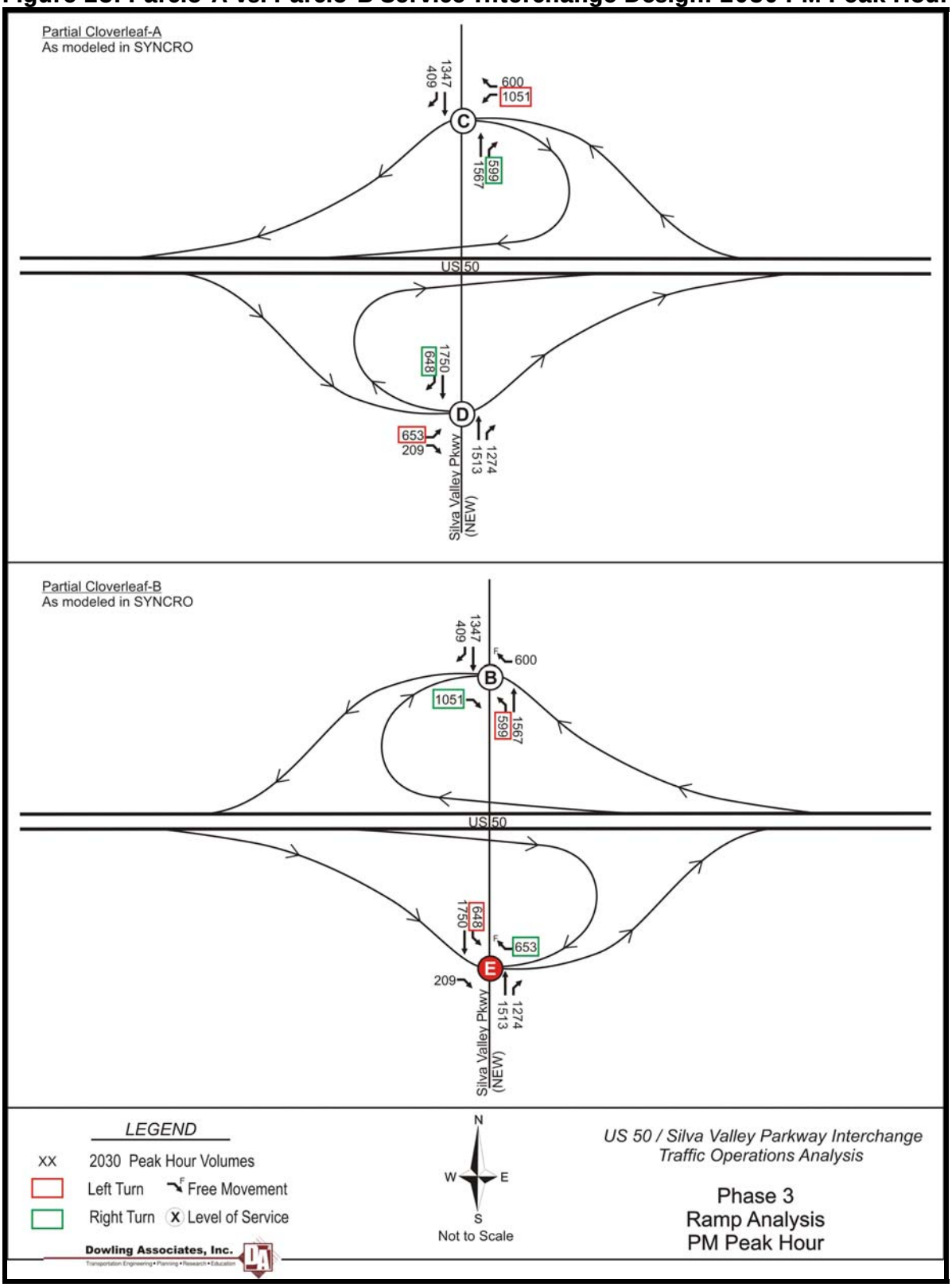


Figure 23: Parclo-A vs. Parclo-B Service Interchange Design: 2030 PM Peak Hour



Project Phase Timing

This section recommends the timing for the phasing of the proposed project.

- Phase 1 of the project consists of construction of new ramps connecting Silva Valley Parkway to US-50, while retaining the existing freeway under-crossing.
- Phase 2 of the project consists of construction of a new 4-lane over-crossing for Silva Valley Parkway.
- Phase 3 consists of the addition two loop on-ramps (Parclo-A design) to supplement the direct on-ramps constructed under Phase 1.

Phase 1: The traffic analysis showed that slight modifications to the proposed designs of the two intersections of Silva Valley Parkway with the new US-50 on and off-ramps would enable Phase 1 of the project to operate satisfactorily in 2010. Further modifications (added lanes) to the design of these intersections would enable Phase 1 to operate satisfactorily through the year 2020. The required left turn storage requirements for the Phase 1 intersections of Silva Valley Parkway with the US-50 ramps are given in Table 12 for 2010 and in Table 20 for 2020.

Phase 2: The traffic analysis showed that Phase 2 of the project would operate satisfactorily in the year 2010 as currently designed. Addition of a second southbound left turn lane at the intersection of Silva Valley with Eastbound US-50 off-ramp is required for Phase 2 to operate satisfactorily through the year 2020. This mitigation would enable this intersection to operate satisfactorily through the year 2030. However, the intersection of Silva Valley with Westbound US-50 off-ramp would require dual northbound and westbound left turn lanes to operate satisfactorily in the year 2030.

While LOS can be made satisfactory for Phase 2 through 2030, it is necessary to also consider the left turn storage requirements on the bridge, which would impact the design of the over-crossing for Phase 2.

At the intersection of Silva Valley with Eastbound US-50, the single southbound left turn lane would require 550 feet for storage in 2010. For 2020 and 2030, the dual southbound left turn lanes would need to be 325 feet long, each, for storage. Deceleration lengths would increase these length requirements. At the intersection of Silva Valley with westbound US-50, the single northbound left turn lane would require 150 feet for storage in 2010. The storage length would need to be increased to 325 feet for 2020. For 2030, the dual northbound left turn lanes would need to be 250 feet long, each, for storage. Deceleration lengths would increase these length requirements.

These storage length requirements effectively preclude consideration of a smaller 2- to 3-lane width Silva Valley bridge over-crossing - regardless of LOS grade.

Phase 3: The traffic analysis showed that Phase 3 would operate satisfactorily as currently designed in the year 2030 (and 2020). Phase 3 eliminates left turn storage requirements for Silva Valley Parkway at its two intersections with US-50. Ramp queue left turn storage requirements are given in Table 20 and Table 27 for 2020 and 2030 respectively.

Summary of Operational Results

The following is a summary of the operational results.

Baseline Analysis

- Volume warrants triggered at EB and WB ramps at Bass Lake Road/US-50
- Unstable mainline operations on EB US-50 west of El Dorado Hill Blvd I/C in PM peak hour. Programmed improvements to US-50 will mitigate.

2010 Analysis Project Phase 1

- Silva Valley at US-50 ramp intersection operations will be deficient unless designed as signalized intersections.
- US-50 mainline and merge-diverge sections for both directions and during both peak hours will be acceptable under both no-project and with-project conditions.

2010 Analysis Project Phase 2 (Same as 2010 Phase 1 except)

- White Rock/Jorger Cutoff PM peak hour operations improve from LOS E to LOS A by construction of Phase 2
- Implementing Phase 2 in 2010 mitigates no-project deficient operating conditions at EB and WB ramp intersections at Bass Lake Road/US-50

2020 Analysis Project Phase 1 (Same as 2010 Phase 1 and)

- Construction of Phase 1 will allow El Dorado Hills & US-50 WB Ramp to operate at an acceptable LOS.
- Silva Valley Parkway/Country Club Drive meets one or more volume warrants.
- Valley View/White Rock will operate deficiently in the PM peak hour under the with-project condition. Provision of dual LT Lanes on WB approach will allow intersection to operate acceptably. Improvements at this intersection are currently identified in future County CIP projects.
- White Rock/Jorger Cutoff will operate deficiently in the AM/PM peak hour under with-project condition. Provide dual LT lanes, a Thru-RT Lane on EB approach; provide dual LT Lane and a Thru-RT Lane on NB approach; provide Thru-LT Lane and a RT Lane on the SB approach; to mitigate.
- Silva Valley at US-50 EB ramp intersection will be deficient in the PM peak hour. Add NB lane to mitigate.
- Unstable mainline operations on EB US-50 east of Silva Valley during the PM peak hour under both the no-project and with-project condition. Identified mitigation is to convert HOV lane to mixed use lane or add a mixed use lane.
- US-50 merge-diverge influence area for WB on-ramp at Bass Lake deficient in AM peak hour under both no-project and with-project conditions. Merge areas of Silva Valley Pkwy to US-50 EB and Bass Lake Rd to US-50 WB deficient in PM peak hour under with project conditions. Identified mitigation is to convert HOV lane to mixed flow lane or add a mixed flow lane.

2020 Analysis Project Phase 2 (Same as 2020 Phase 1 and)

- White Rock/Jorger Cutoff deficiency will be mitigated by constructing Phase 2.
- Silva Valley at US-50 EB ramp intersection will be deficient in the PM peak hour. To mitigate: add SB LT Lane and widen WB on-ramp for a portion of its length to accept LT volumes.

- Silva Valley Parkway bridge structure must be a 4-lane over-crossing or both EB and WB ramp intersections with US-50 will operate deficiently.

2020 Analysis Project Phase 3 (Same as 2020 Phase 2 and)

- Design interchange as Partial Cloverleaf-A design (with diagonal ramps).
- Silva Valley at US-50 EB ramp intersection deficiency will be mitigated by Phase 3.

2030 Analysis Project Phase 2

- Latrobe/White Rock is deficient during the both peak hours. Prove a northbound left and right turn lanes and a dedicated eastbound right-turn lane to mitigate. These improvements are currently identified in future County CIP projects.
- Valley View/White Rock will be deficient in the PM peak hour. Provision of dual LT Lanes on the WB approach, exclusive left and right turn lanes on the NB approach and a dedicated eastbound right-turn lane will allow intersection to operate acceptably. These improvements are currently identified in future County CIP projects.
- White Rock/Jorger Cutoff deficiency is mitigated by construction of Phase 2
- Silva Valley at US-50 EB ramp intersection will be deficient in the PM peak hour. Provide dual LT Lanes on SB approach and widen EB on-ramp for a portion of its length to receive dual left turn volumes to mitigate.
- Silva Valley at US-50 WB ramp intersection will be unacceptable in both peak hours. Provide second exclusive northbound left-turn lane and widen WB on-ramp for a portion of its length for two receiving lanes.
- Unstable mainline operations on EB US-50 east of Silva Valley Pkwy interchange in the PM peak hour only. Segments on EB and WB US-50 west of El Dorado Hills Blvd operate at capacity.
- With exception of Silva Valley Pkwy SB to US-50 WB, all merge influence areas for EB and WB deficient in the PM peak hour under with-project conditions. US-50 EB off-ramp at Bass Lake Rd deficient in the PM peak hour.

2030 Analysis Project Phase 3 (Same as 2030 Phase 2 and)

- Silva Valley at US-50 EB ramp deficiency mitigated by construction of Phase 3.

ATTACHMENT 1

ALTERNATIVE ANALYSIS

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Date: January 4, 2010

Memorandum

To: Paul Hom , El Dorado County Department of Transportation

cc: Silva Valley Pkwy. Interchange Traffic Analysis Project Development Team

From: Jim Damkowitch/Abhi Parikh, Dowling Associates, Inc.

Reference #: P08-004.06

Subject: US 50/Silva Valley Pkwy. Interchange Alternative Phasing Analysis

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As defined in Task Order 2 (Contract # 08-1661) for the Silva Valley Interchange Traffic Study scope of services, a technical memorandum documenting the analysis description, operational results and recommendations is to be developed by Dowling Associates. As a first step towards this end, Dowling Associates has developed this Travel Analysis & Forecasting Methodology memorandum that describes the analysis framework proposed for this traffic study. Formal concurrence from the County and the Project Development Team on the contents of this memorandum will serve to streamline the traffic analysis by precluding the need for re-analysis or changing assumptions mid-way through or near the completion of the traffic study. Dowling Associates will work with the County and PDT to resolve any concerns or issues identified during the review of this memorandum before technical work begins.

The methodology and analysis tools proposed by Dowling Associates, Inc. for the Silva Valley Pkwy Interchange phasing analysis is described herein.

PROJECT BACKGROUND

The Final Traffic Operations Study for US-50 Silva Valley Interchange (Dowling Associates, June 1, 2009) documented the traffic impacts due to the construction of new Silva Valley interchange. As shown in Table 1 and described below, this analysis assumed a 3 phase construction of the interchange

Original Phasing Assumptions

- Phase 1 – consists of diagonal EB and WB on-ramps and off-ramps without an over-crossing, where traffic is routed under US 50 via the existing 2-lane alignment of Silva Valley Pkwy.

- Phase 2 – Consists of two on-ramps and two off-ramps (as in Phase 1) and the over-crossing on a 4- lane Silva Valley Pkwy. but excludes the loop ramps

- Phase 3 – Consists of Phase 2 and addition of WB Loop on-ramp and EB Loop on-ramp. This is the ultimate configuration for the Silva Valley Interchange, expected to be in place by 2030.

The purpose of this analysis is to evaluate the impact of alternative phasing of Silva Valley Interchange on traffic operations in the immediate vicinity of the interchange. Alternative phasing is described below

Alternative Phasing Assumptions

Table 1 below presents the components of the interchange that are going to be constructed under the alternative phasing scenario.

- Alternative Phase 1 – Construction of EB off-ramp, EB Loop on-ramp, WB Diagonal Off-Ramp and WB Diagonal on-ramp and Silva Valley Pkwy Overcrossing on US 50

- Alternative Phase 2 – Ultimate configuration similar to Phase 3 in original phasing. Ultimate configuration is expected to be in place by 2030.

Table 1 Silva Valley Interchange – Construction Phasing Comparison

	Diagonal Ramps				Loop Ramps		
	Eastbound		Westbound		Eastbound	Westbound	Silva Valley Overcrossing on US-50
Phasing	On-Ramp	Off-Ramp	On-Ramp	Off-Ramp	On-Ramp	On-Ramp	
Original Phasing							
Phase 1	Yes	Yes	Yes	Yes	No	No	No
Phase 2	Yes	Yes	Yes	Yes	No	No	**Yes**
Phase 3	Yes	Yes	Yes	Yes	**Yes**	**Yes**	Yes
Alternative Phasing							
Phase 1	No	Yes	Yes	Yes	Yes	No	Yes
Phase 2	**Yes**	Yes	Yes	Yes	Yes	**Yes**	Yes

Note:- **Bold letters** indicates change from previous phase.

The Alternative Phasing assumptions are shown in Figure 1.

In addition to the alternative phasing analysis, this study will also evaluate the following two design modifications for merging the EB Loop on-ramp and EB Diagonal on-ramp with US 50.

1. Merge Loop EB on-ramp into US 50 before merging the diagonal EB on-ramp into US 50

2. Merge Loop EB on-ramp into Diagonal US 50 EB and then merge into US 50

Dowling Associates will base its design recommendation based on operational performance as defined in the Highway Capacity Manual 2000.

STUDY AREA

As defined in the TO-2 scope of work, the traffic operations analysis for alternative phasing will cover the following study intersections

1. Silva Valley Pkwy. and US 50 Eastbound Ramp
2. Silva Valley Pkwy. and US 50 Westbound Ramp
3. Silva Valley Pkwy. and Country Club Drive (future)
4. White Rock Road and Jorger Cuttoff Road

FUTURE TRAFFIC VOLUME FORECASTING

The source of all future traffic volumes used as part of this traffic study is the Final Traffic Operations Study for US-50 Silva Valley Interchange (Dowling Associates, June 1, 2009). The volume set used to generate future volumes for this alternative phasing analysis was based on the Silva Valley I/C Phase 3 analysis forecasts using the El Dorado County DOT traffic model. Per the County's direction, the Silva Valley Interchange travel forecasts reflect annual average traffic conditions i.e., seasonal variation in traffic is not addressed. Unlike other forecasts generated for past studies within El Dorado County, these forecasts explicitly address commercial trucks via an off-model commercial truck volume adjustment.

Future volume forecasting for this analysis is based on the following analysis framework:

1. Study area reflects a closed system – no net change in the study area traffic volume will result from any given phasing alternative.

2. Alternative Phase 1 is a combination of phase 2 and phase 3 of the original phasing analysis. Therefore, turning movement volumes from phase 3 are used as the basis of this analysis.

3. At US 50 **EB Ramps/Silva Valley Pkwy**, the eliminated movements at the Diagonal EB on-ramp are converted from NB Right to NB Left with the assumption that the Loop EB on-ramp will carry the US 50 EB traffic. SB right turn movement to US 50 EB will remain the same

4. Similarly at **US 50 WB Ramps/Silva Valley Pkwy**, eliminated movement from Loop WB on-ramp is converted from NB Right to NB Left assuming the Diagonal WB on-ramp will carry the US 50 WB traffic. SB right turn movement to US 50 WB will remain the same.

Figure 2 and Figure 3 presents the resulting trip diversion for 2020 and 2030 respectively.

Figure 4 presents 2020 Intersection Volumes and Freeway Volumes, Figure 5 presents 2030 Intersection Volumes and Freeway Volumes.

Figure 1 - Silva Valley Parkway I/C Alternative Phasing

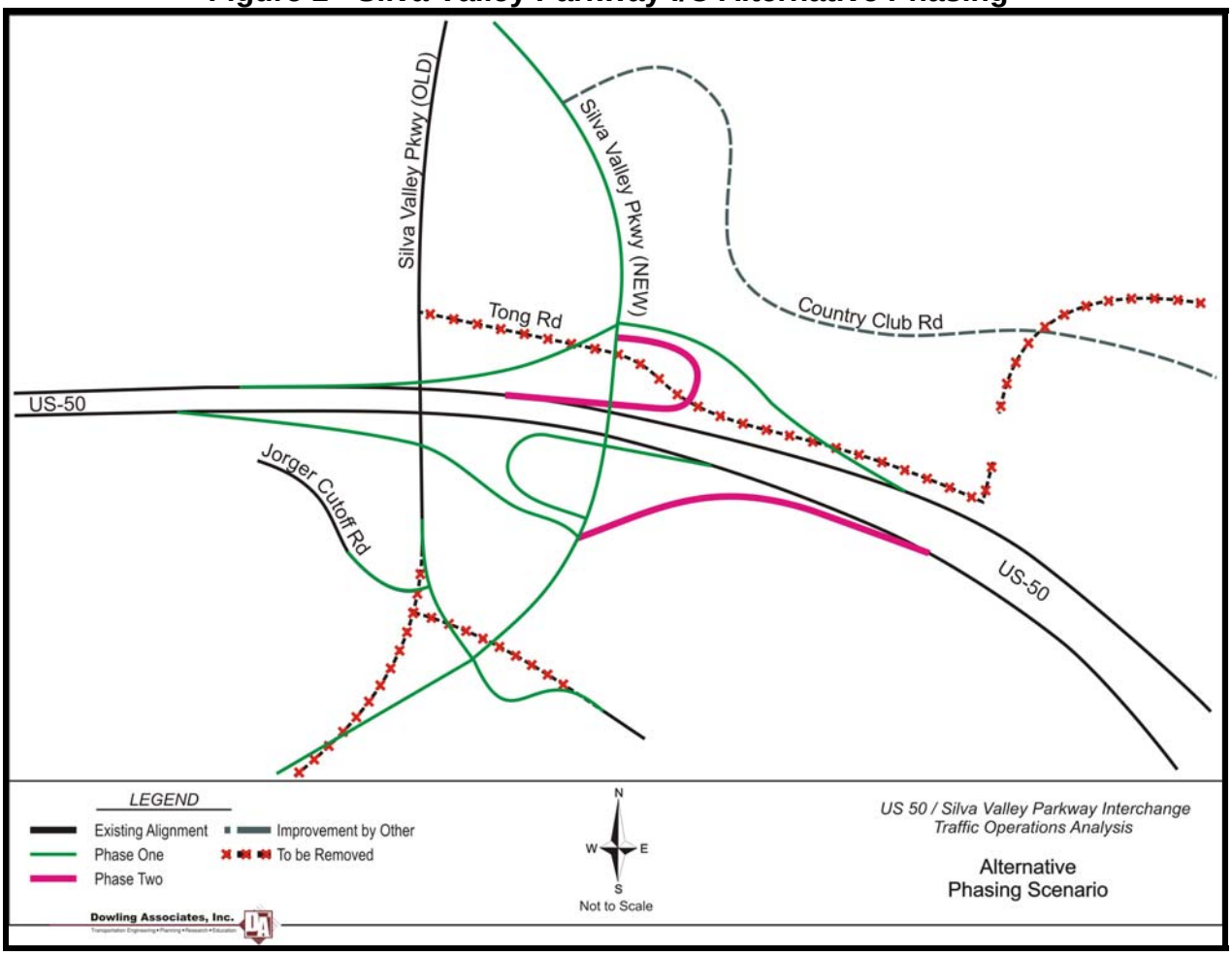


Figure 2 – Future 2020 Volume Diversion

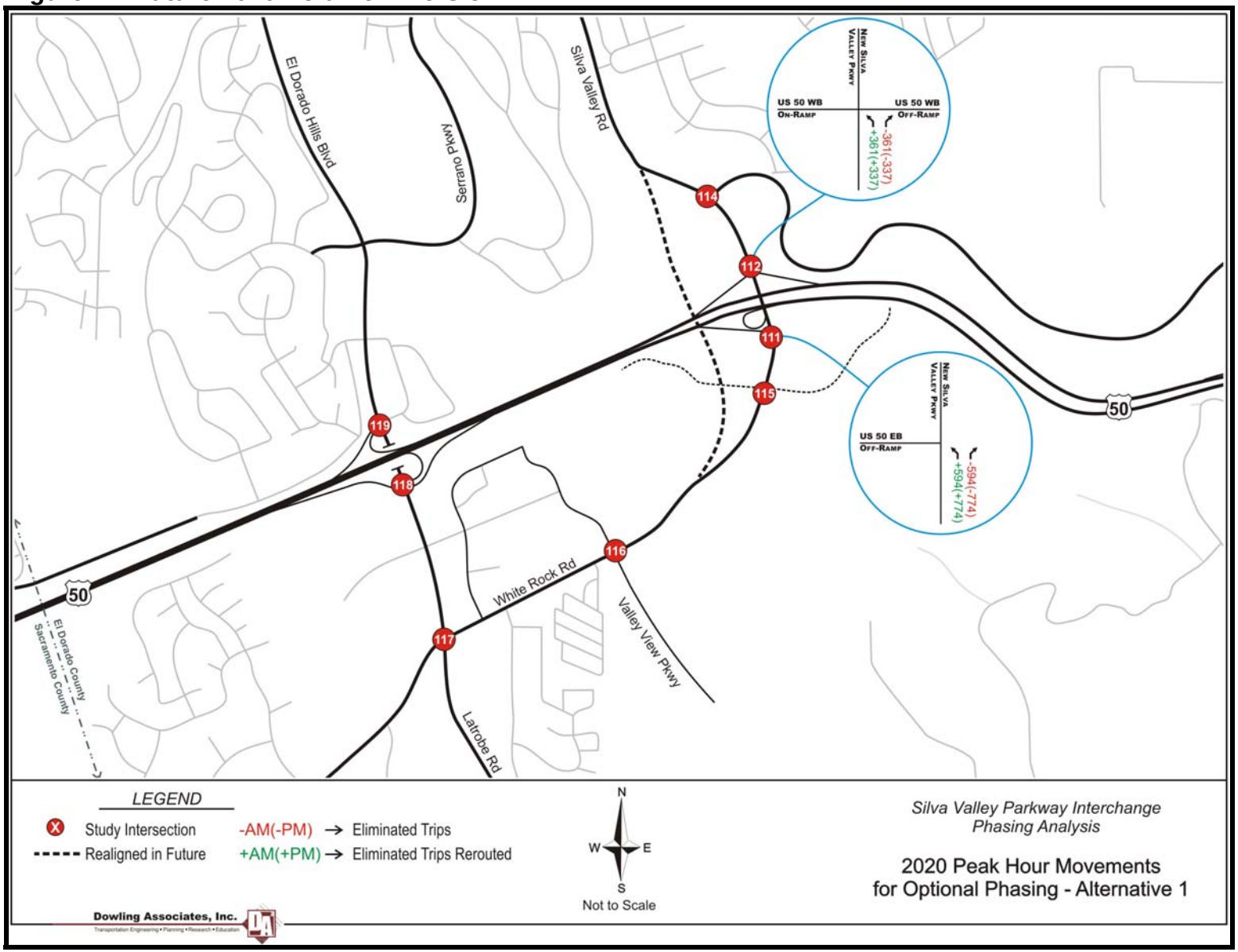


Figure 3 – Future 2030 Volume Diversion

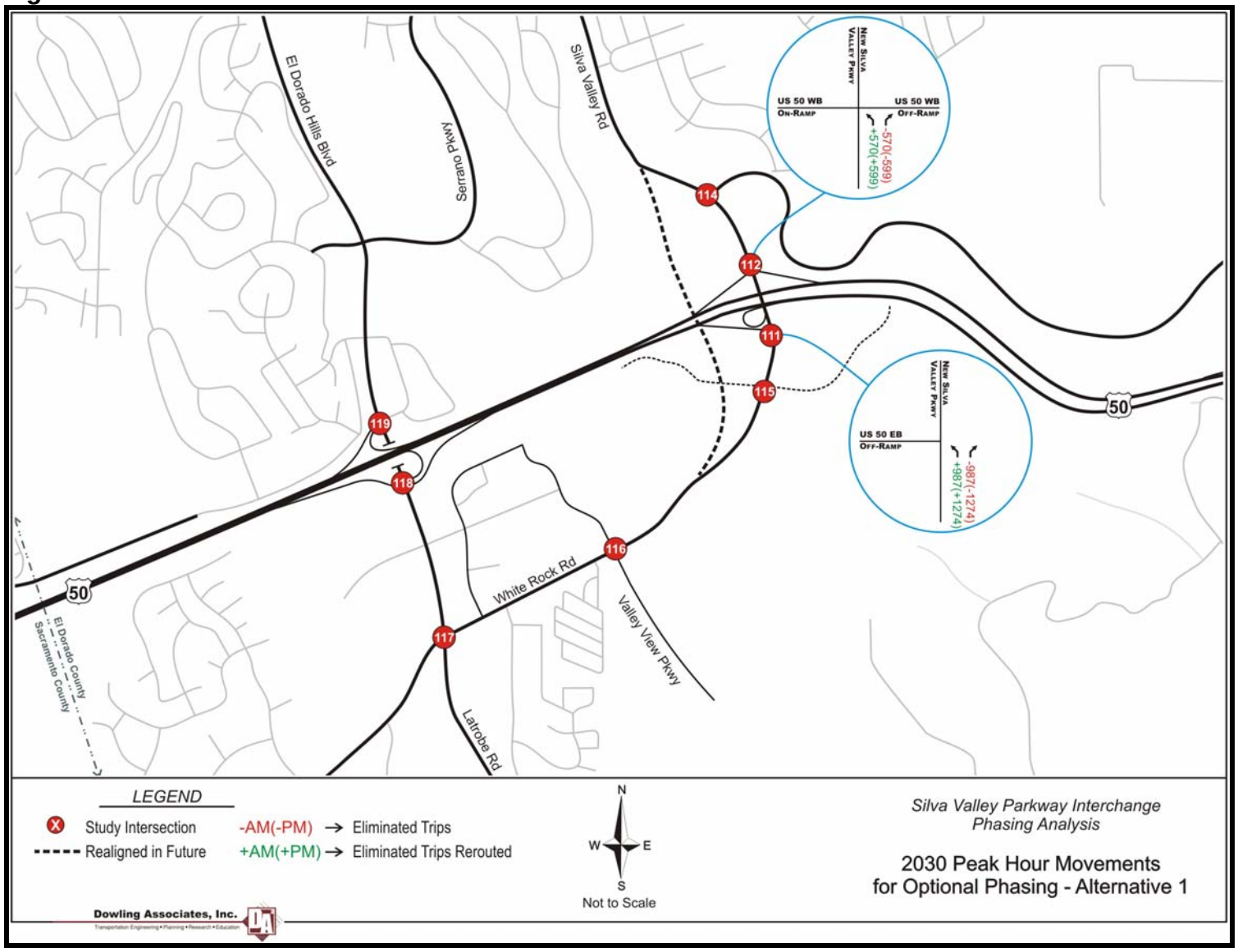


Figure 4 – Future 2020 Intersection and Freeway Volumes

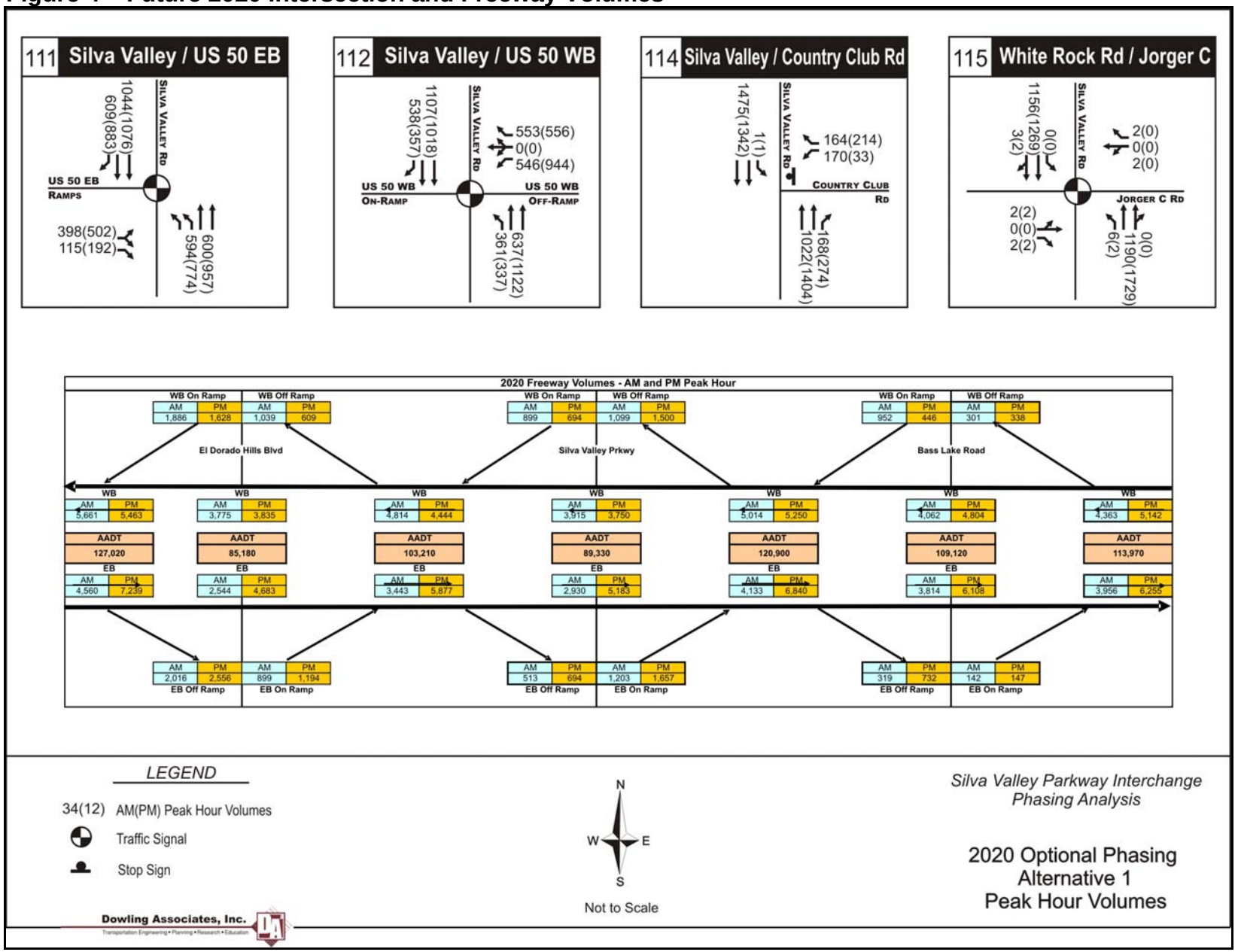
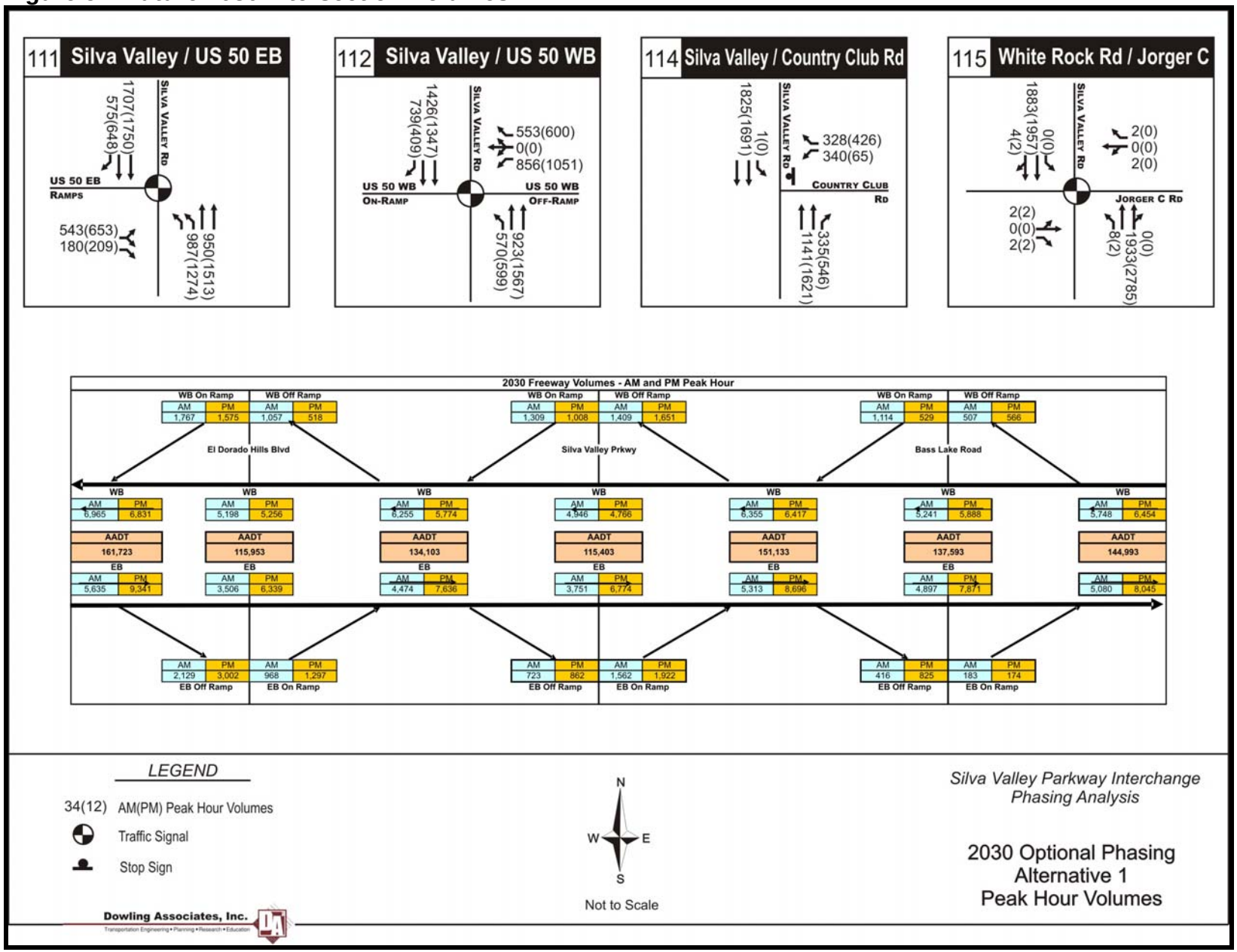


Figure 5 – Future 2030 Intersection Volumes



FUTURE TRAFFIC OPERATIONS ANALYSIS

Generalized operational study methods, analysis criteria and assumptions that will be used for this study are provided in Table 3 below. These are consistent with those used in the Final Traffic Operations Study for US-50 Silva Valley Interchange (Dowling Associates, June 1, 2009).

It should be noted that for state controlled intersections – the Caltrans LOS criteria will be applied to each individual movement. For locally controlled intersection facilities – local agency LOS criteria applies to the intersection as a whole.

Table 3. Operational Analysis Parameters

Operational Analysis Parameter	Silva Valley Parkway Traffic Study TO-2
Analysis Years	2020, 2030
Criteria Significance Local Jurisdiction	LOS E
Criteria Significance State Jurisdiction	LOS D
Travel Demand Model (Primary)	El Dorado DOT Model
US 50 Study Limits	w/o Silva Valley I/C & e/o Silva Valley I/C
Scenarios	Build - Alternative Phasing
Segment Analysis Type	Annual Average Daily Traffic
Intersection Analysis Type	AM & PM Peak Hour
Intersection Operational Analysis	HCM Operational Method
Operational Software Intersections	SYNCHRO-7
Operational Software Freeway Segment	HCM 2000 - HCS Spreadsheets
Operational Software Ramp Merge-Diverge	HCM 2000 - HCS Spreadsheets
Operational Software Weave	HCM 2000
# Intersections	4
	US 50 EB Ramps/Silva Valley Pkwy
	US 50 WB Ramps/Silva Valley Pkwy
	Silva Valley Pkwy/Country Club Drive
	White Rock/Jorger Cutoff

2020 Traffic Operations Analysis

Traffic operations for 2020 AM/PM peak hours were analyzed using the lane geometry assumptions listed under Alternative Phase 1 and turning movement volumes presented in Figure 3. The level of service results for 2020 are presented in Table 4 and detailed LOS worksheets in Appendix A.

As shown in Table 4, all study intersections are forecast to operate at acceptable LOS D or better and meet the LOS threshold criteria identified in Table 3.

Table 4 – 2020 Peak Hour Level of Service

Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
Country Club Drive/Silva Valley Pkwy	8.80	C	9.00	A
US 50 WB Ramps/Silva Valley Pkwy	34.90	C	43.60	D
US 50 EB Ramps/Silva Valley Pkwy	22.90	C	48.70	D
White Rock Road/Jorger Cut-Off	0.1	A	0.1	A
Minor approach delay is higher but ignored due to insignificant volumes.				

2030 Traffic Operations Analysis

2030 peak hour traffic operations were analyzed using the turning movement volumes presented in Figure 4. The resulting LOS results are presented in Table 5.

Table 5 – 2030 Peak Hour Level of Service – Alternative Phase 1

Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
Country Club Drive/Silva Valley Pkwy	22.9	C	27.5	C
US 50 WB Ramps/Silva Valley Pkwy	98.8	**F**	112.5	**F**
US 50 EB Ramps/Silva Valley Pkwy	118.1	**F**	172.1	**F**
White Rock Road/Jorger Cut-Off	2.6	A*	8.4	A*
Minor approach delay is higher but ignored due to insignificant volumes.				

As shown in Table 5, US 50 WB Ramp/Silva Valley Pkwy and US 50 EB Ramps/Silva Valley Pkwy are forecast to operate at unacceptable LOS F.

MITIGATIONS

Year 2020

All study intersections are forecast to operate at acceptable LOS. Therefore no mitigation measures are required for 2020 alternative phasing of Silva Valley Interchange.

Year 2030

Recommended mitigation measure for mitigating the intersections of US 50 EB and WB Ramps with Silva Valley Pkwy is to build a Type L-9 interchange, which includes a diagonal EB On-ramp and Loop WB On Ramp (**i.e. Alternative Phase 2**). This configuration was analyzed as a full buildout configuration in Final Silva Valley Interchange PSR (June 2009, Dowling Associates) and is forecast to operate at acceptable LOS C or better as shown in Table 6.

Table 6 – Mitigated Level of Service

Intersection	2020 Mitigated LOS				2030 Mitigated LOS			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
US 50 WB Ramps/Silva Valley Pkwy	---	---	---	---	15	B	27	**B**
US 50 EB Ramps/Silva Valley Pkwy	---	---	---	---	12	B	24	**B**
**** Worst approach delay reported. Significant but unavoidable impact***								

RAMP METERING ANALYSIS

Ramp metering/queue spill-back analysis was performed for US 50 EB and WB on-ramps at Silva Valley Parkway for 2010, 2020 and 2030 peak hour conditions. The following analyses were performed:

- 2010 Analysis Year — Alternative Phase 1
- 2020 Analysis Year — Alternative Phase 1 & Phase 2
- 2030 Analysis Year — Alternative Phase 1 & Phase 2

Metering analysis was performed using guidelines provided in Chapter 500 (section 504.3) of Highway Design Manual (HDM), 6th Edition. All traffic volumes were adjusted to reflect passenger car equivalents based on the truck classification data collected at each ramp location. Ramp meter discharge rates were iteratively tested to determine the lowest possible rate that would not create vehicle queue lengths which compromised available ramp storage capacity (i.e., preclude queue spill back at ramp intersection). Based on HDM, discharge rate for ramp meters varies from 240 to 900 vehicles per hour per lane (vphpl). This analysis was performed for an equivalent hourly rate during the peak 15 and 5 minutes.

The available storage on the ramp is estimated from engineering design drawings provided by the County, Caltrans, and Mark Thomas & Company. Peak hour traffic volumes as reported in the US 50/Silva Valley Pkwy Interchange Alternative Phasing Analysis technical memorandum (Dowling Associates - January 4, 2010) was used for this evaluation.

It should be noted that purposes of analysis the El Dorado and Silva Valley interchange is assumed to provide an HOV bypass lane for on-ramps. As such, the forecasted traffic volumes were reduced by 11.5% to account for utilization of an HOV bypass lane.

Ramp meter discharge rates were determined using peak 15 and 5-minute arrival flow rates (vph) and available storage length at an on-ramp. The peak 15 and 5-minute arrival flow rate was computed based on hourly adjusted traffic volumes, Peak Hour Factor (PHF) of 0.92 and % of heavy vehicles/RVs. The discharge flow rate was then iteratively adjusted downwards until any further reduction would result in queue spillbacks conditions at the upstream ramp intersection. The resultant peak 15 and 5-minute discharge flow rates were then converted into hourly volumes for input into the merge-diverge analysis.

For queue spillback, two storage assessments were performed - one assuming available storage ends at the ramp intersection (Min Storage) and another assuming available storage extends beyond the ramp intersection and along dedicated right turn lanes – including those on the over-crossing (Max Storage). It should be noted that for Alternative Phase 1 EB loop on-ramp, only the “Min Storage” scenario is available to the NB left turn while the SB right turn onto the loop on-ramp can plausibly be analyzed under the “Max Storage” scenario.

Table 7 through Table 10 present results for optimum discharge rate at ramp meter and queue spillback status under the “Min Storage” assumption for 2010, 2020 and 2030 traffic conditions by Alternative Phase. Table 11 and Table 12 present results for optimum discharge rate at ramp meter and queue spillback status under the “Max Storage” assumption for 2020 and 2030 traffic conditions by Alternative Phase. Detailed spreadsheets for each storage assumption analysis are provided in Appendix G

With the exception of the EB ramp at Silva Valley I/C under 2020 Phase 1, and both the EB and WB ramps under 2030 Phase 1, ramp metering/queue spillback results indicate the minimum value of discharge rate at the ramp meter that would not result in queue spill-back into the through traffic for the peak 15 and 5-minute periods. No other locations are anticipated to experience potential queue spill-back problems if the meter rate is maintained between the minimum rate value and peak hour traffic volumes.

Table 7: 2010 Alt Phase 1 Ramp Metering/Spillback Analysis Results (Min Storage)

2010 Alt Phase I Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
WB On-Ramp	431	335	363	270	504	484	500	OK	OK
EB On-Ramp	743	736	667	658	567	577	580	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization
2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

Table 8: 2020 Alt Phase 1&2 Ramp Metering/Spillback Analysis Results (Min Storage)

2020 Alt Phase I Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
WB On-Ramp	796	614	730	549	485	486	500	OK	OK
EB On-Ramp	1,065	1,466	899	899	1,227	4,203	580	**OVER**	**OVER**
2020 Alt Phase II Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
NB to WB On-Ramp	361	337	253	241	491	427	500	OK	OK
SB to WB On-Ramp	538	357	409	249	494	496	500	OK	OK
NB to EB On-Ramp	594	774	338	498	1,393	1,385	1,400	OK	OK
SB to EB On-Ramp	609	883	460	705	585	568	580	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization
2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

Table 9: 2030 Alt Phase 1&2 Ramp Metering/Spillback Analysis Results (Min Storage)

2030 Alt Phase I Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
WB On-Ramp	1,158	892	899	827	1,922	481	500	**OVER**	OK
EB On-Ramp	1,382	1,701	899	899	3,580	5,939	580	**OVER**	**OVER**
2030 Alt Phase II Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
NB to WB On-Ramp	570	599	439	464	485	488	500	OK	OK
SB to WB On-Ramp	739	409	587	295	499	493	500	OK	OK
NB to EB On-Ramp	987	1,274	688	941	1,374	1,380	1,400	OK	OK
SB to EB On-Ramp	575	648	430	498	581	559	580	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization
2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

Table 10: 2030 Alt Phase 1&2 Ramp Metering/Spillback Analysis Results (Max Storage)

2020 Alt Phase I Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
WB On-Ramp	796	614	663	481	985	986	1,000	OK	OK
EB On-Ramp	1,065	1,466	899	899	1,227	4,203	1,250	OK	**OVER**
2020 Alt Phase II Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
NB to WB On-Ramp	361	337	241	241	585	427	1,250	OK	OK
SB to WB On-Ramp	538	357	342	241	994	558	1,000	OK	OK
NB to EB On-Ramp	594	774	283	443	1,799	1,791	1,800	OK	OK
SB to EB On-Ramp	609	883	473	717	491	474	1,250	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization

2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

Table 11: 2030 Alt Phase 1&2 Ramp Metering/Spillback Analysis Results (Max Storage)

2030 Alt Phase I Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
WB On-Ramp	1,158	892	899	760	1,922	981	1,000	**OVER**	OK
EB On-Ramp	1,382	1,701	899	899	3,580	5,939	1,250	**OVER**	**OVER**
2030 Alt Phase II Ramp Metering/Queue Spillback Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
NB to WB On-Ramp	570	599	338	363	1,235	1,238	1,250	OK	OK
SB to WB On-Ramp	739	409	519	241	999	899	1,000	OK	OK
NB to EB On-Ramp	987	1,274	633	886	1,781	1,786	1,800	OK	OK
SB to EB On-Ramp	575	648	342	405	1,237	1,247	1,250	OK	OK

1 Adjusted for HOV lane bypass lane by assuming 11.5% utilization

2 Based on the engineering design drawings prepared by the County, Caltrans, Mark Thomas & Company and Quincy Engineers

MERGE-DIVERGE ANALYSIS

Merge-diverge analysis was performed using HCM as described in the previous section. Table 13 through Table 17 provide the merge-diverge operational results. As shown, where merge-diverge operations are shown to operate at LOS E or worse – the metering results are shown. Results indicate that construction of Phase 2 (with metering) should occur by 2020 – or deficient ramp merge operations will occur. By 2030, deficient ramp merge are projected regardless of metering due to high peak hour mainline volumes. The latter 2030 operations are also projected assuming the original phasing plan.

Alternative Phase 1 2020 Queue Spillback (No HOV Bypass)

To avoid queue-spillback at the Silva Valley EB on-ramp under 2020 Alternative Phase 1 conditions, it is recommended that striping of the HOV bypass lane be deferred until Alternative Phase 2. This would allow for a two-lane all purpose on-ramp with sufficient storage to accommodate residual queues. Table 12 provides optimum discharge rate and queue spillback status at the EB on-ramp meter assuming no HOV bypass lane. Note that for

this analysis, the 11.5 percent HOV volume reduction was not applied. The resulting ramp merge-diverge analysis is shown in Table 14. Results indicate that with a two-lane metered on-ramp merge operations will improve (LOS E to LOS D) within the merge influence areas of US 50.

Table 12: 2020 Alt Phase 1 Ramp Metering/Spillback – No HOV Bypass (Max Storage)

2020 Alt Phase I Ramp Metering/Queue Spillback Mitigation Analysis Results									
Location	Peak Hour Traffic Volumes (vph) [1]		Minimum Meter Discharge Rate (vph)		Peak 15-min Residual Queues (ft)		Available Storage (ft) [2]	Queue Status	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak		AM Peak	PM Peak
Silva Valley I/C									
EB On-Ramp	1,203	1,657	975	1,431	1,689	1,676	1,700	OK	OK

The merge diverge operational results as previously states are presented as part of Table 13-17.

Table 13: 2010 Alt Phase 1 AM/PM Peak Hour Merge Diverge LOS Worksheet (with Silva Valley I/C)

2010 Merge Analysis

				Freeway-Ramp Components and Characteristics								Volume Adjustment																		
				Freeway Data			On-Ramp Data					Volume Components			Terrain	Volume Composition								Results of Merge Area						
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
AM Peak Hour																															
No Ramp Meter	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	1,868	Right	35	840	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	17.6	0.3	61	B
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	2,621	Right	35	487	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	13.3	0.3	63	B
PM Peak Hour																															
No Ramp Meter	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	3,180	Right	35	832	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	23.7	0.3	60	C
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	2,451	Right	35	379	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	11.1	0.2	63	B

2010 Diverge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment																	
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition								Results of Merge Area						
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
AM Peak Hour																															
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	3,319	Right	35	789	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	12.0	0.5	56.0	B
PM Peak Hour																															
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	3,139	Right	35	777	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	11.1	0.5	56.0	B

Table 14: 2020 Alt Phase 1 AM/PM Peak Hour Merge Diverge LOS Worksheet (with Silva Valley I/C)

2020 Phase I Merge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment																			
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition										Results of Merge Area					
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	E_T (adjacent ramp)	Percent Trucks and Buses on Adjacent Ramp (%)	Percent Recreational Vehicles on Adjacent Ramp (%)	E_R (adjacent ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
AM Peak Hour																																				
No Ramp Meter	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	2,593	Right	35	1203	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	23.8	0.4	60	C
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	3,465	Right	35	899	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	20.8	0.3	61	C
PM Peak Hour																																				
No Ramp Meter	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	4,587	Right	35	1657	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	36.7	0.6	52	E
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	3,195	Right	35	694	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	17.2	0.3	62	B
Ramp Meter @ Min, Max	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	4,587	Right	35	1089	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	32.4	0.5	57	D
Ramp Meter @ Max without HOV Bypass	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	4,587	Right	35	1427	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	34.9	0.6	54	D

2020 Phase I Diverge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment																	
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition								Results of Merge Area					
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
AM Peak Hour																															
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	4,437	Right	35	1099	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	18.0	0.5	55.2	B
PM Peak Hour																															
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	4,522	Right	35	1500	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	19.4	0.6	54.1	B

Table 15: 2020 Alt Phase 2 AM/PM Peak Hour Merge Diverge LOS Worksheet (with Silva Valley I/C)

2020 Phase II Merge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment														Results of Merge Area							
				Freeway Data				On-Ramp Data					Volume Components			Terrain	Volume Composition																		
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Percent Trucks and Buses on Adjacent Ramp (%)	E_T (adjacent ramp)	Percent Recreational Vehicles on Adjacent Ramp (%)	E_R (adjacent ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
AM Peak Hour																																			
No Ramp Meter	Silva Valley Pkwy NB to US 50 EB ON	EB	On	3	70	3,132	Right	35	594	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	21.7	0.3	61	C
	Silva Valley Pkwy SB to US 50 EB ON	EB	On	3	70	2,593	Right	35	609	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	19.3	0.3	61	B
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	3,465	Right	35	361	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	No	No	26.6	0.4	58	C
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	3,465	Right	35	538	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	18.1	0.3	62	B
PM Peak Hour																																			
No Ramp Meter	Silva Valley Pkwy NB to US 50 EB ON	EB	On	3	70	5,368	Right	35	774	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	33.7	0.5	56	D
	Silva Valley Pkwy SB to US 50 EB ON	EB	On	3	70	4,587	Right	35	883	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	30.8	0.4	58	D
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	3,195	Right	35	337	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	No	No	24.3	0.4	60	C
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	3,195	Right	35	357	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	14.7	0.3	63	B

2020 Diverge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment													Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																	
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_f > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
AM Peak Hour																																	
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	4,437	Right	35	1099	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	18.0	0.5	55.2	B
PM Peak Hour																																	
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	4,522	Right	35	1500	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	19.4	0.6	54.1	B

Table 16: 2030 Alt Phase 1 AM/PM Peak Hour Merge Diverge LOS Worksheet (with Silva Valley I/C)

2030 Phase I Merge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment													Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																	
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
AM Peak Hour																																	
No Ramp Meter	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	3,320	Right	35	1562	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	29.9	0.4	58	D
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	4,882	Right	35	1309	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	31.2	0.6	53	D
PM Peak Hour																																	
No Ramp Meter	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	5,995	Right	35	1922	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	Yes	Yes	45.4	1.4	31	F
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	4,748	Right	35	1008	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	27.3	0.4	58	C
Ramp Meter @ Min, Max	Silva Valley Pkwy to US 50 EB ON	EB	On	3	70	5,995	Right	35	1120	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	Yes	Yes	39.3	0.8	49	F

2030 Phase I Diverge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment													Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																	
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_f > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
AM Peak Hour																																	
Non-Mitigated Conditions	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	5,624	Right	35	1409	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	23.7	0.6	54.4	C
PM Peak Hour																																	
Non-Mitigated Conditions	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	5,679	Right	35	1651	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	24.5	0.6	53.7	C

Table 17: 2030 Alt Phase 2 AM/PM Peak Hour Merge Diverge LOS Worksheet (with Silva Valley I/C)

2030 Phase II Merge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment																Results of Merge Area							
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																			
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Acceleration Lane, LA1 (ft.)	Length of 2nd Acceleration Lane, LA2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Percent Trucks and Buses on Adjacent Ramp (%)	E_T (adjacent ramp)	Percent Recreational Vehicles on Adjacent Ramp (%)	E_R (adjacent ramp)	Max. Downstream Freeway Flow, v (pc/h)	Max Desirable Flow Entering Influence Area, V_{R12} (pc/h)	Capacity Check: V_{FO} > Max.	Capacity Check: V_{R12} > Max.	Compute D_R (pc/mi/h)	M_s	Compute S_R (mph)	LOS
AM Peak Hour																																			
No Ramp Meter	Silva Valley Pkwy NB to US 50 EB ON	EB	On	3	70	3,829	Right	35	987	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	28.0	0.4	59	D
	Silva Valley Pkwy SB to US 50 EB ON	EB	On	3	70	3,320	Right	35	575	1	500		1	1	0	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	22.5	0.3	60	C
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,377	Right	35	570	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	Yes	Yes	35.5	0.9	46	F
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	4,882	Right	35	739	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	26.9	0.4	58	C
Ramp Meter @ Min	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,377	Right	35	504	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	Yes	Yes	35.0	0.8	47	F
Ramp Meter @ Max	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,377	Right	35	403	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	Yes	Yes	34.3	0.8	49	F
PM Peak Hour																																			
No Ramp Meter	Silva Valley Pkwy NB to US 50 EB ON	EB	On	3	70	6,569	Right	35	1274	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	Yes	Yes	43.2	1.1	40	F
	Silva Valley Pkwy SB to US 50 EB ON	EB	On	3	70	5,995	Right	35	648	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	35.7	0.6	54	E
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,218	Right	35	599	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4800	4600	Yes	Yes	34.5	0.8	48	F
	Silva Valley Pkwy SB to US 50 WB ON	WB	On	3	70	4,748	Right	35	409	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	22.8	0.3	61	C
Ramp Meter @ Min	Silva Valley Pkwy NB to US 50 EB ON	EB	On	3	70	6,569	Right	35	1088	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	Yes	Yes	41.8	0.9	44	F
	Silva Valley Pkwy SB to US 50 EB ON	EB	On	3	70	5,995	Right	35	573	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	35.2	0.6	54	E
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,218	Right	35	533	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4600	4600	Yes	Yes	34.0	0.7	49	F
Ramp Meter @ Min	Silva Valley Pkwy NB to US 50 EB ON	EB	On	3	70	6,569	Right	35	1033	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	Yes	Yes	41.4	0.9	45	F
	Silva Valley Pkwy SB to US 50 EB ON	EB	On	3	70	5,995	Right	35	480	1	500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	7200	4600	No	No	34.5	0.5	55	D
	Silva Valley Pkwy NB to US 50 WB ON	WB	On	2	70	4,218	Right	35	432	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4600	4600	Yes	Yes	33.2	0.7	51	F

2030 Phase II Diverge Analysis

				Freeway-Ramp Components and Characteristics									Volume Adjustment																			
				Freeway Data			On-Ramp Data						Volume Components			Terrain	Volume Composition																	
ID	Interchange	Direction (NB or SB)	Ramp Type (On or Off)	Number of Lanes on Freeway (Each Direction), N	S_{FF} (mph)	Volume (vph)	Side of Ramp (Left or Right)	S_{FR} (mph)	Volume, V_R (vph)	Lanes on Ramp, N	Length of 1st Deceleration Lane, LD1 (ft.)	Length of 2nd Deceleration Lane, LD2 (ft.)	Freeway PHF	Ramp PHF	Adjacent Ramp PHF	Type (Level, Rolling, Mountainous, Grade, Composite)	Percent Trucks and Buses on Freeway (%)	E_T (fwy)	Percent Recreational Vehicles on Freeway (%)	E_R (fwy)	Percent Trucks and Buses on Ramp (%)	E_T (ramp)	Percent Recreational Vehicles on Ramp (%)	E_R (ramp)	Max Desirable Flow Entering Influence Area, V_{12} (pc/h)	Capacity Check: V_F > Max.	Capacity Check: V_{12} > Max.	Capacity Check: V_{FO} > Max.	Compute D_R (pc/mi/h)	D_s	Compute S_R (mph)	LOS
AM Peak Hour																																
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	5,624	Right	35	1409	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	23.7	0.6	54.4	C
PM Peak Hour																																
Non-Mitigated	US 50 WB Off to Silva Valley Pkwy	WB	Off	3	70	5,679	Right	35	1651	1	1500		1	1	1	Level	6%	1.5	0%	1.2	6%	1.5	0%	1.2	4400	No	No	No	24.5	0.6	53.7	C

RAMP DESIGN RECOMMENDATION

Ultimate configuration for Silva Valley Interchange is assumed to be Partial Clover Leaf "Type A" or Type L-9, as defined in California Highway Design Manual. EB access to US 50 will be provided by building an EB Loop on-ramp for SB Silva Valley Pkwy traffic and EB Diagonal on-ramp for NB Silva Valley Pkwy traffic. The final report for Silva Valley Interchange PSR analyzed the merge-diverge operations on the freeway. This analysis provides recommendation on selecting the most operationally efficient alternative from the following two alternatives

Based on the 2020 operational analysis results presented above, building a EB Loop on-ramp and EB Diagonal on-ramp that merge separately with EB US 50 is recommended.

Freeway operations at merging locations are 'generally'
affected by the interaction of vehicles in the outer two lanes of Freeway and the On Ramp volumes. Given that there are no off-ramps within 1 mile of the EB on-ramps, there is no weaving maneuver and therefore the volumes from the upstream loop on-ramp are expected to begin maneuvering to the inner lanes before the Diagonal on-ramp merges with US 50.

The separate merging of on-ramp reduces the flow rate intensity of the merge by splitting up this demand into two merge platoons at separate locations. This reduces the merging density, providing for better freeway traffic operations. With the increase in volumes beyond 2020, merge alternative 2 is expected to experience even greater operational deficiency given the combined impact of a single merge point with heavy volumes on the freeway.

Therefore, separate merging of US 50 EB Loop on-ramp and US 50 EB Diagonal on-ramp at Silva Valley Pkwy is recommended.

ATTACHMENT 2

US 50 EB Weaving Analyses

B/W El Dorado Hills Blvd and Silva Valley Pkwy

APPENDIX A

Analysis Comparison Sheet

El Dorado Hill I/C Traffic Operations Study

Silva Valley I/C Traffic Operations Study

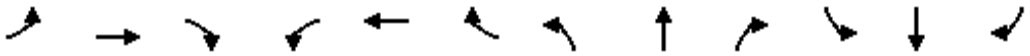
Traffic Study	El Dorado Hills Blvd I/C Traffic Study	Silva Valley Parkway Traffic Study
Analysis Years	2007, 2010, 2030	2007, 2010, 2020, 2030
Criteria Significance Local Jurisdiction	LOS E	LOS E
Criteria Significance State Jurisdiction	LOS D	LOS D
Travel Demand Model (Primary)	El Dorado DOT Model	El Dorado DOT Model
US 50 Study Limits	w/o El Dorado Hills Blvd to e/o Bass Lake	w/o El Dorado Hills Blvd to e/o Bass Lake
Scenarios	Build Scenario	No Build and Build - by Construction Phase
Segment Analysis Type	Average Daily Peak Month Traffic	Annual Average Daily Traffic
Intersection Analysis Type	AM & PM Peak Hour	AM & PM Peak Hour
Operational Analysis	HCM Operational Method	HCM Operational Method
Queue Analysis	95th Percentile Queue	None
Left Turn Storage	Highway Design Manual	Highway Design Manual
Warrant Analysis	Peak Hour Warrant MUTCD	Peak Hour Warrant MUTCD
Operational Software Intersections	SYNCHRO-7	SYNCHRO-7
Operational Software Freeway Segment	HCM 2000 - HCS Spreadsheets	HCM 2000 - HCS Spreadsheets
Operational Software Ramp Merge-Diverge	HCM 2000 - HCS Spreadsheets	HCM 2000 - HCS Spreadsheets
Operational Software Weave	HCM 2000 & HDM	HCM 2000 & HDM
Ramp Metering Analysis	Based on HDM	Based on HDM
Traffic Index - Analysis Type	Annual Average Daily Traffic	Annual Average Daily Traffic
# Intersections	5	11
	White Rock Road/Latrobe Road	White Rock Road/Latrobe Road
	US 50 EB Ramps/Latrobe Road	US 50 EB Ramps/Latrobe Road
	US 50 WB Ramps/El Dorado Hills Blvd	US 50 WB Ramps/El Dorado Hills Blvd
	Town Center Blvd/Latrobe Road	US 50 EB Ramps/Bass Lake
	Saratoga Way/El Dorado Hills Blvd	US 50 WB Ramps/Bass Lake
		US 50 EB Ramps/Silva Valley Pkwy
		US 50 WB Ramps/Silva Valley Pkwy
		Silva Valley Pkwy/Serrano Pkwy
		Silva Valley Pkwy/Country Club Drive
		White Rock/Jorger Cutoff
		Valley View/White Rock

APPENDIX B

Intersection Level of Service Calculation Worksheets

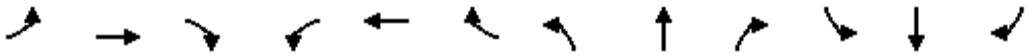
Existing

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	82	105	217	227	329	91	132	68	166	212	221
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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	0.91		1.00	1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3241		1770	3225		1770	3539	1583	1770	3268	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3241		1770	3225		1770	3539	1583	1770	3268	
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)	173	89	114	236	247	358	99	143	74	180	230	240
RTOR Reduction (vph)	0	94	0	0	285	0	0	0	59	0	184	0
Lane Group Flow (vph)	173	109	0	236	320	0	99	143	15	180	286	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	8.1	8.8		9.5	10.2		3.9	10.4	10.4	5.1	11.6	
Effective Green, g (s)	8.1	8.8		9.5	10.2		3.9	10.4	10.4	5.1	11.6	
Actuated g/C Ratio	0.16	0.18		0.19	0.20		0.08	0.21	0.21	0.10	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	288	573		338	661		139	739	331	181	761	
v/s Ratio Prot	c0.10	0.03		c0.13	0.10		0.06	0.04		c0.10	c0.09	
v/s Ratio Perm									0.01			
v/c Ratio	0.60	0.19		0.70	0.48		0.71	0.19	0.05	0.99	0.38	
Uniform Delay, d1	19.3	17.5		18.8	17.5		22.4	16.2	15.7	22.3	16.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.5	0.2		6.2	0.6		15.8	0.1	0.1	64.9	0.3	
Delay (s)	22.9	17.6		25.0	18.0		38.2	16.4	15.8	87.3	16.4	
Level of Service	C	B		C	B		D	B	B	F	B	
Approach Delay (s)		20.0			20.0			23.1			36.0	
Approach LOS		C			B			C			D	

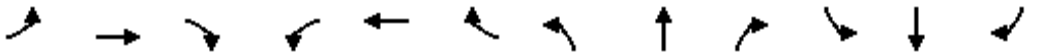
Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	1	1	0	1	1	203	1	1	543	1
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)	1	0	1	1	0	1	1	221	1	1	590	1
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	817	817	591	817	817	221	591			222		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	817	817	591	817	817	221	591			222		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	294	310	507	294	310	818	984			1347		

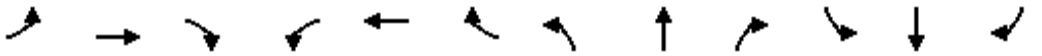
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	2	223	592
Volume Left	1	1	1	1
Volume Right	1	1	1	1
cSH	372	433	984	1347
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	14.7	13.4	0.1	0.0
Lane LOS	B	B	A	A
Approach Delay (s)	14.7	13.4	0.1	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	39.3%	ICU Level of Service	A	
Analysis Period (min)	15			



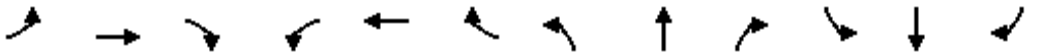
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	163	38	20	481	42	154	9	31	9	8	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.88		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1770	1840		1770	1647		1770	1741	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1810		1770	1840		1770	1647		1770	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)	15	177	41	22	523	46	167	10	34	10	9	7
RTOR Reduction (vph)	0	12	0	0	4	0	0	24	0	0	6	0
Lane Group Flow (vph)	15	206	0	22	565	0	167	20	0	10	10	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	20.0		0.7	20.0		7.1	15.7		0.7	9.3	
Effective Green, g (s)	0.7	20.0		0.7	20.0		7.1	15.7		0.7	9.3	
Actuated g/C Ratio	0.01	0.38		0.01	0.38		0.13	0.30		0.01	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	23	682		23	693		237	487		23	305	
v/s Ratio Prot	0.01	0.11		c0.01	c0.31		c0.09	c0.01		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.65	0.30		0.96	0.81		0.70	0.04		0.43	0.03	
Uniform Delay, d1	26.1	11.6		26.2	14.9		22.0	13.3		26.0	18.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.9	0.3		166.5	7.3		9.2	0.0		12.6	0.0	
Delay (s)	77.0	11.9		192.7	22.2		31.2	13.4		38.6	18.2	
Level of Service	E	B		F	C		C	B		D	B	
Approach Delay (s)		16.1			28.5			27.4			26.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



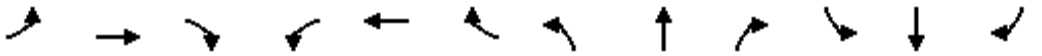
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	73	16	160	231	210	60	325	70	68	1025	613
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.98			1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1716			1825	1583	1770	3445		1770	3539	1583
Flt Permitted	0.95	0.99			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1716			1825	1583	1770	3445		1770	3539	1583
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	79	17	174	251	228	65	353	76	74	1114	666
RTOR Reduction (vph)	0	7	0	0	0	0	0	20	0	0	0	339
Lane Group Flow (vph)	112	107	0	0	425	228	65	409	0	74	1114	327
Turn Type	Split			Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	11.8	11.8			26.9	26.9	4.9	27.1		18.2	40.4	40.4
Effective Green, g (s)	11.8	11.8			26.9	26.9	4.9	27.1		18.2	40.4	40.4
Actuated g/C Ratio	0.12	0.12			0.27	0.27	0.05	0.27		0.18	0.40	0.40
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	198	202			491	426	87	934		322	1430	640
v/s Ratio Prot	c0.07	0.06			c0.23		c0.04	0.12		0.04	c0.31	
v/s Ratio Perm						0.14						0.21
v/c Ratio	0.57	0.53			0.87	0.54	0.75	0.44		0.23	0.78	0.51
Uniform Delay, d1	41.7	41.5			34.8	31.2	46.9	30.2		34.9	25.9	22.4
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.60	0.57	1.09
Incremental Delay, d2	3.7	2.5			14.7	1.3	29.0	1.5		0.2	2.8	1.9
Delay (s)	45.4	44.0			49.6	32.5	76.0	31.6		21.1	17.5	26.2
Level of Service	D	D			D	C	E	C		C	B	C
Approach Delay (s)		44.7			43.6			37.5			20.7	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



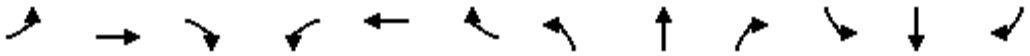
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1175	0	0	423	0	652	203	213	1122	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.95	1.00	1.00	0.95	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		3539	1583	1770	3539	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		3539	1583	1770	3539	
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)	0	0	1277	0	0	460	0	709	221	232	1220	0
RTOR Reduction (vph)	0	0	16	0	0	0	0	0	57	0	0	0
Lane Group Flow (vph)	0	0	1261	0	0	460	0	709	164	232	1220	0
Turn Type			custom			Free			Perm	Prot		
Protected Phases			5					2		1	6	
Permitted Phases						Free			2			
Actuated Green, G (s)			51.0			100.0		74.3	74.3	17.7	41.0	
Effective Green, g (s)			51.0			100.0		74.3	74.3	17.7	41.0	
Actuated g/C Ratio			0.51			1.00		0.74	0.74	0.18	0.41	
Clearance Time (s)			4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)			3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)			1421			1611		2629	1176	313	1451	
v/s Ratio Prot			c0.45					0.20		0.13	c0.34	
v/s Ratio Perm						0.29			0.10			
v/c Ratio			0.89			0.29		0.27	0.14	0.74	0.84	
Uniform Delay, d1			21.9			0.0		4.1	3.7	39.0	26.6	
Progression Factor			1.00			1.00		0.52	0.32	0.79	0.81	
Incremental Delay, d2			7.1			0.4		0.2	0.2	5.1	3.4	
Delay (s)			29.0			0.4		2.4	1.4	36.1	24.9	
Level of Service			C			A		A	A	D	C	
Approach Delay (s)		29.0			0.4			2.2			26.7	
Approach LOS		C			A			A			C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	634	0	258	395	680	0	0	701	1177
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
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.91	0.91
Frt				1.00	1.00	0.85	1.00	1.00			0.93	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	3539			3158	1441
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	3539			3158	1441
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)	0	0	0	689	0	280	429	739	0	0	762	1279
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	148	325
Lane Group Flow (vph)	0	0	0	344	345	280	429	739	0	0	1254	314
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				23.8	23.8	23.8	15.0	68.2			49.2	49.2
Effective Green, g (s)				23.8	23.8	23.8	15.0	68.2			49.2	49.2
Actuated g/C Ratio				0.24	0.24	0.24	0.15	0.68			0.49	0.49
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				400	400	377	515	2414			1554	709
v/s Ratio Prot							c0.12	0.21			c0.40	
v/s Ratio Perm				0.20	0.21	0.18						0.22
v/c Ratio				0.86	0.86	0.74	0.83	0.31			0.81	0.44
Uniform Delay, d1				36.5	36.5	35.3	41.3	6.4			21.4	16.5
Progression Factor				1.00	1.00	1.00	0.83	0.59			0.45	0.38
Incremental Delay, d2				16.9	17.2	7.7	10.8	0.3			4.1	1.8
Delay (s)				53.4	53.7	43.0	45.1	4.1			13.7	8.1
Level of Service				D	D	D	D	A			B	A
Approach Delay (s)		0.0			50.5			19.1			12.0	
Approach LOS		A			D			B			B	

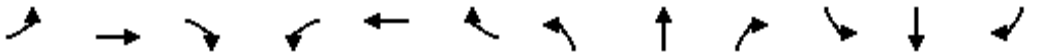
Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	214	1	5	0	0	0	0	36	4	87	5	0
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)	233	1	5	0	0	0	0	39	4	95	5	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	236	238	5	242	236	41	5			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236	238	5	242	236	41	5			43		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	66	100	99	100	100	100	100			94		
cM capacity (veh/h)	685	623	1078	675	625	1030	1616			1565		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	239	43	100
Volume Left	233	0	95
Volume Right	5	4	0
cSH	691	1700	1565
Volume to Capacity	0.35	0.03	0.06
Queue Length 95th (ft)	39	0	5
Control Delay (s)	12.9	0.0	7.1
Lane LOS	B		A
Approach Delay (s)	12.9	0.0	7.1
Approach LOS	B		

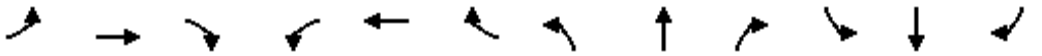
Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	30.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	7	0	79	26	224	0	0	85	759
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	8	0	86	28	243	0	0	92	825
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	392	392	92	392	1217	243	917			243		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	392	392	92	392	1217	243	917			243		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	100	89	96			100		
cM capacity (veh/h)	491	523	965	551	174	795	744			1323		

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	93	272	92	825
Volume Left	8	28	0	0
Volume Right	86	0	0	825
cSH	768	744	1700	1700
Volume to Capacity	0.12	0.04	0.05	0.49
Queue Length 95th (ft)	10	3	0	0
Control Delay (s)	10.3	1.4	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.3	1.4	0.0	
Approach LOS	B			

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	75.5%	ICU Level of Service	D	
Analysis Period (min)	15			



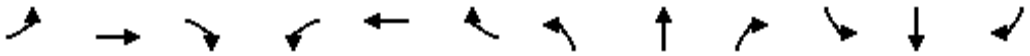
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	6	5	96	43	276	45	561	57	499	1714	528
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
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)	3433	1863	1583	1770	1863	1583	3433	3539	1583	3433	3539	1583
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)	3433	1863	1583	1770	1863	1583	3433	3539	1583	3433	3539	1583
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)	26	7	5	104	47	300	49	610	62	542	1863	574
RTOR Reduction (vph)	0	0	5	0	0	266	0	0	32	0	0	154
Lane Group Flow (vph)	26	7	0	104	47	34	49	610	30	542	1863	420
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	4.0	4.0	4.0	11.4	11.4	11.4	3.2	47.7	47.7	20.9	65.4	65.4
Effective Green, g (s)	4.0	4.0	4.0	11.4	11.4	11.4	3.2	47.7	47.7	20.9	65.4	65.4
Actuated g/C Ratio	0.04	0.04	0.04	0.11	0.11	0.11	0.03	0.48	0.48	0.21	0.65	0.65
Clearance 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
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	75	63	202	212	180	110	1688	755	717	2315	1035
v/s Ratio Prot	c0.01	0.00		c0.06	0.03		0.01	c0.17		0.16	c0.53	
v/s Ratio Perm			0.00			0.02			0.02			0.27
v/c Ratio	0.19	0.09	0.00	0.51	0.22	0.19	0.45	0.36	0.04	0.76	0.80	0.41
Uniform Delay, d1	46.4	46.3	46.1	41.7	40.3	40.1	47.5	16.5	13.9	37.2	12.6	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.61	0.37	0.39	1.02	0.82	0.76
Incremental Delay, d2	0.7	0.5	0.0	2.2	0.5	0.5	2.7	0.6	0.1	3.1	2.1	0.8
Delay (s)	47.1	46.8	46.1	43.9	40.8	40.6	31.6	6.7	5.5	40.9	12.5	7.0
Level of Service	D	D	D	D	D	D	C	A	A	D	B	A
Approach Delay (s)		46.9			41.4			8.3			16.6	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	279	53	706	253	73	1671
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.91		1.00	0.91
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	1583	4884		1770	5085
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	1583	4884		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	58	767	275	79	1816
RTOR Reduction (vph)	0	44	64	0	0	0
Lane Group Flow (vph)	303	14	978	0	79	1816
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	24.0	24.0	48.0		16.0	68.0
Effective Green, g (s)	24.0	24.0	48.0		16.0	68.0
Actuated g/C Ratio	0.24	0.24	0.48		0.16	0.68
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	824	380	2344		283	3458
v/s Ratio Prot	c0.09		0.20		0.04	c0.36
v/s Ratio Perm		0.01				
v/c Ratio	0.37	0.04	0.42		0.28	0.53
Uniform Delay, d1	31.7	29.1	16.9		36.9	8.0
Progression Factor	1.00	1.00	0.97		0.87	0.39
Incremental Delay, d2	1.3	0.2	0.5		1.4	0.3
Delay (s)	32.9	29.3	16.8		33.7	3.5
Level of Service	C	C	B		C	A
Approach Delay (s)	32.4		16.8			4.7
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

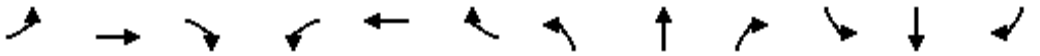


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	20	337	42	7	103	187	525	47	232	1365	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.91		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.86		1.00	0.99		1.00	0.99	
Flt Protected	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1706	1583	1770	1602		1770	5023		1770	3491	
Flt Permitted	0.95	0.96	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1706	1583	1770	1602		1770	5023		1770	3491	
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)	146	22	366	46	8	112	203	571	51	252	1484	148
RTOR Reduction (vph)	0	0	183	0	103	0	0	8	0	0	6	0
Lane Group Flow (vph)	83	85	183	46	17	0	203	614	0	252	1626	0
Turn Type	Split		pm+ov	Split			Prot			Prot		
Protected Phases	4	4	5	8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	10.3	10.3	20.3	8.2	8.2		10.0	46.2		19.3	55.5	
Effective Green, g (s)	10.3	10.3	20.3	8.2	8.2		10.0	46.2		19.3	55.5	
Actuated g/C Ratio	0.10	0.10	0.20	0.08	0.08		0.10	0.46		0.19	0.56	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	173	176	385	145	131		177	2321		342	1938	
v/s Ratio Prot	0.05	0.05	c0.05	c0.03	0.01		c0.11	0.12		0.14	c0.47	
v/s Ratio Perm			0.07									
v/c Ratio	0.48	0.48	0.47	0.32	0.13		1.15	0.26		0.74	0.84	
Uniform Delay, d1	42.3	42.3	35.1	43.3	42.6		45.0	16.5		38.0	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.66	0.52		1.00	1.00	
Incremental Delay, d2	2.1	2.1	0.9	1.3	0.5		110.3	0.3		8.0	4.6	
Delay (s)	44.4	44.4	36.1	44.5	43.1		140.1	8.9		46.0	23.1	
Level of Service	D	D	D	D	D		F	A		D	C	
Approach Delay (s)		38.7			43.5			41.1			26.2	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

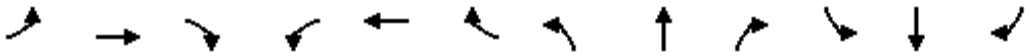
Existing

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	234	98	81	115	151	98	129	164	175	74	105
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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.96		1.00	0.91		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3382		1770	3238		1770	3539	1583	1770	3227	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3382		1770	3238		1770	3539	1583	1770	3227	
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)	198	254	107	88	125	164	107	140	178	190	80	114
RTOR Reduction (vph)	0	69	0	0	140	0	0	0	148	0	87	0
Lane Group Flow (vph)	198	292	0	88	149	0	107	140	30	190	107	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	11.1	14.1		4.5	7.5		4.7	8.6	8.6	8.1	12.0	
Effective Green, g (s)	11.1	14.1		4.5	7.5		4.7	8.6	8.6	8.1	12.0	
Actuated g/C Ratio	0.22	0.27		0.09	0.15		0.09	0.17	0.17	0.16	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	383	930		155	473		162	593	265	279	755	
v/s Ratio Prot	c0.11	c0.09		c0.05	0.05		0.06	c0.04		c0.11	c0.03	
v/s Ratio Perm									0.02			
v/c Ratio	0.52	0.31		0.57	0.31		0.66	0.24	0.11	0.68	0.14	
Uniform Delay, d1	17.7	14.8		22.5	19.6		22.5	18.5	18.1	20.4	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.2		4.7	0.4		9.7	0.2	0.2	6.7	0.1	
Delay (s)	18.9	15.0		27.2	20.0		32.2	18.7	18.3	27.1	15.7	
Level of Service	B	B		C	B		C	B	B	C	B	
Approach Delay (s)		16.4			21.7			21.9			21.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



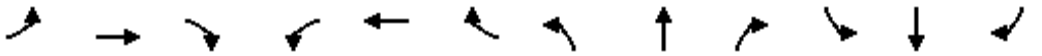
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	1	1	0	1	1	570	1	1	230	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	1	1	0	1	1	620	1	1	250	1
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	876	876	251	876	876	620	251			621		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	876	876	251	876	876	620	251			621		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	268	287	788	269	287	488	1314			960		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	2	622	252
Volume Left	1	1	1	1
Volume Right	1	1	1	1
cSH	400	346	1314	960
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	14.0	15.5	0.0	0.0
Lane LOS	B	C	A	A
Approach Delay (s)	14.0	15.5	0.0	0.0
Approach LOS	B	C		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	40.8%	ICU Level of Service	A	
Analysis Period (min)	15			

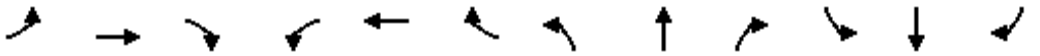
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	446	135	22	169	39	77	17	14	110	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1798		1770	1811		1770	1736		1770	1751	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1798		1770	1811		1770	1736		1770	1751	
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)	13	485	147	24	184	42	84	18	15	120	33	22
RTOR Reduction (vph)	0	15	0	0	11	0	0	13	0	0	18	0
Lane Group Flow (vph)	13	617	0	24	215	0	84	20	0	120	37	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	22.3		0.7	22.3		3.1	7.2		5.0	9.1	
Effective Green, g (s)	0.7	22.3		0.7	22.3		3.1	7.2		5.0	9.1	
Actuated g/C Ratio	0.01	0.44		0.01	0.44		0.06	0.14		0.10	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	24	783		24	789		107	244		173	311	
v/s Ratio Prot	0.01	c0.34		c0.01	0.12		0.05	0.01		c0.07	c0.02	
v/s Ratio Perm												
v/c Ratio	0.54	0.79		1.00	0.27		0.79	0.08		0.69	0.12	
Uniform Delay, d1	25.1	12.4		25.2	9.3		23.7	19.1		22.4	17.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.7	5.3		183.7	0.2		30.5	0.1		11.4	0.2	
Delay (s)	47.8	17.7		209.0	9.4		54.2	19.3		33.8	17.9	
Level of Service	D	B		F	A		D	B		C	B	
Approach Delay (s)		18.3			28.6			44.3			28.8	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	51.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



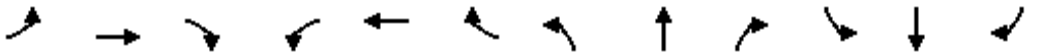
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	230	186	20	88	100	150	96	900	239	275	510	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99			1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1737			1820	1583	1770	3428		1770	3539	1583
Flt Permitted	0.95	1.00			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1737			1820	1583	1770	3428		1770	3539	1583
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)	250	202	22	96	109	163	104	978	260	299	554	218
RTOR Reduction (vph)	0	3	0	0	0	0	0	18	0	0	0	109
Lane Group Flow (vph)	225	246	0	0	205	163	104	1220	0	299	554	109
Turn Type	Split			Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	20.5	20.5			16.0	16.0	12.3	53.3		24.2	65.2	65.2
Effective Green, g (s)	20.5	20.5			16.0	16.0	12.3	53.3		24.2	65.2	65.2
Actuated g/C Ratio	0.16	0.16			0.12	0.12	0.09	0.41		0.19	0.50	0.50
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	265	274			224	195	167	1405		329	1775	794
v/s Ratio Prot	0.13	c0.14			c0.11		0.06	c0.36		c0.17	0.16	
v/s Ratio Perm						0.10						0.07
v/c Ratio	0.85	0.90			0.92	0.84	0.62	0.87		0.91	0.31	0.14
Uniform Delay, d1	53.2	53.7			56.3	55.7	56.6	35.1		51.8	19.1	17.3
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		0.69	0.46	0.07
Incremental Delay, d2	21.6	29.4			37.5	25.5	7.0	7.5		25.4	0.4	0.3
Delay (s)	74.8	83.1			93.8	81.2	63.7	42.6		61.1	9.1	1.5
Level of Service	E	F			F	F	E	D		E	A	A
Approach Delay (s)		79.2			88.2			44.2			22.1	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM Average Control Delay	47.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



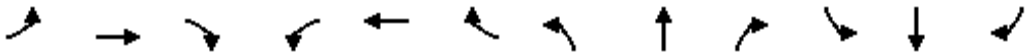
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	870	0	0	1057	0	1471	708	274	630	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.95	1.00	1.00	0.95	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		3539	1583	1770	3539	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		3539	1583	1770	3539	
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)	0	0	946	0	0	1149	0	1599	770	298	685	0
RTOR Reduction (vph)	0	0	279	0	0	0	0	0	73	0	0	0
Lane Group Flow (vph)	0	0	667	0	0	1149	0	1599	697	298	685	0
Turn Type			custom			Free			Perm	Prot		
Protected Phases			5					2		1	6	
Permitted Phases						Free			2			
Actuated Green, G (s)			39.1			130.0		94.9	94.9	27.1	82.9	
Effective Green, g (s)			39.1			130.0		94.9	94.9	27.1	82.9	
Actuated g/C Ratio			0.30			1.00		0.73	0.73	0.21	0.64	
Clearance Time (s)			4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)			3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)			838			1611		2583	1156	369	2257	
v/s Ratio Prot			c0.24					0.45		0.17	0.19	
v/s Ratio Perm						c0.71			0.44			
v/c Ratio			0.80			0.71		0.62	0.60	0.81	0.30	
Uniform Delay, d1			41.8			0.0		8.6	8.5	49.0	10.6	
Progression Factor			1.00			1.00		0.49	0.42	1.16	0.26	
Incremental Delay, d2			5.3			2.7		0.1	0.2	8.6	0.2	
Delay (s)			47.1			2.7		4.3	3.7	65.4	3.0	
Level of Service			D			A		A	A	E	A	
Approach Delay (s)		47.1			2.7			4.1			21.9	
Approach LOS		D			A			A			C	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	221	0	298	915	1613	0	0	683	750
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
Lane Util. Factor				0.95	0.95	1.00	0.97	0.95			0.91	0.91
Frt				1.00	1.00	0.85	1.00	1.00			0.95	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	3539			3232	1441
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	3539			3232	1441
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)	0	0	0	240	0	324	995	1753	0	0	742	815
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	35	295
Lane Group Flow (vph)	0	0	0	120	120	324	995	1753	0	0	1041	186
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				28.8	28.8	28.8	40.0	93.2			49.2	49.2
Effective Green, g (s)				28.8	28.8	28.8	40.0	93.2			49.2	49.2
Actuated g/C Ratio				0.22	0.22	0.22	0.31	0.72			0.38	0.38
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				372	372	351	1056	2537			1223	545
v/s Ratio Prot							c0.29	0.50			c0.32	
v/s Ratio Perm				0.07	0.07	c0.20						0.13
v/c Ratio				0.32	0.32	0.92	0.94	0.69			0.85	0.34
Uniform Delay, d1				42.4	42.4	49.5	43.9	10.3			37.0	28.8
Progression Factor				1.00	1.00	1.00	0.75	0.38			0.79	0.67
Incremental Delay, d2				0.5	0.5	29.1	12.6	1.2			6.8	1.5
Delay (s)				42.9	42.9	78.7	45.6	5.1			35.9	20.9
Level of Service				D	D	E	D	A			D	C
Approach Delay (s)		0.0			63.5			19.8			31.3	
Approach LOS		A			E			B			C	

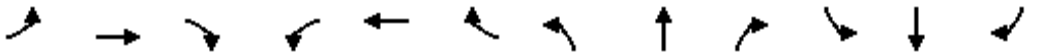
Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	617	2	18	0	0	0	0	11	3	105	6	0
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)	671	2	20	0	0	0	0	12	3	114	7	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	248	250	7	269	248	14	7			15		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	248	250	7	269	248	14	7			15		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	98	100	100	100	100			93		
cM capacity (veh/h)	667	606	1076	633	608	1066	1614			1603		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	692	15	121
Volume Left	671	0	114
Volume Right	20	3	0
cSH	674	1700	1603
Volume to Capacity	1.03	0.01	0.07
Queue Length 95th (ft)	433	0	6
Control Delay (s)	66.6	0.0	7.0
Lane LOS	F		A
Approach Delay (s)	66.6	0.0	7.0
Approach LOS	F		

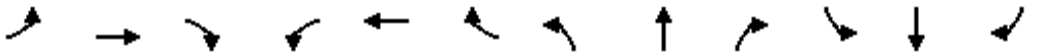
Intersection Summary				
Average Delay	56.7			
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	8	0	91	13	615	0	0	103	349
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	9	0	99	14	668	0	0	112	379
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	809	809	112	809	1188	668	491			668		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	809	809	112	809	1188	668	491			668		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	100	78	99			100		
cM capacity (veh/h)	232	310	941	296	186	458	1072			921		

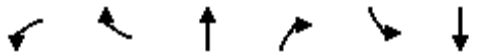
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	108	683	112	379
Volume Left	9	14	0	0
Volume Right	99	0	0	379
cSH	439	1072	1700	1700
Volume to Capacity	0.25	0.01	0.07	0.22
Queue Length 95th (ft)	24	1	0	0
Control Delay (s)	15.9	0.4	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	15.9	0.4	0.0	
Approach LOS	C			

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	70.8%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	34	51	74	9	696	12	1174	94	608	861	31
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	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
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)	3433	1863	1583	1770	1863	1583	3433	3539	1583	3433	3539	1583
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)	3433	1863	1583	1770	1863	1583	3433	3539	1583	3433	3539	1583
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)	336	37	55	80	10	757	13	1276	102	661	936	34
RTOR Reduction (vph)	0	0	48	0	0	238	0	0	55	0	0	18
Lane Group Flow (vph)	336	37	7	80	10	519	13	1276	47	661	936	16
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	15.5	15.5	15.5	33.5	33.5	33.5	2.7	43.0	43.0	22.0	62.3	62.3
Effective Green, g (s)	15.5	15.5	15.5	33.5	33.5	33.5	2.7	43.0	43.0	22.0	62.3	62.3
Actuated g/C Ratio	0.12	0.12	0.12	0.26	0.26	0.26	0.02	0.33	0.33	0.17	0.48	0.48
Clearance 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
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	409	222	189	456	480	408	71	1171	524	581	1696	759
v/s Ratio Prot	c0.10	0.02		0.05	0.01		0.00	c0.36		c0.19	0.26	
v/s Ratio Perm			0.00			c0.33			0.03			0.01
v/c Ratio	0.82	0.17	0.03	0.18	0.02	1.27	0.18	1.09	0.09	1.14	0.55	0.02
Uniform Delay, d1	55.9	51.4	50.6	37.5	36.0	48.2	62.6	43.5	30.0	54.0	24.0	17.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.60	0.40	0.94	0.89	0.88
Incremental Delay, d2	12.5	0.4	0.1	0.2	0.0	140.9	0.6	48.0	0.2	78.8	1.1	0.0
Delay (s)	68.4	51.8	50.7	37.7	36.0	189.1	44.4	74.3	12.1	129.9	22.5	15.7
Level of Service	E	D	D	D	D	F	D	E	B	F	C	B
Approach Delay (s)		64.7			173.0			69.4			65.9	
Approach LOS		E			F			E			E	

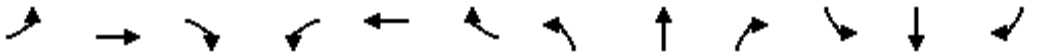
Intersection Summary			
HCM Average Control Delay	88.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	279	53	706	253	73	1671
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.91		1.00	0.91
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	1583	4884		1770	5085
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	1583	4884		1770	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	303	58	767	275	79	1816
RTOR Reduction (vph)	0	45	50	0	0	0
Lane Group Flow (vph)	303	13	992	0	79	1816
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	30.0	30.0	68.0		20.0	92.0
Effective Green, g (s)	30.0	30.0	68.0		20.0	92.0
Actuated g/C Ratio	0.23	0.23	0.52		0.15	0.71
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	792	365	2555		272	3599
v/s Ratio Prot	c0.09		0.20		0.04	c0.36
v/s Ratio Perm		0.01				
v/c Ratio	0.38	0.04	0.39		0.29	0.50
Uniform Delay, d1	42.2	38.8	18.6		48.7	8.6
Progression Factor	1.00	1.00	0.72		1.17	0.53
Incremental Delay, d2	1.4	0.2	0.3		2.6	0.5
Delay (s)	43.6	39.0	13.7		59.6	5.1
Level of Service	D	D	B		E	A
Approach Delay (s)	42.8		13.7			7.4
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

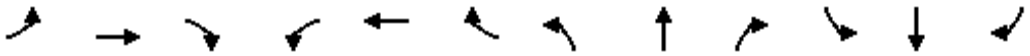


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	12	53	81	19	432	69	1408	86	262	1047	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		1.00	0.91		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1745	1583	1770	1595		1770	5042		1770	3534	
Flt Permitted	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1745	1583	1770	1595		1770	5042		1770	3534	
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)	22	13	58	88	21	470	75	1530	93	285	1138	11
RTOR Reduction (vph)	0	0	51	0	416	0	0	4	0	0	0	0
Lane Group Flow (vph)	17	18	7	88	75	0	75	1619	0	285	1149	0
Turn Type	Split		pm+ov	Split			Prot			Prot		
Protected Phases	4	4	5	8	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	4.7	4.7	16.8	14.9	14.9		12.1	68.6		25.8	82.3	
Effective Green, g (s)	4.7	4.7	16.8	14.9	14.9		12.1	68.6		25.8	82.3	
Actuated g/C Ratio	0.04	0.04	0.13	0.11	0.11		0.09	0.53		0.20	0.63	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	61	63	253	203	183		165	2661		351	2237	
v/s Ratio Prot	0.01	c0.01	0.00	c0.05	0.05		0.04	c0.32		c0.16	0.33	
v/s Ratio Perm			0.00									
v/c Ratio	0.28	0.29	0.03	0.43	0.41		0.45	0.61		0.81	0.51	
Uniform Delay, d1	61.0	61.0	49.5	53.6	53.5		55.8	21.4		49.8	13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.89	0.81		1.00	1.00	
Incremental Delay, d2	2.5	2.5	0.0	1.5	1.5		2.0	1.0		13.3	0.8	
Delay (s)	63.5	63.5	49.5	55.1	55.0		51.6	18.4		63.1	13.8	
Level of Service	E	E	D	E	D		D	B		E	B	
Approach Delay (s)		54.8			55.0			19.9			23.6	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

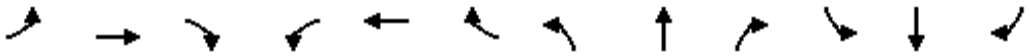
2010 No Project

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	136	142	217	389	329	134	132	68	166	230	283
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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	0.93		1.00	1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3269		1770	3296		1770	3539	1583	1770	3246	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3269		1770	3296		1770	3539	1583	1770	3246	
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)	208	148	154	236	423	358	146	143	74	180	250	308
RTOR Reduction (vph)	0	116	0	0	236	0	0	0	61	0	248	0
Lane Group Flow (vph)	208	186	0	236	545	0	146	143	13	180	310	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	9.0	13.7		9.1	13.8		6.1	9.9	9.9	7.1	10.9	
Effective Green, g (s)	9.0	13.7		9.1	13.8		6.1	9.9	9.9	7.1	10.9	
Actuated g/C Ratio	0.16	0.25		0.16	0.25		0.11	0.18	0.18	0.13	0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	285	803		289	815		193	628	281	225	634	
v/s Ratio Prot	c0.12	0.06		c0.13	c0.17		0.08	0.04		c0.10	c0.10	
v/s Ratio Perm									0.01			
v/c Ratio	0.73	0.23		0.82	0.67		0.76	0.23	0.05	0.80	0.49	
Uniform Delay, d1	22.2	16.8		22.5	18.9		24.1	19.7	19.0	23.7	20.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.0	0.1		16.1	2.1		15.5	0.2	0.1	18.1	0.6	
Delay (s)	31.3	17.0		38.7	21.0		39.6	19.9	19.1	41.8	20.6	
Level of Service	C	B		D	C		D	B	B	D	C	
Approach Delay (s)		22.8			25.1			27.7			25.7	
Approach LOS		C			C			C			C	

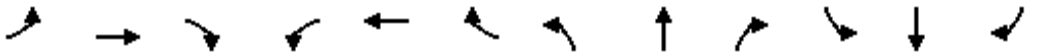
Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	1	1	0	1	1	332	1	1	587	1
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)	1	0	1	1	0	1	1	361	1	1	638	1
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	1005	1005	639	1005	1005	361	639			362		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1005	1005	639	1005	1005	361	639			362		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	219	241	476	219	241	683	945			1197		

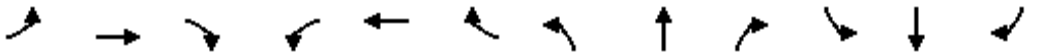
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	2	363	640
Volume Left	1	1	1	1
Volume Right	1	1	1	1
cSH	300	332	945	1197
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	17.1	15.9	0.0	0.0
Lane LOS	C	C	A	A
Approach Delay (s)	17.1	15.9	0.0	0.0
Approach LOS	C	C		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	41.7%	ICU Level of Service	A	
Analysis Period (min)	15			



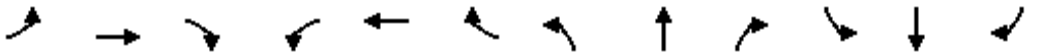
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	274	86	40	506	43	215	9	51	9	9	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.87		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1796		1770	1841		1770	1626		1770	1748	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1796		1770	1841		1770	1626		1770	1748	
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)	16	298	93	43	550	47	234	10	55	10	10	7
RTOR Reduction (vph)	0	15	0	0	4	0	0	38	0	0	6	0
Lane Group Flow (vph)	16	376	0	43	593	0	234	27	0	10	11	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	21.8		2.3	23.4		10.1	18.7		0.7	9.3	
Effective Green, g (s)	0.7	21.8		2.3	23.4		10.1	18.7		0.7	9.3	
Actuated g/C Ratio	0.01	0.37		0.04	0.39		0.17	0.31		0.01	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	21	658		68	724		300	511		21	273	
v/s Ratio Prot	0.01	c0.21		0.02	c0.32		c0.13	c0.02		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.76	0.57		0.63	0.82		0.78	0.05		0.48	0.04	
Uniform Delay, d1	29.3	15.1		28.2	16.2		23.6	14.2		29.2	21.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	92.1	1.2		17.6	7.2		12.3	0.0		16.0	0.1	
Delay (s)	121.4	16.3		45.8	23.3		36.0	14.3		45.3	21.4	
Level of Service	F	B		D	C		D	B		D	C	
Approach Delay (s)		20.4			24.8			31.3			30.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



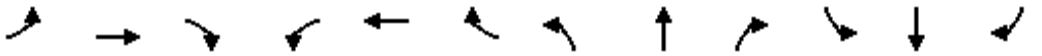
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	178	16	186	231	277	60	1097	93	80	1547	613
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3496		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3496		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	152	193	17	202	251	301	65	1192	101	87	1682	666
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	45	0	0	64
Lane Group Flow (vph)	152	210	0	202	251	301	65	1192	56	87	1682	602
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	11.0	11.9		12.2	13.1	34.5	8.2	48.5	60.7	21.4	61.7	72.7
Effective Green, g (s)	11.0	11.9		12.2	13.1	34.5	8.2	48.5	60.7	21.4	61.7	72.7
Actuated g/C Ratio	0.10	0.11		0.11	0.12	0.31	0.07	0.44	0.55	0.19	0.56	0.66
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	343	378		381	421	496	132	2825	931	668	2852	1104
v/s Ratio Prot	0.04	0.06		0.06	0.07	c0.12	0.04	c0.19	0.01	0.03	c0.33	c0.05
v/s Ratio Perm						0.07			0.03			0.33
v/c Ratio	0.44	0.56		0.53	0.60	0.61	0.49	0.42	0.06	0.13	0.59	0.55
Uniform Delay, d1	46.6	46.5		46.2	45.9	32.0	48.9	21.1	11.4	36.6	15.8	9.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.55	0.33	0.11
Incremental Delay, d2	0.9	1.8		1.4	2.3	2.1	2.9	0.5	0.0	0.1	0.7	0.4
Delay (s)	47.5	48.3		47.6	48.2	34.1	51.8	21.6	11.5	20.2	5.9	1.5
Level of Service	D	D		D	D	C	D	C	B	C	A	A
Approach Delay (s)		48.0			42.4			22.3			5.2	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



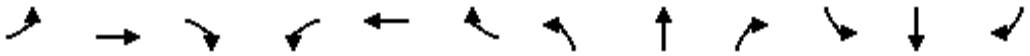
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1270	0	0	525	0	1328	404	759	1941	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1380	0	0	571	0	1443	439	825	2110	0
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1378	0	0	571	0	1443	439	825	2110	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases			1			Free			Free			
Actuated Green, G (s)			79.6			110.0		69.4	110.0	32.6	55.0	
Effective Green, g (s)			79.6			110.0		69.4	110.0	32.6	55.0	
Actuated g/C Ratio			0.72			1.00		0.63	1.00	0.30	0.50	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			2118			1611		3208	1583	1017	3204	
v/s Ratio Prot			c0.28					0.28		c0.24	c0.33	
v/s Ratio Perm			0.22			0.35			0.28			
v/c Ratio			0.65			0.35		0.45	0.28	0.81	0.66	
Uniform Delay, d1			7.9			0.0		10.5	0.0	35.8	20.5	
Progression Factor			1.00			1.00		1.37	1.00	0.92	0.40	
Incremental Delay, d2			0.7			0.6		0.4	0.4	2.4	0.5	
Delay (s)			8.7			0.6		14.7	0.4	35.3	8.7	
Level of Service			A			A		B	A	D	A	
Approach Delay (s)		8.7			0.6			11.4			16.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	291	89	1145	168	200	58	848	752	253	73	1387	1078
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	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583	1681	1763	1583	3433	6166		1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583	1681	1763	1583	3433	6166		1770	5085	1583
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)	316	97	1245	183	217	63	922	817	275	79	1508	1172
RTOR Reduction (vph)	0	0	0	0	0	49	0	53	0	0	0	0
Lane Group Flow (vph)	205	208	1245	165	235	14	922	1039	0	79	1508	1172
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	15.5	15.5	110.0	16.0	16.0	23.7	29.7	54.8		7.7	32.8	110.0
Effective Green, g (s)	15.5	15.5	110.0	16.0	16.0	23.7	29.7	54.8		7.7	32.8	110.0
Actuated g/C Ratio	0.14	0.14	1.00	0.15	0.15	0.22	0.27	0.50		0.07	0.30	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	237	243	1583	245	256	399	927	3072		124	1516	1583
v/s Ratio Prot	0.12	0.12		0.10	0.13	0.00	c0.27	0.17		0.04	c0.30	
v/s Ratio Perm			c0.79			0.01						0.74
v/c Ratio	0.86	0.86	0.79	0.67	0.92	0.03	0.99	0.34		0.64	0.99	0.74
Uniform Delay, d1	46.2	46.2	0.0	44.5	46.4	34.1	40.1	16.7		49.8	38.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.82	1.01		0.97	0.76	1.00
Incremental Delay, d2	26.3	24.3	4.0	7.1	34.7	0.0	26.9	0.3		7.4	18.2	2.2
Delay (s)	72.6	70.5	4.0	51.6	81.1	34.1	59.8	17.0		55.8	47.3	2.2
Level of Service	E	E	A	D	F	C	E	B		E	D	A
Approach Delay (s)		20.8			64.2			36.6			28.4	
Approach LOS		C			E			D			C	

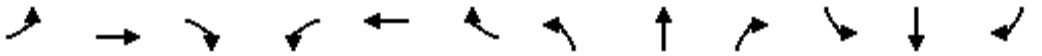
Intersection Summary			
HCM Average Control Delay	31.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	214	7	35	0	0	0	0	40	10	462	25	0
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)	233	8	38	0	0	0	0	43	11	502	27	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	1080	1086	27	1122	1080	49	27			54		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1080	1086	27	1122	1080	49	27			54		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	95	96	100	100	100	100			68		
cM capacity (veh/h)	146	146	1048	127	147	1020	1587			1551		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	278	54	529
Volume Left	233	0	502
Volume Right	38	11	0
cSH	166	1700	1551
Volume to Capacity	1.68	0.03	0.32
Queue Length 95th (ft)	485	0	36
Control Delay (s)	377.7	0.0	8.1
Lane LOS	F		A
Approach Delay (s)	377.7	0.0	8.1
Approach LOS	F		

Intersection Summary			
Average Delay	126.9		
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		



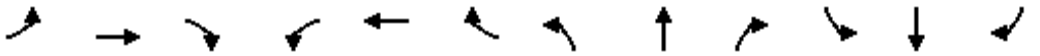
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	117	0	175	26	228	0	0	370	759
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	127	0	190	28	248	0	0	402	825
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	707	707	402	707	1532	248	1227			248		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	707	707	402	707	1532	248	1227			248		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	62	100	76	95			100		
cM capacity (veh/h)	256	342	648	337	111	791	568			1318		

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	317	276	402	825
Volume Left	127	28	0	0
Volume Right	190	0	0	825
cSH	514	568	1700	1700
Volume to Capacity	0.62	0.05	0.24	0.49
Queue Length 95th (ft)	104	4	0	0
Control Delay (s)	22.7	1.8	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	22.7	1.8	0.0	
Approach LOS	C			

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	87.7%	ICU Level of Service	E	
Analysis Period (min)	15			

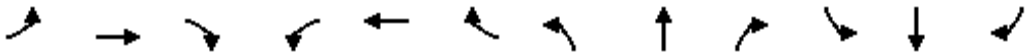
2010 No Project

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	348	135	81	242	151	128	351	164	175	85	132
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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3391		1770	3335		1770	3539	1583	1770	3216	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3391		1770	3335		1770	3539	1583	1770	3216	
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)	214	378	147	88	263	164	139	382	178	190	92	143
RTOR Reduction (vph)	0	59	0	0	135	0	0	0	138	0	106	0
Lane Group Flow (vph)	214	466	0	88	292	0	139	382	40	190	129	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	11.4	17.4		4.4	10.4		6.2	13.2	13.2	8.1	15.1	
Effective Green, g (s)	11.4	17.4		4.4	10.4		6.2	13.2	13.2	8.1	15.1	
Actuated g/C Ratio	0.19	0.29		0.07	0.18		0.10	0.22	0.22	0.14	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	341	998		132	587		186	790	354	243	822	
v/s Ratio Prot	c0.12	0.14		c0.05	c0.09		0.08	c0.11		c0.11	0.04	
v/s Ratio Perm									0.03			
v/c Ratio	0.63	0.47		0.67	0.50		0.75	0.48	0.11	0.78	0.16	
Uniform Delay, d1	21.9	17.1		26.6	22.0		25.7	20.0	18.3	24.6	17.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.6	0.3		12.0	0.7		15.1	0.5	0.1	15.0	0.1	
Delay (s)	25.5	17.4		38.7	22.7		40.8	20.5	18.4	39.7	17.1	
Level of Service	C	B		D	C		D	C	B	D	B	
Approach Delay (s)		19.7			25.4			24.0			27.2	
Approach LOS		B			C			C			C	

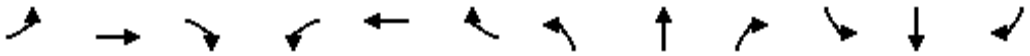
Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	1	1	0	1	1	641	1	1	299	1
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)	1	0	1	1	0	1	1	697	1	1	325	1
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	1028	1028	326	1028	1028	697	326			698		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1028	1028	326	1028	1028	697	326			698		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	99	100	100	100			100		
cM capacity (veh/h)	211	234	716	212	234	441	1234			899		

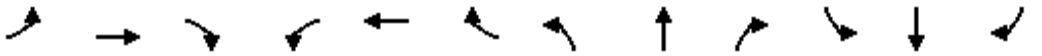
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	2	699	327
Volume Left	1	1	1	1
Volume Right	1	1	1	1
cSH	326	286	1234	899
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	16.1	17.7	0.0	0.0
Lane LOS	C	C	A	A
Approach Delay (s)	16.1	17.7	0.0	0.0
Approach LOS	C	C		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	44.5%	ICU Level of Service	A	
Analysis Period (min)	15			



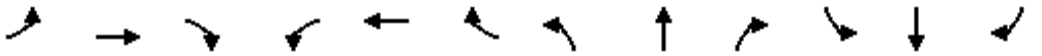
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	455	137	88	173	40	112	18	76	112	30	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.88		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1798		1770	1811		1770	1638		1770	1667	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1798		1770	1811		1770	1638		1770	1667	
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)	13	495	149	96	188	43	122	20	83	122	33	77
RTOR Reduction (vph)	0	13	0	0	9	0	0	74	0	0	68	0
Lane Group Flow (vph)	13	631	0	96	222	0	122	29	0	122	42	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	29.5		5.0	33.8		7.0	7.2		7.0	7.2	
Effective Green, g (s)	0.7	29.5		5.0	33.8		7.0	7.2		7.0	7.2	
Actuated g/C Ratio	0.01	0.46		0.08	0.52		0.11	0.11		0.11	0.11	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	19	820		137	946		191	182		191	186	
v/s Ratio Prot	0.01	c0.35		c0.05	0.12		c0.07	0.02		0.07	c0.02	
v/s Ratio Perm												
v/c Ratio	0.68	0.77		0.70	0.24		0.64	0.16		0.64	0.22	
Uniform Delay, d1	31.9	14.7		29.1	8.4		27.6	26.0		27.6	26.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	69.9	4.4		15.0	0.1		6.8	0.4		6.8	0.6	
Delay (s)	101.8	19.1		44.1	8.5		34.5	26.4		34.5	26.8	
Level of Service	F	B		D	A		C	C		C	C	
Approach Delay (s)		20.8			19.0			30.8			30.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



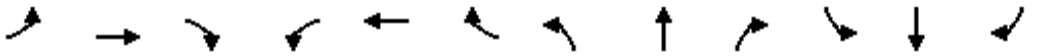
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	186	20	88	100	295	102	1177	308	272	1070	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3487		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3487		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	359	202	22	96	109	321	111	1279	335	296	1163	230
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	101	0	0	77
Lane Group Flow (vph)	359	224	0	96	109	321	111	1279	234	296	1163	153
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	16.5	16.3		9.0	8.8	28.6	12.2	48.9	57.9	19.8	56.5	73.0
Effective Green, g (s)	16.5	16.3		9.0	8.8	28.6	12.2	48.9	57.9	19.8	56.5	73.0
Actuated g/C Ratio	0.15	0.15		0.08	0.08	0.26	0.11	0.44	0.53	0.18	0.51	0.66
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	515	517		281	283	412	196	2849	833	618	2612	1108
v/s Ratio Prot	c0.10	0.06		0.03	0.03	c0.14	c0.06	c0.20	0.02	0.09	0.23	0.02
v/s Ratio Perm						0.06			0.12			0.08
v/c Ratio	0.70	0.43		0.34	0.39	0.78	0.57	0.45	0.28	0.48	0.45	0.14
Uniform Delay, d1	44.4	42.6		47.7	48.0	37.8	46.4	21.2	14.5	40.5	16.9	6.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.65	0.40	0.81
Incremental Delay, d2	4.1	0.6		0.7	0.9	9.0	3.7	0.5	0.2	0.5	0.5	0.1
Delay (s)	48.5	43.2		48.4	48.9	46.8	50.1	21.7	14.7	26.8	7.2	5.6
Level of Service	D	D		D	D	D	D	C	B	C	A	A
Approach Delay (s)		46.5			47.5			22.2			10.4	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



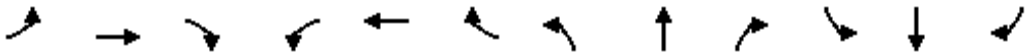
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1288	0	0	1218	0	1693	1170	315	852	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1400	0	0	1324	0	1840	1272	342	926	0
RTOR Reduction (vph)	0	0	9	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1391	0	0	1324	0	1840	1272	342	926	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases			1			Free			Free			
Actuated Green, G (s)			76.6			110.0		74.2	110.0	27.8	53.2	
Effective Green, g (s)			76.6			110.0		74.2	110.0	27.8	53.2	
Actuated g/C Ratio			0.70			1.00		0.67	1.00	0.25	0.48	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			2042			1611		3430	1583	868	3099	
v/s Ratio Prot			0.30					0.36		0.10	0.14	
v/s Ratio Perm			0.20			c0.82			0.80			
v/c Ratio			0.68			0.82		0.54	0.80	0.39	0.30	
Uniform Delay, d1			9.6			0.0		9.1	0.0	34.1	17.1	
Progression Factor			1.00			1.00		0.55	1.00	0.44	0.42	
Incremental Delay, d2			1.0			4.9		0.1	0.4	0.2	0.2	
Delay (s)			10.6			4.9		5.1	0.4	15.1	7.4	
Level of Service			B			A		A	A	B	A	
Approach Delay (s)		10.6			4.9			3.2			9.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	736	73	236	221	161	95	931	1682	298	73	710	733
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	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583	1681	1755	1583	3433	6263		1770	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1583	1681	1755	1583	3433	6263		1770	5085	1583
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)	800	79	257	240	175	103	1012	1828	324	79	772	797
RTOR Reduction (vph)	0	0	0	0	0	6	0	29	0	0	0	0
Lane Group Flow (vph)	440	439	257	204	211	97	1012	2123	0	79	772	797
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	28.0	28.0	110.0	15.4	15.4	22.4	32.6	43.6		7.0	18.0	110.0
Effective Green, g (s)	28.0	28.0	110.0	15.4	15.4	22.4	32.6	43.6		7.0	18.0	110.0
Actuated g/C Ratio	0.25	0.25	1.00	0.14	0.14	0.20	0.30	0.40		0.06	0.16	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	428	433	1583	235	246	322	1017	2482		113	832	1583
v/s Ratio Prot	c0.26	0.26		c0.12	0.12	0.02	c0.29	c0.34		0.04	c0.15	
v/s Ratio Perm			0.16			0.04						0.50
v/c Ratio	1.03	1.01	0.16	0.87	0.86	0.30	1.00	0.86		0.70	0.93	0.50
Uniform Delay, d1	41.0	41.0	0.0	46.3	46.2	37.2	38.6	30.3		50.5	45.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79		0.63	0.60	1.00
Incremental Delay, d2	50.9	46.8	0.2	26.9	24.3	0.5	23.4	3.1		14.2	15.3	0.9
Delay (s)	91.9	87.8	0.2	73.2	70.5	37.7	53.9	27.1		46.2	42.7	0.9
Level of Service	F	F	A	E	E	D	D	C		D	D	A
Approach Delay (s)		69.6			65.1			35.7			22.7	
Approach LOS		E			E			D			C	

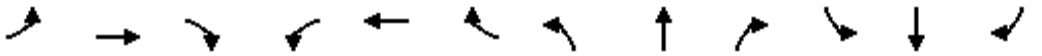
Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	617	3	56	0	0	0	0	11	3	485	61	0
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)	671	3	61	0	0	0	0	12	3	527	66	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	1134	1136	66	1197	1134	14	66			15		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1134	1136	66	1197	1134	14	66			15		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	98	94	100	100	100	100			67		
cM capacity (veh/h)	134	136	997	112	136	1066	1535			1603		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	735	15	593
Volume Left	671	0	527
Volume Right	61	3	0
cSH	144	1700	1603
Volume to Capacity	5.10	0.01	0.33
Queue Length 95th (ft)	Err	0	36
Control Delay (s)	Err	0.0	7.7
Lane LOS	F		A
Approach Delay (s)	Err	0.0	7.7
Approach LOS	F		

Intersection Summary			
Average Delay	5472.1		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	278	0	109	13	615	0	0	268	349
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	302	0	118	14	668	0	0	291	379
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	988	988	291	988	1367	668	671			668		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	988	988	291	988	1367	668	671			668		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	74	98			100		
cM capacity (veh/h)	166	243	748	223	145	458	920			921		

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	421	683	291	379
Volume Left	302	14	0	0
Volume Right	118	0	0	379
cSH	261	920	1700	1700
Volume to Capacity	1.61	0.02	0.17	0.22
Queue Length 95th (ft)	650	1	0	0
Control Delay (s)	326.3	0.4	0.0	0.0
Lane LOS	F	A		
Approach Delay (s)	326.3	0.4	0.0	
Approach LOS	F			

Intersection Summary				
Average Delay	77.5			
Intersection Capacity Utilization	86.8%	ICU Level of Service	E	
Analysis Period (min)	15			

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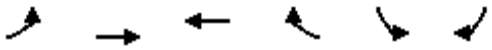
AM Peak

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	302	0	840	0	0
Sign Control	Yield		Free		Yield	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	328	0	913	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	913	0	0		328	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	913	0	0		328	0
tC, single (s)	6.5	6.2	4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	4.0	3.3	2.2		3.5	4.0
p0 queue free %	100	70	100		100	100
cM capacity (veh/h)	273	1085	1623		436	896

Direction, Lane #	EB 1	EB 2	NB 1
Volume Total	164	164	913
Volume Left	0	0	0
Volume Right	164	164	913
cSH	1085	1085	1700
Volume to Capacity	0.15	0.15	0.54
Queue Length 95th (ft)	13	13	0
Control Delay (s)	8.9	8.9	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9		0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	789	0	487
Sign Control		Yield	Yield		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	0	0	858	0	529
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	858	0	529	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	858	0	529	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	100	100	100	21	100	
cM capacity (veh/h)	58	896	455	1085	1623	

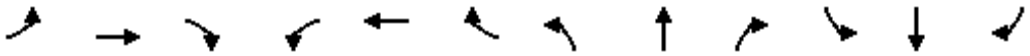
Direction, Lane #	WB 1	WB 2	SB 1
Volume Total	429	429	529
Volume Left	0	0	0
Volume Right	429	429	529
cSH	1085	1085	1700
Volume to Capacity	0.40	0.40	0.31
Queue Length 95th (ft)	48	48	0
Control Delay (s)	10.5	10.5	0.0
Lane LOS	B	B	
Approach Delay (s)	10.5		0.0
Approach LOS	B		

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	20	769	20	15	472
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)	16	22	836	22	16	513
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						646
pX, platoon unblocked	0.85					
vC, conflicting volume	1382	836			858	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1360	836			858	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	94			98	
cM capacity (veh/h)	135	367			783	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	16	22	836	22	16	513
Volume Left	16	0	0	0	16	0
Volume Right	0	22	0	22	0	0
cSH	135	367	1700	1700	783	1700
Volume to Capacity	0.12	0.06	0.49	0.01	0.02	0.30
Queue Length 95th (ft)	10	5	0	0	2	0
Control Delay (s)	35.2	15.4	0.0	0.0	9.7	0.0
Lane LOS	E	C			A	
Approach Delay (s)	23.9		0.0		0.3	
Approach LOS	C					

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	642	0	381	0	0	0	250	198	0	0	50	252
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.87	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1770	1583				1770	1863			1629	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1770	1583				1770	1863			1629	
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)	698	0	414	0	0	0	272	215	0	0	54	274
RTOR Reduction (vph)	0	0	216	0	0	0	0	0	0	0	174	0
Lane Group Flow (vph)	0	698	198	0	0	0	272	215	0	0	154	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)		42.0	42.0				25.1	50.0			20.9	
Effective Green, g (s)		42.0	42.0				25.1	50.0			20.9	
Actuated g/C Ratio		0.42	0.42				0.25	0.50			0.21	
Clearance Time (s)		4.0	4.0				4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		743	665				444	932			340	
v/s Ratio Prot		c0.39					c0.15	0.12			c0.09	
v/s Ratio Perm			0.12									
v/c Ratio		0.94	0.30				0.61	0.23			0.45	
Uniform Delay, d1		27.8	19.2				33.1	14.1			34.6	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		19.5	0.3				2.5	0.6			1.0	
Delay (s)		47.2	19.5				35.6	14.7			35.5	
Level of Service		D	B				D	B			D	
Approach Delay (s)		36.9			0.0			26.4			35.5	
Approach LOS		D			A			C			D	

Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

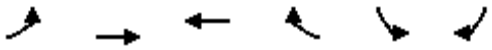
2010 Plus Project Phase-1

PM Peak

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	525	0	832	0	0
Sign Control	Yield		Free		Yield	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	571	0	904	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	904	0	0		571	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904	0	0		571	0
tC, single (s)	6.5	6.2	4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	4.0	3.3	2.2		3.5	4.0
p0 queue free %	100	47	100		100	100
cM capacity (veh/h)	277	1085	1623		205	896

Direction, Lane #	EB 1	EB 2	NB 1
Volume Total	285	285	904
Volume Left	0	0	0
Volume Right	285	285	904
cSH	1085	1085	1700
Volume to Capacity	0.26	0.26	0.53
Queue Length 95th (ft)	26	26	0
Control Delay (s)	9.5	9.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5		0.0
Approach LOS	A		

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		54.9%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	777	0	379
Sign Control		Yield	Yield		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	0	0	845	0	412
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	845	0	412	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	845	0	412	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	100	100	100	22	100	
cM capacity (veh/h)	63	896	530	1085	1623	

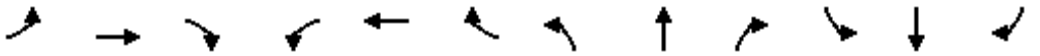
Direction, Lane #	WB 1	WB 2	SB 1
Volume Total	422	422	412
Volume Left	0	0	0
Volume Right	422	422	412
cSH	1085	1085	1700
Volume to Capacity	0.39	0.39	0.24
Queue Length 95th (ft)	47	47	0
Control Delay (s)	10.4	10.4	0.0
Lane LOS	B	B	
Approach Delay (s)	10.4		0.0
Approach LOS	B		

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	27	750	27	9	370
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)	10	29	815	29	10	402
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						646
pX, platoon unblocked	0.84					
vC, conflicting volume	1237	815			845	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1186	815			845	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	92			99	
cM capacity (veh/h)	172	377			792	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	10	29	815	29	10	402
Volume Left	10	0	0	0	10	0
Volume Right	0	29	0	29	0	0
cSH	172	377	1700	1700	792	1700
Volume to Capacity	0.06	0.08	0.48	0.02	0.01	0.24
Queue Length 95th (ft)	4	6	0	0	1	0
Control Delay (s)	27.1	15.3	0.0	0.0	9.6	0.0
Lane LOS	D	C			A	
Approach Delay (s)	18.3		0.0		0.2	
Approach LOS	C					

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

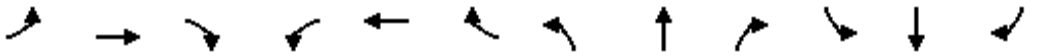


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	559	0	406	0	0	0	400	273	0	0	175	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0				4.0	4.0			4.0	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.90	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1770	1583				1770	1863			1676	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1770	1583				1770	1863			1676	
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)	608	0	441	0	0	0	435	297	0	0	190	380
RTOR Reduction (vph)	0	0	179	0	0	0	0	0	0	0	45	0
Lane Group Flow (vph)	0	608	262	0	0	0	435	297	0	0	525	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)		45.0	45.0				32.0	77.0			41.0	
Effective Green, g (s)		45.0	45.0				32.0	77.0			41.0	
Actuated g/C Ratio		0.35	0.35				0.25	0.59			0.32	
Clearance Time (s)		4.0	4.0				4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		613	548				436	1103			529	
v/s Ratio Prot		c0.34					c0.25	0.16			c0.31	
v/s Ratio Perm			0.17									
v/c Ratio		0.99	0.48				1.00	0.27			0.99	
Uniform Delay, d1		42.3	33.3				49.0	12.9			44.3	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		34.1	0.7				42.2	0.1			36.9	
Delay (s)		76.4	34.0				91.2	13.0			81.3	
Level of Service		E	C				F	B			F	
Approach Delay (s)		58.6			0.0			59.4			81.3	
Approach LOS		E			A			E			F	

Intersection Summary			
HCM Average Control Delay	64.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

2010 Plus Project Phase-2

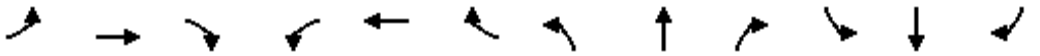
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	252	0	50	0	0	0	0	250	198	642	381	0
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	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1606	1447					3406	1524	1770	3406	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1606	1447					3406	1524	1770	3406	
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)	274	0	54	0	0	0	0	272	215	698	414	0
RTOR Reduction (vph)	0	2	42	0	0	0	0	0	156	0	0	0
Lane Group Flow (vph)	140	137	7	0	0	0	0	272	59	698	414	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Split		Perm						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	12.5	12.5	12.5					24.7	24.7	40.8	69.5	
Effective Green, g (s)	12.5	12.5	12.5					24.7	24.7	40.8	69.5	
Actuated g/C Ratio	0.14	0.14	0.14					0.27	0.27	0.45	0.77	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	233	223	201					935	418	802	2630	
v/s Ratio Prot	0.08	c0.09						c0.08		c0.39	0.12	
v/s Ratio Perm			0.00						0.04			
v/c Ratio	0.60	0.62	0.03					0.29	0.14	0.87	0.16	
Uniform Delay, d1	36.4	36.5	33.5					25.7	24.6	22.2	2.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.60	0.04	
Incremental Delay, d2	4.3	5.0	0.1					0.8	0.7	9.1	0.1	
Delay (s)	40.7	41.5	33.6					26.5	25.4	22.5	0.2	
Level of Service	D	D	C					C	C	C	A	
Approach Delay (s)		40.0			0.0			26.0			14.2	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

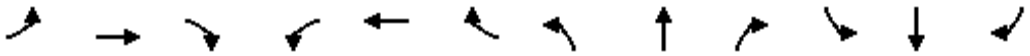
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	236	0	553	151	351	0	0	787	336
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
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.86	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1451	1504	1703	3539			3539	1583
Flt Permitted				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1451	1504	1703	3539			3539	1583
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)	0	0	0	257	0	601	164	382	0	0	855	365
RTOR Reduction (vph)	0	0	0	0	228	247	0	0	0	0	0	180
Lane Group Flow (vph)	0	0	0	231	86	66	164	382	0	0	855	185
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				18.9	18.9	18.9	13.6	63.1			45.5	45.5
Effective Green, g (s)				18.9	18.9	18.9	13.6	63.1			45.5	45.5
Actuated g/C Ratio				0.21	0.21	0.21	0.15	0.70			0.51	0.51
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				340	305	316	257	2481			1789	800
v/s Ratio Prot				c0.14	0.06		c0.10	0.11			c0.24	
v/s Ratio Perm						0.04						0.12
v/c Ratio				0.68	0.28	0.21	0.64	0.15			0.48	0.23
Uniform Delay, d1				32.8	29.9	29.4	35.9	4.5			14.5	12.5
Progression Factor				1.00	1.00	1.00	1.11	0.22			1.00	1.00
Incremental Delay, d2				5.3	0.5	0.3	4.8	0.1			0.9	0.7
Delay (s)				38.1	30.4	29.7	44.7	1.1			15.4	13.1
Level of Service				D	C	C	D	A			B	B
Approach Delay (s)		0.0			32.2			14.2			14.7	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



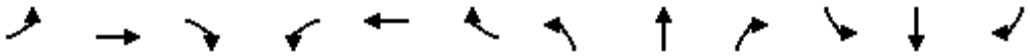
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	82	115	301	227	360	150	275	150	166	338	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	0.91		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3229		1770	3214		1770	3539	1583	1770	3318	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3229		1770	3214		1770	3539	1583	1770	3318	
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)	173	89	125	327	247	391	163	299	163	180	367	263
RTOR Reduction (vph)	0	102	0	0	292	0	0	0	130	0	194	0
Lane Group Flow (vph)	173	112	0	327	346	0	163	299	33	180	436	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	8.8	11.0		13.2	15.4		7.1	12.4	12.4	8.1	13.4	
Effective Green, g (s)	8.8	11.0		13.2	15.4		7.1	12.4	12.4	8.1	13.4	
Actuated g/C Ratio	0.14	0.18		0.22	0.25		0.12	0.20	0.20	0.13	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	257	585		385	815		207	723	323	236	732	
v/s Ratio Prot	0.10	0.03		c0.18	c0.11		0.09	0.08		c0.10	c0.13	
v/s Ratio Perm									0.02			
v/c Ratio	0.67	0.19		0.85	0.42		0.79	0.41	0.10	0.76	0.60	
Uniform Delay, d1	24.6	21.1		22.8	18.9		26.1	21.0	19.6	25.4	21.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.8	0.2		15.9	0.4		17.7	0.4	0.1	13.6	1.3	
Delay (s)	31.4	21.2		38.7	19.3		43.8	21.4	19.8	38.9	22.5	
Level of Service	C	C		D	B		D	C	B	D	C	
Approach Delay (s)		25.8			25.9			26.8			26.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	15	20	903	1	1	1123
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)	16	22	982	1	1	1221
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			996			646
pX, platoon unblocked						
vC, conflicting volume	1595	491			983	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1595	491			983	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	96			100	
cM capacity (veh/h)	97	523			698	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	16	22	654	328	1	610	610
Volume Left	16	0	0	0	1	0	0
Volume Right	0	22	0	1	0	0	0
cSH	97	523	1700	1700	698	1700	1700
Volume to Capacity	0.17	0.04	0.38	0.19	0.00	0.36	0.36
Queue Length 95th (ft)	14	3	0	0	0	0	0
Control Delay (s)	49.2	12.2	0.0	0.0	10.2	0.0	0.0
Lane LOS	E	B			B		
Approach Delay (s)	28.1		0.0		0.0		
Approach LOS	D						

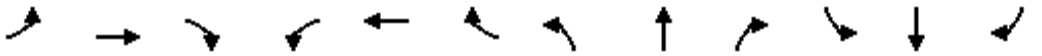
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	1	1	0	1	1	332	1	1	587	1
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			0.93			1.00			1.00	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1695			1695			1862			1862	
Flt Permitted		0.95			0.95			1.00			1.00	
Satd. Flow (perm)		1653			1653			1860			1862	
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)	1	0	1	1	0	1	1	361	1	1	638	1
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	1	0	0	363	0	0	640	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.0			16.0			21.0			21.0	
Effective Green, g (s)		16.0			16.0			21.0			21.0	
Actuated g/C Ratio		0.36			0.36			0.47			0.47	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		588			588			868			869	
v/s Ratio Prot												
v/s Ratio Perm		c0.00			0.00			0.20			0.34	
v/c Ratio		0.00			0.00			0.42			0.74	
Uniform Delay, d1		9.4			9.4			8.0			9.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			0.0			1.5			5.5	
Delay (s)		9.4			9.4			9.4			15.3	
Level of Service		A			A			A			B	
Approach Delay (s)		9.4			9.4			9.4			15.3	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

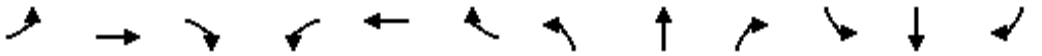


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	275	60	77	311	43	225	17	100	75	14	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.87		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3444		1770	3474		1770	1623		1770	1774	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3444		1770	3474		1770	1623		1770	1774	
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)	16	299	65	84	338	47	245	18	109	82	15	7
RTOR Reduction (vph)	0	31	0	0	17	0	0	80	0	0	6	0
Lane Group Flow (vph)	16	333	0	84	368	0	245	47	0	82	16	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	12.1		3.0	14.4		8.2	12.5		3.9	8.2	
Effective Green, g (s)	0.7	12.1		3.0	14.4		8.2	12.5		3.9	8.2	
Actuated g/C Ratio	0.01	0.25		0.06	0.30		0.17	0.26		0.08	0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	26	877		112	1053		306	427		145	306	
v/s Ratio Prot	0.01	0.10		c0.05	c0.11		c0.14	c0.03		0.05	0.01	
v/s Ratio Perm												
v/c Ratio	0.62	0.38		0.75	0.35		0.80	0.11		0.57	0.05	
Uniform Delay, d1	23.3	14.6		21.9	12.9		18.9	13.3		21.0	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.3	0.3		24.2	0.2		13.9	0.1		5.0	0.1	
Delay (s)	59.5	14.9		46.1	13.1		32.8	13.4		26.0	16.5	
Level of Service	E	B		D	B		C	B		C	B	
Approach Delay (s)		16.8			19.0			26.2			24.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

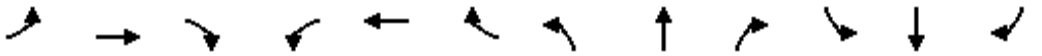
HCM Signalized Intersection Capacity Analysis
117: White Rock Rd & Latrobe Rd

3/4/2009



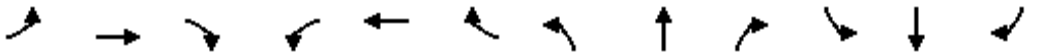
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	163	73	16	160	231	300	60	711	70	75	1175	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3445		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3445		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	177	79	17	174	251	326	65	773	76	82	1277	636
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	35	0	0	98
Lane Group Flow (vph)	177	96	0	174	251	326	65	773	41	82	1277	538
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	10.8	6.5		16.1	11.8	26.4	6.6	26.8	42.9	14.6	34.8	45.6
Effective Green, g (s)	10.8	6.5		16.1	11.8	26.4	6.6	26.8	42.9	14.6	34.8	45.6
Actuated g/C Ratio	0.14	0.08		0.20	0.15	0.33	0.08	0.34	0.54	0.18	0.43	0.57
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	463	280		691	522	522	146	2147	928	627	2212	981
v/s Ratio Prot	0.05	0.03		0.05	0.07	c0.11	c0.04	0.12	0.01	0.02	c0.25	c0.07
v/s Ratio Perm						0.09			0.02			0.27
v/c Ratio	0.38	0.34		0.25	0.48	0.62	0.45	0.36	0.04	0.13	0.58	0.55
Uniform Delay, d1	31.6	34.7		26.9	31.3	22.6	35.0	20.1	8.8	27.4	17.1	10.8
Progression Factor	1.00	1.00		0.93	0.93	0.82	1.00	1.00	1.00	0.55	0.47	0.27
Incremental Delay, d2	0.5	0.7		0.2	0.7	2.3	2.2	0.5	0.0	0.1	0.9	0.5
Delay (s)	32.1	35.5		25.2	29.8	20.7	37.1	20.6	8.8	15.0	8.9	3.5
Level of Service	C	D		C	C	C	D	C	A	B	A	A
Approach Delay (s)		33.3			24.8			20.8			7.4	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1420	0	0	483	0	1100	343	483	1225	0
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	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1543	0	0	525	0	1196	373	525	1332	0
RTOR Reduction (vph)	0	0	3	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1540	0	0	525	0	1196	373	525	1332	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases			1			Free			Free			
Actuated Green, G (s)			56.7			80.0		38.4	80.0	33.6	48.9	
Effective Green, g (s)			56.7			80.0		38.4	80.0	33.6	48.9	
Actuated g/C Ratio			0.71			1.00		0.48	1.00	0.42	0.61	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			2115			1611		2441	1583	1442	3917	
v/s Ratio Prot			c0.21					c0.24		0.15	0.21	
v/s Ratio Perm			0.34			0.33			0.24			
v/c Ratio			0.73			0.33		0.49	0.24	0.36	0.34	
Uniform Delay, d1			7.0			0.0		14.1	0.0	15.9	7.6	
Progression Factor			1.00			1.00		0.37	1.00	0.60	0.56	
Incremental Delay, d2			1.3			0.5		0.6	0.3	0.1	0.2	
Delay (s)			8.3			0.5		5.9	0.3	9.6	4.4	
Level of Service			A			A		A	A	A	A	
Approach Delay (s)		8.3			0.5			4.6			5.9	
Approach LOS		A			A			A			A	

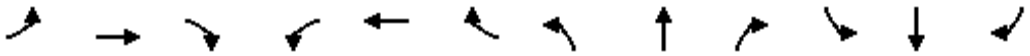
Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	169	89	761	168	200	58	804	610	169	69	779	1000
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	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1742	1583	1681	1763	1583	3433	6199		1770	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1742	1583	1681	1763	1583	3433	6199		1770	5085	1583
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)	184	97	827	183	217	63	874	663	184	75	847	1087
RTOR Reduction (vph)	0	0	0	0	0	42	0	59	0	0	0	0
Lane Group Flow (vph)	138	143	827	165	235	21	874	788	0	75	847	1087
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	11.7	11.7	80.0	14.8	14.8	26.3	21.6	26.0		11.5	15.9	80.0
Effective Green, g (s)	11.7	11.7	80.0	14.8	14.8	26.3	21.6	26.0		11.5	15.9	80.0
Actuated g/C Ratio	0.15	0.15	1.00	0.18	0.18	0.33	0.27	0.32		0.14	0.20	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	246	255	1583	311	326	520	927	2015		254	1011	1583
v/s Ratio Prot	0.08	0.08		0.10	0.13	0.01	c0.25	0.13		0.04	c0.17	
v/s Ratio Perm			0.52			0.01						c0.69
v/c Ratio	0.56	0.56	0.52	0.53	0.72	0.04	0.94	0.39		0.30	0.84	0.69
Uniform Delay, d1	31.8	31.8	0.0	29.5	30.7	18.3	28.6	20.9		30.6	30.8	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.56	0.41		0.58	0.64	1.00
Incremental Delay, d2	2.9	2.8	1.2	1.7	7.6	0.0	16.6	0.5		0.5	6.9	2.0
Delay (s)	34.7	34.6	1.2	31.2	38.3	18.3	32.5	9.1		18.3	26.8	2.0
Level of Service	C	C	A	C	D	B	C	A		B	C	A
Approach Delay (s)		9.7			33.0			21.0			13.1	
Approach LOS		A			C			C			B	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



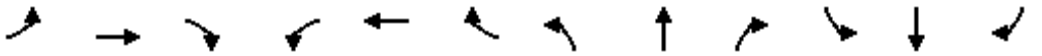
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	214	1	5	0	0	0	0	40	7	94	6	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	233	1	5	0	0	0	0	43	8	102	7	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	258	262	7	264	258	47	7			51		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258	262	7	264	258	47	7			51		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	65	100	99	100	100	100	100			93		
cM capacity (veh/h)	660	601	1076	650	604	1022	1614			1555		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	239	51	109
Volume Left	233	0	102
Volume Right	5	8	0
cSH	666	1700	1555
Volume to Capacity	0.36	0.03	0.07
Queue Length 95th (ft)	41	0	5
Control Delay (s)	13.4	0.0	7.1
Lane LOS	B		A
Approach Delay (s)	13.4	0.0	7.1
Approach LOS	B		

Intersection Summary				
Average Delay	10.0			
Intersection Capacity Utilization	31.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
121: US50 westbound on ramp & Bass Lake Rd

4/6/2010



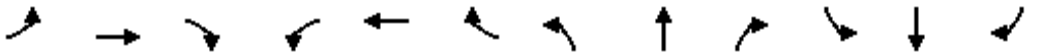
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	14	0	80	26	224	0	0	86	645
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	15	0	87	28	243	0	0	93	701
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	393	393	93	393	1095	243	795			243		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	393	393	93	393	1095	243	795			243		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	100	89	97			100		
cM capacity (veh/h)	491	524	964	551	206	795	827			1323		

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	102	272	93	701
Volume Left	15	28	0	0
Volume Right	87	0	0	701
cSH	746	827	1700	1700
Volume to Capacity	0.14	0.03	0.05	0.41
Queue Length 95th (ft)	12	3	0	0
Control Delay (s)	10.6	1.3	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.6	1.3	0.0	
Approach LOS	B			

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	68.9%	ICU Level of Service	C	
Analysis Period (min)	15			

2010 Plus Project Phase-2

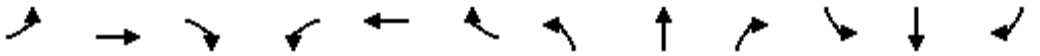
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	0	175	0	0	0	0	400	273	559	406	0
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	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1592	1447					3406	1524	1770	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1592	1447					3406	1524	1770	3406	
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)	380	0	190	0	0	0	0	435	297	608	441	0
RTOR Reduction (vph)	0	6	137	0	0	0	0	0	221	0	0	0
Lane Group Flow (vph)	201	192	34	0	0	0	0	435	76	608	441	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Split		Perm						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	12.9	12.9	12.9					16.6	16.6	23.5	44.1	
Effective Green, g (s)	12.9	12.9	12.9					16.6	16.6	23.5	44.1	
Actuated g/C Ratio	0.20	0.20	0.20					0.26	0.26	0.36	0.68	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	334	316	287					870	389	640	2311	
v/s Ratio Prot	0.12	c0.12						c0.13		c0.34	0.13	
v/s Ratio Perm			0.02						0.05			
v/c Ratio	0.60	0.61	0.12					0.50	0.19	0.95	0.19	
Uniform Delay, d1	23.7	23.7	21.4					20.7	19.0	20.2	3.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.64	0.31	
Incremental Delay, d2	3.0	3.3	0.2					2.1	1.1	22.3	0.2	
Delay (s)	26.8	27.0	21.6					22.7	20.1	35.2	1.4	
Level of Service	C	C	C					C	C	D	A	
Approach Delay (s)		25.3			0.0			21.6			21.0	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

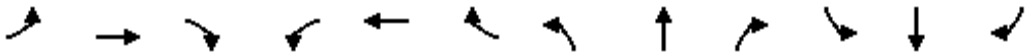
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	277	0	500	75	675	0	0	688	304
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
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.87	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1454	1504	1703	3539			3539	1583
Flt Permitted				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1454	1504	1703	3539			3539	1583
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)	0	0	0	301	0	543	82	734	0	0	748	330
RTOR Reduction (vph)	0	0	0	0	143	143	0	0	0	0	0	177
Lane Group Flow (vph)	0	0	0	271	148	139	82	734	0	0	748	153
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				16.7	16.7	16.7	6.1	40.3			30.2	30.2
Effective Green, g (s)				16.7	16.7	16.7	6.1	40.3			30.2	30.2
Actuated g/C Ratio				0.26	0.26	0.26	0.09	0.62			0.46	0.46
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				416	374	386	160	2194			1644	735
v/s Ratio Prot				c0.17	0.10		c0.05	0.21			c0.21	
v/s Ratio Perm						0.09						0.10
v/c Ratio				0.65	0.40	0.36	0.51	0.33			0.45	0.21
Uniform Delay, d1				21.6	20.0	19.8	28.0	5.9			11.8	10.3
Progression Factor				1.00	1.00	1.00	0.55	0.20			1.00	1.00
Incremental Delay, d2				3.6	0.7	0.6	2.4	0.4			0.9	0.6
Delay (s)				25.2	20.7	20.4	18.0	1.5			12.7	11.0
Level of Service				C	C	C	B	A			B	B
Approach Delay (s)		0.0			22.0			3.2			12.2	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



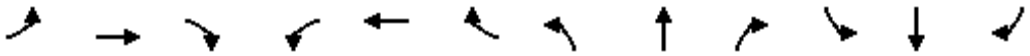
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	234	175	250	115	151	200	375	250	232	235	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.94		1.00	0.91		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3312		1770	3238		1770	3539	1583	1770	3363	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3312		1770	3238		1770	3539	1583	1770	3363	
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)	198	254	190	272	125	164	217	408	272	252	255	127
RTOR Reduction (vph)	0	157	0	0	133	0	0	0	215	0	89	0
Lane Group Flow (vph)	198	287	0	272	156	0	217	408	57	252	293	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	10.3	10.7		11.1	11.5		10.6	12.9	12.9	11.1	13.4	
Effective Green, g (s)	10.3	10.7		11.1	11.5		10.6	12.9	12.9	11.1	13.4	
Actuated g/C Ratio	0.17	0.17		0.18	0.19		0.17	0.21	0.21	0.18	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	295	573		318	603		304	739	330	318	729	
v/s Ratio Prot	0.11	c0.09		c0.15	0.05		0.12	c0.12		c0.14	0.09	
v/s Ratio Perm									0.04			
v/c Ratio	0.67	0.50		0.86	0.26		0.71	0.55	0.17	0.79	0.40	
Uniform Delay, d1	24.2	23.1		24.6	21.5		24.2	21.9	20.1	24.2	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.9	0.7		19.6	0.2		7.7	0.9	0.2	12.7	0.4	
Delay (s)	30.1	23.8		44.1	21.7		31.9	22.8	20.3	36.9	21.1	
Level of Service	C	C		D	C		C	C	C	D	C	
Approach Delay (s)		25.7			32.6			24.2			27.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	61.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	27	1174	1	0	991
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)	10	29	1276	1	0	1077
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			996			646
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	1815	639			1277	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1747	503			1179	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	94			100	
cM capacity (veh/h)	73	486			557	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	10	29	851	426	0	539	539
Volume Left	10	0	0	0	0	0	0
Volume Right	0	29	0	1	0	0	0
cSH	73	486	1700	1700	1700	1700	1700
Volume to Capacity	0.13	0.06	0.50	0.25	0.00	0.32	0.32
Queue Length 95th (ft)	11	5	0	0	0	0	0
Control Delay (s)	61.8	12.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B					
Approach Delay (s)	25.1		0.0		0.0		
Approach LOS	D						

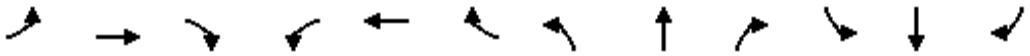
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	1	1	0	1	1	641	1	1	299	1
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			0.93			1.00			1.00	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1695			1695			1862			1862	
Flt Permitted		0.95			0.95			1.00			1.00	
Satd. Flow (perm)		1652			1652			1862			1860	
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)	1	0	1	1	0	1	1	697	1	1	325	1
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	1	0	0	699	0	0	327	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.0			16.0			26.0			26.0	
Effective Green, g (s)		16.0			16.0			26.0			26.0	
Actuated g/C Ratio		0.32			0.32			0.52			0.52	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		529			529			968			967	
v/s Ratio Prot												
v/s Ratio Perm		c0.00			0.00			0.38			0.18	
v/c Ratio		0.00			0.00			0.72			0.34	
Uniform Delay, d1		11.6			11.6			9.2			7.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			0.0			4.7			0.9	
Delay (s)		11.6			11.6			13.9			7.9	
Level of Service		B			B			B			A	
Approach Delay (s)		11.6			11.6			13.9			7.9	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

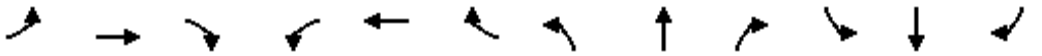


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	455	250	125	356	100	98	23	100	118	69	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.97		1.00	0.88		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3351		1770	3423		1770	1635		1770	1797	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3351		1770	3423		1770	1635		1770	1797	
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)	13	495	272	136	387	109	107	25	109	128	75	23
RTOR Reduction (vph)	0	112	0	0	36	0	0	91	0	0	19	0
Lane Group Flow (vph)	13	655	0	136	460	0	107	43	0	128	79	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	16.5		4.3	20.1		4.3	8.1		4.3	8.1	
Effective Green, g (s)	0.7	16.5		4.3	20.1		4.3	8.1		4.3	8.1	
Actuated g/C Ratio	0.01	0.34		0.09	0.41		0.09	0.16		0.09	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	25	1124		155	1398		155	269		155	296	
v/s Ratio Prot	0.01	c0.20		c0.08	c0.13		0.06	0.03		c0.07	c0.04	
v/s Ratio Perm												
v/c Ratio	0.52	0.58		0.88	0.33		0.69	0.16		0.83	0.27	
Uniform Delay, d1	24.1	13.5		22.2	9.9		21.8	17.6		22.1	18.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.1	0.8		38.7	0.1		12.5	0.3		28.7	0.5	
Delay (s)	42.2	14.3		60.9	10.1		34.3	17.9		50.8	18.4	
Level of Service	D	B		E	B		C	B		D	B	
Approach Delay (s)		14.7			21.0			25.2			36.8	
Approach LOS		B			C			C			D	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

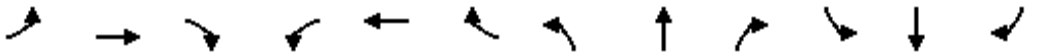
HCM Signalized Intersection Capacity Analysis
117: White Rock Rd & Latrobe Rd

3/4/2009



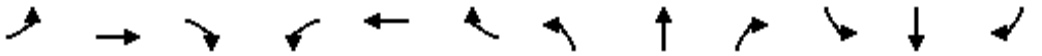
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	236	186	20	88	100	163	96	1168	239	320	725	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3487		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3487		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	257	202	22	96	109	177	104	1270	260	348	788	327
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	72	0	0	112
Lane Group Flow (vph)	257	224	0	96	109	177	104	1270	188	348	788	215
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	12.8	13.1		8.2	8.5	24.1	9.8	47.1	55.3	15.6	52.9	65.7
Effective Green, g (s)	12.8	13.1		8.2	8.5	24.1	9.8	47.1	55.3	15.6	52.9	65.7
Actuated g/C Ratio	0.13	0.13		0.08	0.08	0.24	0.10	0.47	0.55	0.16	0.53	0.66
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	439	457		282	301	382	173	3018	875	536	2690	1103
v/s Ratio Prot	c0.07	c0.06		0.03	0.03	0.07	c0.06	c0.20	0.02	c0.10	0.15	0.02
v/s Ratio Perm						0.04			0.10			0.11
v/c Ratio	0.59	0.49		0.34	0.36	0.46	0.60	0.42	0.21	0.65	0.29	0.19
Uniform Delay, d1	41.1	40.3		43.3	43.2	32.4	43.2	17.5	11.3	39.6	13.1	6.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.56	0.22	0.04
Incremental Delay, d2	2.0	0.8		0.7	0.7	0.9	5.8	0.4	0.1	2.5	0.3	0.1
Delay (s)	43.1	41.2		44.1	43.9	33.3	49.0	17.9	11.5	24.6	3.1	0.3
Level of Service	D	D		D	D	C	D	B	B	C	A	A
Approach Delay (s)		42.2			39.0			18.8			7.6	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



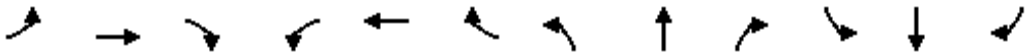
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1011	0	0	1099	0	1700	791	300	881	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1099	0	0	1195	0	1848	860	326	958	0
RTOR Reduction (vph)	0	0	36	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1063	0	0	1195	0	1848	860	326	958	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases			1			Free			Free			
Actuated Green, G (s)			53.7			100.0		77.2	100.0	14.8	53.1	
Effective Green, g (s)			53.7			100.0		77.2	100.0	14.8	53.1	
Actuated g/C Ratio			0.54			1.00		0.77	1.00	0.15	0.53	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			1608			1611		3926	1583	508	3403	
v/s Ratio Prot			0.26					0.36		0.09	0.15	
v/s Ratio Perm			0.12			c0.74			0.54			
v/c Ratio			0.66			0.74		0.47	0.54	0.64	0.28	
Uniform Delay, d1			16.6			0.0		4.1	0.0	40.1	12.9	
Progression Factor			1.00			1.00		0.54	1.00	0.71	0.54	
Incremental Delay, d2			1.0			3.1		0.0	0.1	2.5	0.2	
Delay (s)			17.7			3.1		2.3	0.1	30.8	7.1	
Level of Service			B			A		A	A	C	A	
Approach Delay (s)		17.7			3.1			1.6			13.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	73	401	221	161	95	930	1571	298	56	559	589
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	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583	1681	1755	1583	3433	6255		1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583	1681	1755	1583	3433	6255		1770	5085	1583
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)	245	79	436	240	175	103	1011	1708	324	61	608	640
RTOR Reduction (vph)	0	0	0	0	0	36	0	31	0	0	0	0
Lane Group Flow (vph)	159	165	436	204	211	67	1011	2001	0	61	608	640
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	13.7	13.7	100.0	15.6	15.6	22.4	32.9	47.9		6.8	21.8	100.0
Effective Green, g (s)	13.7	13.7	100.0	15.6	15.6	22.4	32.9	47.9		6.8	21.8	100.0
Actuated g/C Ratio	0.14	0.14	1.00	0.16	0.16	0.22	0.33	0.48		0.07	0.22	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	230	236	1583	262	274	418	1129	2996		120	1109	1583
v/s Ratio Prot	0.09	c0.10		c0.12	0.12	0.01	c0.29	c0.32		0.03	0.12	
v/s Ratio Perm			0.28			0.03						0.40
v/c Ratio	0.69	0.70	0.28	0.78	0.77	0.16	0.90	0.67		0.51	0.55	0.40
Uniform Delay, d1	41.1	41.2	0.0	40.5	40.5	31.2	31.9	20.0		45.0	34.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.74		1.31	0.55	1.00
Incremental Delay, d2	8.6	8.7	0.4	13.6	12.5	0.2	7.9	1.0		3.0	1.8	0.7
Delay (s)	49.8	49.9	0.4	54.1	53.0	31.4	33.5	15.7		62.0	20.8	0.7
Level of Service	D	D	A	D	D	C	C	B		E	C	A
Approach Delay (s)		21.5			49.1			21.6			12.9	
Approach LOS		C			D			C			B	

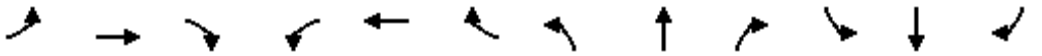
Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	617	2	19	0	0	0	0	15	3	117	8	0
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)	671	2	21	0	0	0	0	16	3	127	9	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	281	283	9	303	281	18	9			20		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	281	283	9	303	281	18	9			20		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	98	100	100	100	100			92		
cM capacity (veh/h)	630	576	1073	597	578	1061	1611			1597		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	693	20	136
Volume Left	671	0	127
Volume Right	21	3	0
cSH	638	1700	1597
Volume to Capacity	1.09	0.01	0.08
Queue Length 95th (ft)	499	0	6
Control Delay (s)	86.2	0.0	7.0
Lane LOS	F		A
Approach Delay (s)	86.2	0.0	7.0
Approach LOS	F		

Intersection Summary				
Average Delay	71.6			
Intersection Capacity Utilization	55.7%	ICU Level of Service	B	
Analysis Period (min)	15			



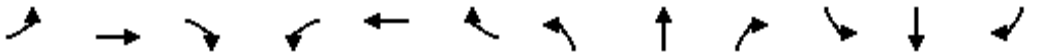
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	19	0	91	13	615	0	0	106	297
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	21	0	99	14	668	0	0	115	323
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	812	812	115	812	1135	668	438			668		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	812	812	115	812	1135	668	438			668		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	93	100	78	99			100		
cM capacity (veh/h)	231	309	937	295	200	458	1122			921		

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	120	683	115	323
Volume Left	21	14	0	0
Volume Right	99	0	0	323
cSH	418	1122	1700	1700
Volume to Capacity	0.29	0.01	0.07	0.19
Queue Length 95th (ft)	29	1	0	0
Control Delay (s)	17.0	0.3	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.0	0.3	0.0	
Approach LOS	C			

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	68.1%	ICU Level of Service	C	
Analysis Period (min)	15			

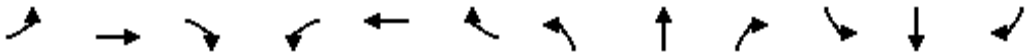
2020 No Project

AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	298	316	189	217	929	329	278	132	69	166	290	490
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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.94		1.00	0.96		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3341		1770	3400		1770	3539	1583	1770	3206	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3341		1770	3400		1770	3539	1583	1770	3206	
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)	324	343	205	236	1010	358	302	143	75	180	315	533
RTOR Reduction (vph)	0	84	0	0	36	0	0	0	61	0	277	0
Lane Group Flow (vph)	324	464	0	236	1332	0	302	143	14	180	571	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	17.0	34.1		17.9	35.0		16.0	18.9	18.9	13.1	16.0	
Effective Green, g (s)	17.0	34.1		17.9	35.0		16.0	18.9	18.9	13.1	16.0	
Actuated g/C Ratio	0.17	0.34		0.18	0.35		0.16	0.19	0.19	0.13	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	301	1139		317	1190		283	669	299	232	513	
v/s Ratio Prot	c0.18	0.14		0.13	c0.39		c0.17	c0.04		0.10	c0.18	
v/s Ratio Perm									0.01			
v/c Ratio	1.08	0.41		0.74	1.12		1.07	0.21	0.05	0.78	1.11	
Uniform Delay, d1	41.5	25.2		38.9	32.5		42.0	34.3	33.2	42.0	42.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	73.7	0.2		9.1	65.4		72.4	0.2	0.1	14.9	74.3	
Delay (s)	115.2	25.5		48.0	97.9		114.4	34.4	33.2	57.0	116.3	
Level of Service	F	C		D	F		F	C	C	E	F	
Approach Delay (s)		58.8			90.6			80.7			105.9	
Approach LOS		E			F			F			F	

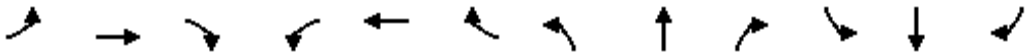
Intersection Summary			
HCM Average Control Delay	86.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	105.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	1	1	0	1	1	477	2	1	694	1
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)	1	0	1	1	0	1	1	518	2	1	754	1
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	1280	1280	755	1280	1279	520	755			521		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1280	1280	755	1280	1279	520	755			521		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	99	100	100	100			100		
cM capacity (veh/h)	142	165	409	142	165	556	855			1046		

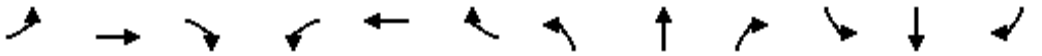
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	2	522	757
Volume Left	1	1	1	1
Volume Right	1	1	2	1
cSH	211	226	855	1046
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	22.2	21.1	0.0	0.0
Lane LOS	C	C	A	A
Approach Delay (s)	22.2	21.1	0.0	0.0
Approach LOS	C	C		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A	
Analysis Period (min)	15			



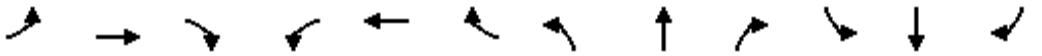
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	426	172	104	672	43	204	9	119	9	13	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.86		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1782		1770	1846		1770	1603		1770	1770	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1782		1770	1846		1770	1603		1770	1770	
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)	49	463	187	113	730	47	222	10	129	10	14	7
RTOR Reduction (vph)	0	15	0	0	2	0	0	101	0	0	7	0
Lane Group Flow (vph)	49	635	0	113	775	0	222	38	0	10	14	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	2.1	31.5		7.3	36.7		13.4	15.1		0.6	2.3	
Effective Green, g (s)	2.1	31.5		7.3	36.7		13.4	15.1		0.6	2.3	
Actuated g/C Ratio	0.03	0.45		0.10	0.52		0.19	0.21		0.01	0.03	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	53	796		183	961		336	343		15	58	
v/s Ratio Prot	0.03	0.36		c0.06	c0.42		c0.13	0.02		0.01	c0.01	
v/s Ratio Perm												
v/c Ratio	0.92	0.80		0.62	0.81		0.66	0.11		0.67	0.25	
Uniform Delay, d1	34.1	16.8		30.3	14.0		26.4	22.3		34.9	33.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	95.3	5.6		6.1	5.0		4.8	0.1		75.9	2.2	
Delay (s)	129.4	22.3		36.3	19.0		31.3	22.4		110.7	35.5	
Level of Service	F	C		D	B		C	C		F	D	
Approach Delay (s)		29.8			21.2			27.9			59.7	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



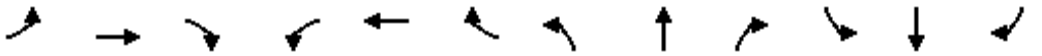
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	207	528	16	273	149	501	142	2197	171	120	2360	613
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3524		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3524		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	225	574	17	297	162	545	154	2388	186	130	2565	666
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	71	0	0	255
Lane Group Flow (vph)	225	589	0	297	162	545	154	2388	115	130	2565	411
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	14.3	30.8		28.2	44.7	44.7	10.0	67.0	67.0	8.0	65.0	65.0
Effective Green, g (s)	14.3	30.8		28.2	44.7	44.7	10.0	67.0	67.0	8.0	65.0	65.0
Actuated g/C Ratio	0.10	0.21		0.19	0.30	0.30	0.07	0.45	0.45	0.05	0.43	0.43
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	724		645	1055	472	118	2862	707	183	2204	686
v/s Ratio Prot	0.07	c0.17		0.09	0.05		c0.09	0.37		0.04	c0.50	
v/s Ratio Perm						c0.34			0.07			0.26
v/c Ratio	0.69	0.81		0.46	0.15	1.15	1.31	0.83	0.16	0.71	1.16	0.60
Uniform Delay, d1	65.7	56.9		54.1	38.7	52.6	70.0	36.6	24.8	69.9	42.5	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.11	0.46	0.39
Incremental Delay, d2	5.9	7.0		0.5	0.1	91.3	185.6	3.0	0.5	3.8	75.4	1.1
Delay (s)	71.6	63.9		54.7	38.8	144.0	255.6	39.7	25.3	81.1	94.8	13.9
Level of Service	E	E		D	D	F	F	D	C	F	F	B
Approach Delay (s)		66.0			100.6			50.9			78.2	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM Average Control Delay	70.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



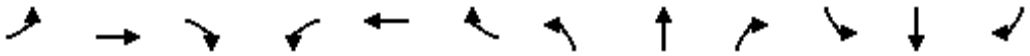
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1270	0	0	692	0	2513	430	850	2796	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1380	0	0	752	0	2732	467	924	3039	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	6	0	0	0
Lane Group Flow (vph)	0	0	1380	0	0	752	0	2732	461	924	3039	0
Turn Type			custom			Free			Perm	Prot		
Protected Phases			5					2		1	6	
Permitted Phases						Free			2			
Actuated Green, G (s)			72.0			150.0		97.0	97.0	45.0	70.0	
Effective Green, g (s)			72.0			150.0		97.0	97.0	45.0	70.0	
Actuated g/C Ratio			0.48			1.00		0.65	0.65	0.30	0.47	
Clearance Time (s)			4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)			3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)			1338			1611		3288	1024	1030	2990	
v/s Ratio Prot			c0.50					0.54		0.27	c0.47	
v/s Ratio Perm						0.47			0.29			
v/c Ratio			1.03			0.47		0.83	0.45	0.90	1.02	
Uniform Delay, d1			39.0			0.0		20.2	13.2	50.3	40.0	
Progression Factor			1.00			1.00		0.45	0.48	0.56	0.44	
Incremental Delay, d2			33.0			1.0		0.2	0.1	1.1	9.9	
Delay (s)			72.0			1.0		9.3	6.5	29.1	27.3	
Level of Service			E			A		A	A	C	C	
Approach Delay (s)		72.0			1.0			8.9			27.8	
Approach LOS		E			A			A			C	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



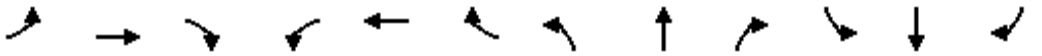
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	401	386	1420	465	200	75	1152	1799	254	73	1761	1198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1761	1583	1681	1734	1583	3433	6289		1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1761	1583	1681	1734	1583	3433	6289		1770	5085	1583
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)	436	420	1543	505	217	82	1252	1955	276	79	1914	1302
RTOR Reduction (vph)	0	0	0	0	0	16	0	17	0	0	0	0
Lane Group Flow (vph)	392	464	1543	353	369	66	1252	2214	0	79	1914	1302
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	30.0	30.0	150.0	25.0	25.0	38.9	36.0	65.1		13.9	43.0	150.0
Effective Green, g (s)	30.0	30.0	150.0	25.0	25.0	38.9	36.0	65.1		13.9	43.0	150.0
Actuated g/C Ratio	0.20	0.20	1.00	0.17	0.17	0.26	0.24	0.43		0.09	0.29	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	352	1583	280	289	411	824	2729		164	1458	1583
v/s Ratio Prot	0.23	c0.26		0.21	c0.21	0.01	c0.36	0.35		0.04	c0.38	
v/s Ratio Perm			0.97			0.03						0.82
v/c Ratio	1.17	1.32	0.97	1.26	1.28	0.16	1.52	0.81		0.48	1.31	0.82
Uniform Delay, d1	60.0	60.0	0.0	62.5	62.5	42.9	57.0	37.1		64.6	53.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.58		0.82	0.82	1.00
Incremental Delay, d2	102.5	161.9	17.4	142.9	148.6	0.2	237.7	1.8		1.0	143.0	2.2
Delay (s)	162.5	221.9	17.4	205.4	211.1	43.1	282.1	23.4		54.1	186.8	2.2
Level of Service	F	F	B	F	F	D	F	C		D	F	A
Approach Delay (s)		80.6			191.5			116.4			110.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	112.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	214	27	135	0	0	0	0	54	31	512	292	0
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	
Lane Util. Factor		1.00						1.00		1.00	1.00	
Frt		0.95						0.95		1.00	1.00	
Flt Protected		0.97						1.00		0.95	1.00	
Satd. Flow (prot)		1723						1771		1770	1863	
Flt Permitted		0.97						1.00		0.70	1.00	
Satd. Flow (perm)		1723						1771		1298	1863	
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)	233	29	147	0	0	0	0	59	34	557	317	0
RTOR Reduction (vph)	0	30	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	379	0	0	0	0	0	80	0	557	317	0
Turn Type	Perm									Perm		
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		18.8						43.2		43.2	43.2	
Effective Green, g (s)		18.8						43.2		43.2	43.2	
Actuated g/C Ratio		0.27						0.62		0.62	0.62	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		463						1093		801	1150	
v/s Ratio Prot								0.05			0.17	
v/s Ratio Perm		0.22								c0.43		
v/c Ratio		0.82						0.07		0.70	0.28	
Uniform Delay, d1		24.0						5.4		9.0	6.2	
Progression Factor		1.00						1.00		0.57	0.63	
Incremental Delay, d2		10.8						0.1		2.6	0.3	
Delay (s)		34.8						5.5		7.7	4.2	
Level of Service		C						A		A	A	
Approach Delay (s)		34.8			0.0			5.5			6.5	
Approach LOS		C			A			A			A	

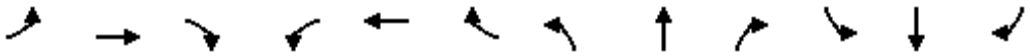
Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	384	0	495	26	241	1	0	420	759
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
Lane Util. Factor					1.00			1.00			1.00	1.00
Frt					0.92			1.00			1.00	0.85
Flt Protected					0.98			1.00			1.00	1.00
Satd. Flow (prot)					1684			1853			1863	1583
Flt Permitted					0.98			0.85			1.00	1.00
Satd. Flow (perm)					1684			1591			1863	1583
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)	0	0	0	417	0	538	28	262	1	0	457	825
RTOR Reduction (vph)	0	0	0	0	66	0	0	0	0	0	0	463
Lane Group Flow (vph)	0	0	0	0	889	0	0	291	0	0	457	362
Turn Type				Perm			Perm					Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					37.9			24.1			24.1	24.1
Effective Green, g (s)					37.9			24.1			24.1	24.1
Actuated g/C Ratio					0.54			0.34			0.34	0.34
Clearance Time (s)					4.0			4.0			4.0	4.0
Vehicle Extension (s)					3.0			3.0			3.0	3.0
Lane Grp Cap (vph)					912			548			641	545
v/s Ratio Prot											c0.25	
v/s Ratio Perm					0.53			0.18				0.23
v/c Ratio					0.97			0.53			0.71	0.66
Uniform Delay, d1					15.6			18.4			19.9	19.5
Progression Factor					1.00			1.11			1.00	1.00
Incremental Delay, d2					23.5			2.2			6.6	6.3
Delay (s)					39.1			22.5			26.6	25.8
Level of Service					D			C			C	C
Approach Delay (s)		0.0			39.1			22.5			26.1	
Approach LOS		A			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	122.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Mitigation

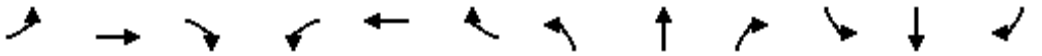


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	298	316	189	217	929	329	278	132	69	166	290	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95	1.00	1.00	0.95	
Frt	1.00	0.94		1.00	0.96		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3341		1770	3400		3433	3539	1583	1770	3206	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3341		1770	3400		3433	3539	1583	1770	3206	
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)	324	343	205	236	1010	358	302	143	75	180	315	533
RTOR Reduction (vph)	0	93	0	0	40	0	0	0	60	0	172	0
Lane Group Flow (vph)	324	455	0	236	1328	0	302	143	15	180	676	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	9.0	27.6		16.4	35.0		9.0	18.2	18.2	11.5	20.7	
Effective Green, g (s)	9.0	27.6		16.4	35.0		9.0	18.2	18.2	11.5	20.7	
Actuated g/C Ratio	0.10	0.31		0.18	0.39		0.10	0.20	0.20	0.13	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	344	1028		324	1327		344	718	321	227	740	
v/s Ratio Prot	c0.09	0.14		0.13	c0.39		0.09	0.04		c0.10	c0.21	
v/s Ratio Perm									0.01			
v/c Ratio	0.94	0.44		0.73	1.00		0.88	0.20	0.05	0.79	0.99dr	
Uniform Delay, d1	40.1	24.9		34.6	27.4		39.8	29.7	28.8	37.9	33.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.6	0.3		7.9	25.0		21.4	0.1	0.1	17.1	15.6	
Delay (s)	73.7	25.2		42.5	52.3		61.2	29.8	28.8	55.0	49.3	
Level of Service	E	C		D	D		E	C	C	E	D	
Approach Delay (s)		43.2			50.9			47.9			50.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	48.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	401	386	1420	465	200	75	1152	1799	254	73	1761	1198
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	0.91	0.91	1.00	0.91	0.91	1.00	0.94	0.86	1.00	1.00	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3221	1687	1583	1610	3301	1583	4990	6408	1583	1770	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3221	1687	1583	1610	3301	1583	4990	6408	1583	1770	6408	1583
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)	436	420	1543	505	217	82	1252	1955	276	79	1914	1302
RTOR Reduction (vph)	0	0	0	0	0	32	0	0	155	0	0	0
Lane Group Flow (vph)	392	464	1543	252	470	50	1252	1955	121	79	1914	1302
Turn Type	Split		Free	Split		pm+ov	Prot		Perm	Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8			2			Free
Actuated Green, G (s)	37.0	37.0	150.0	21.0	21.0	36.1	34.0	60.9	60.9	15.1	42.0	150.0
Effective Green, g (s)	37.0	37.0	150.0	21.0	21.0	36.1	34.0	60.9	60.9	15.1	42.0	150.0
Actuated g/C Ratio	0.25	0.25	1.00	0.14	0.14	0.24	0.23	0.41	0.41	0.10	0.28	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	795	416	1583	225	462	381	1131	2602	643	178	1794	1583
v/s Ratio Prot	0.12	c0.28		0.16	0.14	0.01	c0.25	0.31		0.04	c0.30	
v/s Ratio Perm			c0.97			0.02			0.08			0.82
v/c Ratio	0.49	1.12	0.97	1.12	1.08dl	0.13	1.11	0.75	0.19	0.44	1.07	0.82
Uniform Delay, d1	48.5	56.5	0.0	64.5	64.5	44.7	58.0	38.1	28.7	63.5	54.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.56	0.79	0.82	0.82	1.00
Incremental Delay, d2	0.5	79.3	17.4	96.0	46.3	0.2	57.0	1.3	0.4	0.8	36.0	2.2
Delay (s)	48.9	135.8	17.4	160.5	110.8	44.8	102.4	22.6	23.1	52.8	80.1	2.2
Level of Service	D	F	B	F	F	D	F	C	C	D	F	A
Approach Delay (s)		45.4			119.7			51.3			48.7	
Approach LOS		D			F			D			D	

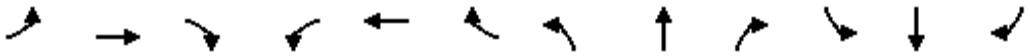
Intersection Summary			
HCM Average Control Delay	54.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

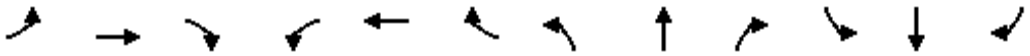
2020 No Project

PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	247	728	259	81	666	151	228	447	165	175	132	222
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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.96		1.00	0.97		1.00	1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3400		1770	3441		1770	3539	1583	1770	3206	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3400		1770	3441		1770	3539	1583	1770	3206	
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)	268	791	282	88	724	164	248	486	179	190	143	241
RTOR Reduction (vph)	0	42	0	0	24	0	0	0	142	0	194	0
Lane Group Flow (vph)	268	1031	0	88	864	0	248	486	37	190	190	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	13.9	29.3		4.7	20.1		12.0	15.9	15.9	11.2	15.1	
Effective Green, g (s)	13.9	29.3		4.7	20.1		12.0	15.9	15.9	11.2	15.1	
Actuated g/C Ratio	0.18	0.38		0.06	0.26		0.16	0.21	0.21	0.15	0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	319	1292		108	897		275	730	326	257	628	
v/s Ratio Prot	0.15	c0.30		0.05	c0.25		c0.14	c0.14		0.11	0.06	
v/s Ratio Perm									0.02			
v/c Ratio	0.84	0.80		0.81	0.96		0.90	0.67	0.11	0.74	0.30	
Uniform Delay, d1	30.5	21.3		35.8	28.1		32.0	28.2	24.9	31.6	26.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.7	3.5		35.7	21.5		30.1	2.3	0.2	10.6	0.3	
Delay (s)	48.2	24.8		71.5	49.6		62.0	30.5	25.0	42.2	26.8	
Level of Service	D	C		E	D		E	C	C	D	C	
Approach Delay (s)		29.5			51.6			38.0			31.9	
Approach LOS		C			D			D			C	

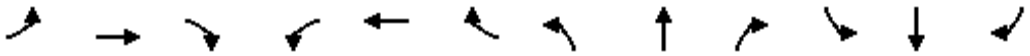
Intersection Summary			
HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	0	1	1	0	1	1	838	2	1	470	1
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)	1	0	1	1	0	1	1	911	2	1	511	1
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	1429	1429	511	1429	1428	912	512			913		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1429	1429	511	1429	1428	912	512			913		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	99	100	100	100			100		
cM capacity (veh/h)	112	134	562	112	135	332	1053			746		

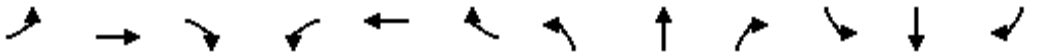
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	2	914	513
Volume Left	1	1	1	1
Volume Right	1	1	2	1
cSH	187	168	1053	746
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	24.5	26.8	0.0	0.0
Lane LOS	C	D	A	A
Approach Delay (s)	24.5	26.8	0.0	0.0
Approach LOS	C	D		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	55.0%	ICU Level of Service	A	
Analysis Period (min)	15			



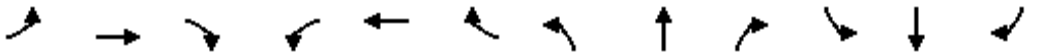
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	641	201	256	244	40	113	18	174	112	30	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1796		1770	1824		1770	1610		1770	1615	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1796		1770	1824		1770	1610		1770	1615	
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)	176	697	218	278	265	43	123	20	189	122	33	259
RTOR Reduction (vph)	0	10	0	0	5	0	0	172	0	0	236	0
Lane Group Flow (vph)	176	905	0	278	303	0	123	37	0	122	56	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	14.8	53.1		17.0	55.3		8.0	9.2		8.0	9.2	
Effective Green, g (s)	14.8	53.1		17.0	55.3		8.0	9.2		8.0	9.2	
Actuated g/C Ratio	0.14	0.51		0.16	0.54		0.08	0.09		0.08	0.09	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	254	923		291	976		137	143		137	144	
v/s Ratio Prot	0.10	c0.50		c0.16	0.17		c0.07	0.02		0.07	c0.03	
v/s Ratio Perm												
v/c Ratio	0.69	0.98		0.96	0.31		0.90	0.26		0.89	0.39	
Uniform Delay, d1	42.1	24.6		42.8	13.4		47.2	43.9		47.2	44.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.9	24.9		40.4	0.2		47.0	1.0		45.7	1.7	
Delay (s)	50.0	49.5		83.2	13.6		94.3	44.8		92.9	46.1	
Level of Service	D	D		F	B		F	D		F	D	
Approach Delay (s)		49.6			46.6			63.1			59.9	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	52.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



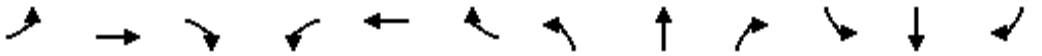
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	564	186	20	88	55	433	167	1433	539	439	1578	379
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3487		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3487		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	613	202	22	96	60	471	182	1558	586	477	1715	412
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	342	0	0	236
Lane Group Flow (vph)	613	219	0	96	60	471	182	1558	244	477	1715	176
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	26.0	59.4		9.6	43.0	43.0	15.0	41.0	41.0	24.0	50.0	50.0
Effective Green, g (s)	26.0	59.4		9.6	43.0	43.0	15.0	41.0	41.0	24.0	50.0	50.0
Actuated g/C Ratio	0.17	0.40		0.06	0.29	0.29	0.10	0.27	0.27	0.16	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	595	1381		220	1015	454	177	1752	433	549	1695	528
v/s Ratio Prot	c0.18	0.06		0.03	0.02		c0.10	0.24		0.14	c0.34	
v/s Ratio Perm						c0.30			0.15			0.11
v/c Ratio	1.03	0.16		0.44	0.06	1.04	1.03	0.89	0.56	0.87	1.01	0.33
Uniform Delay, d1	62.0	29.2		67.6	38.8	53.5	67.5	52.3	46.8	61.5	50.0	37.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.61	0.52	0.44
Incremental Delay, d2	44.9	0.1		1.4	0.0	52.3	75.2	7.2	5.2	7.5	18.4	0.8
Delay (s)	106.9	29.2		69.0	38.8	105.8	142.7	59.5	52.1	45.2	44.3	17.4
Level of Service	F	C		E	D	F	F	E	D	D	D	B
Approach Delay (s)		86.1			93.7			64.2			40.2	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM Average Control Delay	60.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



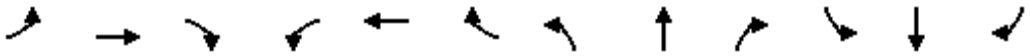
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1340	0	0	1255	0	2583	1360	452	1325	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1457	0	0	1364	0	2808	1478	491	1440	0
RTOR Reduction (vph)	0	0	2	0	0	0	0	0	1	0	0	0
Lane Group Flow (vph)	0	0	1455	0	0	1364	0	2808	1477	491	1440	0
Turn Type			custom			Free			Perm	Prot		
Protected Phases			5					2		1	6	
Permitted Phases						Free			2			
Actuated Green, G (s)			90.3			150.0		123.0	123.0	19.0	51.7	
Effective Green, g (s)			90.3			150.0		123.0	123.0	19.0	51.7	
Actuated g/C Ratio			0.60			1.00		0.82	0.82	0.13	0.34	
Clearance Time (s)			4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)			3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)			1678			1611		4170	1298	435	2209	
v/s Ratio Prot			0.52					0.55		c0.14	0.22	
v/s Ratio Perm						0.85			c0.93			
v/c Ratio			0.87			0.85		0.67	1.14	1.13	0.65	
Uniform Delay, d1			24.9			0.0		5.4	13.5	65.5	41.5	
Progression Factor			1.00			1.00		0.61	1.24	0.40	0.27	
Incremental Delay, d2			5.0			5.7		0.1	63.1	61.0	0.1	
Delay (s)			29.9			5.7		3.4	79.8	87.0	11.4	
Level of Service			C			A		A	E	F	B	
Approach Delay (s)		29.9			5.7			29.7			30.6	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



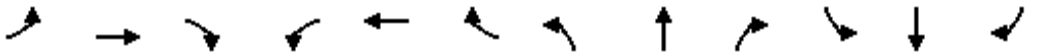
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1310	317	286	291	435	235	1035	2212	591	73	1200	777
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1717	1583	1681	1764	1583	3433	6205		1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1717	1583	1681	1764	1583	3433	6205		1770	5085	1583
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)	1424	345	311	316	473	255	1125	2404	642	79	1304	845
RTOR Reduction (vph)	0	0	0	0	0	1	0	32	0	0	0	0
Lane Group Flow (vph)	883	886	311	284	505	254	1125	3014	0	79	1304	845
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	48.0	48.0	150.0	29.0	29.0	34.0	27.0	52.0		5.0	30.0	150.0
Effective Green, g (s)	48.0	48.0	150.0	29.0	29.0	34.0	27.0	52.0		5.0	30.0	150.0
Actuated g/C Ratio	0.32	0.32	1.00	0.19	0.19	0.23	0.18	0.35		0.03	0.20	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	538	549	1583	325	341	359	618	2151		59	1017	1583
v/s Ratio Prot	c0.53	0.52		0.17	c0.29	0.02	c0.33	c0.49		0.04	c0.26	
v/s Ratio Perm			0.20			0.14						0.53
v/c Ratio	1.64	1.61	0.20	0.87	1.48	0.71	1.82	1.40		1.34	1.28	0.53
Uniform Delay, d1	51.0	51.0	0.0	58.7	60.5	53.4	61.5	49.0		72.5	60.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.81		0.64	0.57	1.00
Incremental Delay, d2	296.9	284.6	0.3	21.9	231.6	6.3	373.4	182.5		203.3	131.4	0.7
Delay (s)	347.9	335.6	0.3	80.6	292.1	59.7	428.4	222.4		249.6	165.7	0.7
Level of Service	F	F	A	F	F	E	F	F		F	F	A
Approach Delay (s)		290.7			177.8			277.9			106.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	229.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.55		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	133.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	617	7	183	0	0	0	0	12	4	501	245	0
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	
Lane Util. Factor		1.00						1.00		1.00	1.00	
Frt		0.97						0.97		1.00	1.00	
Flt Protected		0.96						1.00		0.95	1.00	
Satd. Flow (prot)		1739						1804		1770	1863	
Flt Permitted		0.96						1.00		0.75	1.00	
Satd. Flow (perm)		1739						1804		1390	1863	
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)	671	8	199	0	0	0	0	13	4	545	266	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	866	0	0	0	0	0	15	0	545	266	0
Turn Type	Perm									Perm		
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		44.0						38.0		38.0	38.0	
Effective Green, g (s)		44.0						38.0		38.0	38.0	
Actuated g/C Ratio		0.49						0.42		0.42	0.42	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		850						762		587	787	
v/s Ratio Prot								0.01			0.14	
v/s Ratio Perm		0.50								c0.39		
v/c Ratio		1.02						0.02		0.93	0.34	
Uniform Delay, d1		23.0						15.1		24.7	17.5	
Progression Factor		1.00						1.00		0.97	1.04	
Incremental Delay, d2		35.8						0.0		19.6	0.9	
Delay (s)		58.8						15.2		43.5	19.2	
Level of Service		E						B		D	B	
Approach Delay (s)		58.8			0.0			15.2			35.5	
Approach LOS		E			A			B			D	

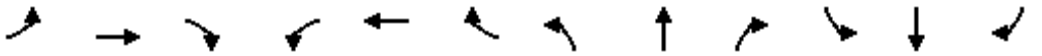
Intersection Summary			
HCM Average Control Delay	47.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	378	0	169	13	615	1	0	368	349
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
Lane Util. Factor					1.00			1.00			1.00	1.00
Frt					0.96			1.00			1.00	0.85
Flt Protected					0.97			1.00			1.00	1.00
Satd. Flow (prot)					1725			1860			1863	1583
Flt Permitted					0.97			0.99			1.00	1.00
Satd. Flow (perm)					1725			1845			1863	1583
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)	0	0	0	411	0	184	14	668	1	0	400	379
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	0	0	0	176
Lane Group Flow (vph)	0	0	0	0	576	0	0	683	0	0	400	203
Turn Type				Perm			Perm					Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					33.8			48.2			48.2	48.2
Effective Green, g (s)					33.8			48.2			48.2	48.2
Actuated g/C Ratio					0.38			0.54			0.54	0.54
Clearance Time (s)					4.0			4.0			4.0	4.0
Vehicle Extension (s)					3.0			3.0			3.0	3.0
Lane Grp Cap (vph)					648			988			998	848
v/s Ratio Prot											0.21	
v/s Ratio Perm					0.33			c0.37				0.13
v/c Ratio					0.89			0.69			0.40	0.24
Uniform Delay, d1					26.3			15.4			12.4	11.1
Progression Factor					1.00			0.11			1.00	1.00
Incremental Delay, d2					14.1			0.4			1.2	0.7
Delay (s)					40.4			2.1			13.6	11.8
Level of Service					D			A			B	B
Approach Delay (s)		0.0			40.4			2.1			12.7	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1310	317	286	291	435	235	1035	2212	591	73	1200	777
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	0.91	0.91	1.00	0.91	0.91	1.00	0.94	0.86	1.00	1.00	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3221	1660	1583	1610	3371	1583	4990	6408	1583	1770	6408	1583
Flt Permitted	0.95	0.98	1.00	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3221	1660	1583	1610	3371	1583	4990	6408	1583	1770	6408	1583
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)	1424	345	311	316	473	255	1125	2404	642	79	1304	845
RTOR Reduction (vph)	0	0	0	0	0	1	0	0	286	0	0	0
Lane Group Flow (vph)	1168	601	311	256	533	254	1125	2404	356	79	1304	845
Turn Type	Split		Free	Split		pm+ov	Prot		Perm	Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8			2			Free
Actuated Green, G (s)	50.0	50.0	150.0	22.0	22.0	29.0	31.0	55.0	55.0	7.0	31.0	150.0
Effective Green, g (s)	50.0	50.0	150.0	22.0	22.0	29.0	31.0	55.0	55.0	7.0	31.0	150.0
Actuated g/C Ratio	0.33	0.33	1.00	0.15	0.15	0.19	0.21	0.37	0.37	0.05	0.21	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1074	553	1583	236	494	306	1031	2350	580	83	1324	1583
v/s Ratio Prot	c0.36	0.36		c0.16	0.16	0.04	c0.23	c0.38		0.04	c0.20	
v/s Ratio Perm			0.20			0.12			0.22			0.53
v/c Ratio	1.09	1.09	0.20	1.08	1.08	0.83	1.09	1.02	0.61	0.95	0.98	0.53
Uniform Delay, d1	50.0	50.0	0.0	64.0	64.0	58.1	59.5	47.5	38.8	71.3	59.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.83	0.58	0.67	0.60	1.00
Incremental Delay, d2	54.4	64.0	0.3	83.0	63.4	17.2	52.0	21.3	3.2	59.3	15.3	0.7
Delay (s)	104.4	114.0	0.3	147.0	127.4	75.3	107.7	60.6	25.7	107.2	51.1	0.7
Level of Service	F	F	A	F	F	E	F	E	C	F	D	A
Approach Delay (s)		91.6			119.5			67.9			34.0	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM Average Control Delay	70.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

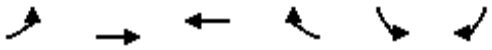
2020 Plus Project Phase-1

AM Peak

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	513	0	1203	0	0
Sign Control	Yield		Free		Yield	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	558	0	1308	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	1308	0	0		558	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1308	0	0		558	0
tC, single (s)	6.5	6.2	4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	4.0	3.3	2.2		3.5	4.0
p0 queue free %	100	49	100		100	100
cM capacity (veh/h)	160	1085	1623		214	896

Direction, Lane #	EB 1	EB 2	NB 1
Volume Total	279	279	1308
Volume Left	0	0	0
Volume Right	279	279	1308
cSH	1085	1085	1700
Volume to Capacity	0.26	0.26	0.77
Queue Length 95th (ft)	26	26	0
Control Delay (s)	9.5	9.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5		0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		



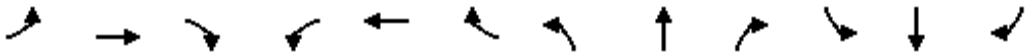
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	1099	0	899
Sign Control		Yield	Yield		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1195	0	977
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)					996	
pX, platoon unblocked						
vC, conflicting volume	1195	0	977	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1195	0	977	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	0	100	100	0	100	
cM capacity (veh/h)	0	896	251	1085	1623	

Direction, Lane #	WB 1	WB 2	SB 1
Volume Total	597	597	977
Volume Left	0	0	0
Volume Right	597	597	977
cSH	1085	1085	1700
Volume to Capacity	0.55	0.55	0.57
Queue Length 95th (ft)	87	87	0
Control Delay (s)	12.3	12.3	0.0
Lane LOS	B	B	
Approach Delay (s)	12.3		0.0
Approach LOS	B		

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	70	108	991	108	70	829
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	76	117	1077	117	76	901
RTOR Reduction (vph)	0	87	0	22	0	0
Lane Group Flow (vph)	76	30	1077	95	76	901
Turn Type		pt+ov		pt+ov	Prot	
Protected Phases	8	8 1	2	2 8	1	6
Permitted Phases						
Actuated Green, G (s)	9.2	22.0	60.0	73.2	8.8	72.8
Effective Green, g (s)	9.2	22.0	60.0	73.2	8.8	72.8
Actuated g/C Ratio	0.10	0.24	0.67	0.81	0.10	0.81
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	181	387	1242	1288	173	1507
v/s Ratio Prot	c0.04	0.02	c0.58	0.06	0.04	c0.48
v/s Ratio Perm						
v/c Ratio	0.42	0.08	0.87	0.07	0.44	0.60
Uniform Delay, d1	37.9	26.2	11.9	1.7	38.3	3.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	8.3	0.0	1.8	1.8
Delay (s)	39.5	26.3	20.2	1.7	40.1	4.9
Level of Service	D	C	C	A	D	A
Approach Delay (s)	31.5		18.3			7.7
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	609	0	1044	0	0	0	600	594	0	0	115	398
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.88	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1770	1583				1770	1863			1646	
Flt Permitted		0.76	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1410	1583				1770	1863			1646	
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)	662	0	1135	0	0	0	652	646	0	0	125	433
RTOR Reduction (vph)	0	0	521	0	0	0	0	0	0	0	96	0
Lane Group Flow (vph)	0	662	614	0	0	0	652	646	0	0	462	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		49.0	49.0				38.0	73.0			31.0	
Effective Green, g (s)		49.0	49.0				38.0	73.0			31.0	
Actuated g/C Ratio		0.38	0.38				0.29	0.56			0.24	
Clearance Time (s)		4.0	4.0				4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		531	597				517	1046			393	
v/s Ratio Prot							c0.37	0.35			c0.28	
v/s Ratio Perm		c0.47	0.39									
v/c Ratio		1.25	1.03				1.26	0.62			1.18	
Uniform Delay, d1		40.5	40.5				46.0	19.1			49.5	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		126.1	44.4				132.4	2.7			102.7	
Delay (s)		166.6	84.9				178.4	21.9			152.2	
Level of Service		F	F				F	C			F	
Approach Delay (s)		115.0			0.0			100.5			152.2	
Approach LOS		F			A			F			F	

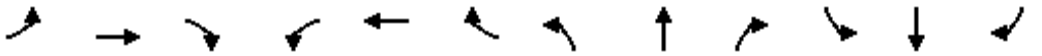
Intersection Summary			
HCM Average Control Delay	115.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Mitigation

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	513	0	1203	0	0
Sign Control	Yield		Free		Yield	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	558	0	1308	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	1308	0	0		558	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1308	0	0		558	0
tC, single (s)	6.5	6.2	4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	4.0	3.3	2.2		3.5	4.0
p0 queue free %	100	49	100		100	100
cM capacity (veh/h)	160	1085	1623		214	896

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	279	279	654	654
Volume Left	0	0	0	0
Volume Right	279	279	654	654
cSH	1085	1085	1700	1700
Volume to Capacity	0.26	0.26	0.38	0.38
Queue Length 95th (ft)	26	26	0	0
Control Delay (s)	9.5	9.5	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.5		0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	609	0	1044	0	0	0	600	594	0	0	115	398
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
Lane Util. Factor	0.97		1.00				0.97	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)	3433		1583				3433	1863			1863	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		1583				3433	1863			1863	1583
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)	662	0	1135	0	0	0	652	646	0	0	125	433
RTOR Reduction (vph)	0	0	162	0	0	0	0	0	0	0	0	333
Lane Group Flow (vph)	662	0	973	0	0	0	652	646	0	0	125	100
Turn Type	Prot		pt+ov	Perm		Perm	Prot			Prot		Perm
Protected Phases	7	4	4 5		8		5	2		1	6	
Permitted Phases				8		8						6
Actuated Green, G (s)	36.4		61.3				20.9	45.6			20.7	20.7
Effective Green, g (s)	36.4		61.3				20.9	45.6			20.7	20.7
Actuated g/C Ratio	0.40		0.68				0.23	0.51			0.23	0.23
Clearance Time (s)	4.0						4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0						3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	1388		1078				797	944			428	364
v/s Ratio Prot	0.19		c0.61				0.19	c0.35			0.07	
v/s Ratio Perm												0.06
v/c Ratio	0.48		0.90				0.82	0.68			0.29	0.27
Uniform Delay, d1	19.8		11.9				32.7	16.8			28.6	28.5
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3		10.5				6.5	4.0			0.4	0.4
Delay (s)	20.0		22.3				39.3	20.8			29.0	28.9
Level of Service	C		C				D	C			C	C
Approach Delay (s)		21.5			0.0			30.1			28.9	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

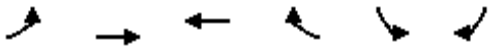
2020 Plus Project Phase-1

PM Peak

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	694	0	1657	0	0
Sign Control	Yield		Free		Yield	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	754	0	1801	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	0	0	0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0		0	0
tC, single (s)	6.5	6.2	4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	4.0	3.3	2.2		3.5	4.0
p0 queue free %	100	30	100		100	100
cM capacity (veh/h)	896	1085	1623		312	896

Direction, Lane #	EB 1	EB 2	NB 1
Volume Total	377	377	1801
Volume Left	0	0	0
Volume Right	377	377	1801
cSH	1085	1085	1700
Volume to Capacity	0.35	0.35	1.06
Queue Length 95th (ft)	39	39	0
Control Delay (s)	10.1	10.1	0.0
Lane LOS	B	B	
Approach Delay (s)	10.1		0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
Analysis Period (min)	15		



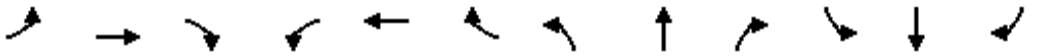
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	1500	0	694
Sign Control		Yield	Yield		Free	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1630	0	754
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)					996	
pX, platoon unblocked						
vC, conflicting volume	0	0	0	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	0	100	100	0	100	
cM capacity (veh/h)	0	896	896	1085	1623	

Direction, Lane #	WB 1	WB 2	SB 1
Volume Total	815	815	754
Volume Left	0	0	0
Volume Right	815	815	754
cSH	1085	1085	1700
Volume to Capacity	0.75	0.75	0.44
Queue Length 95th (ft)	186	186	0
Control Delay (s)	17.6	17.6	0.0
Lane LOS	C	C	
Approach Delay (s)	17.6		0.0
Approach LOS	C		

Intersection Summary			
Average Delay	12.0		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	74	200	1300	200	74	620
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	217	1413	217	80	674
RTOR Reduction (vph)	0	73	0	15	0	0
Lane Group Flow (vph)	80	144	1413	202	80	674
Turn Type		pt+ov		pt+ov	Prot	
Protected Phases	8	8 1	2	2 8	1	6
Permitted Phases						
Actuated Green, G (s)	13.7	25.8	106.2	123.9	8.1	118.3
Effective Green, g (s)	13.7	25.8	106.2	123.9	8.1	118.3
Actuated g/C Ratio	0.10	0.18	0.76	0.88	0.06	0.84
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	173	292	1413	1401	102	1574
v/s Ratio Prot	0.05	c0.09	c0.76	0.13	c0.05	0.36
v/s Ratio Perm						
v/c Ratio	0.46	0.49	1.00	0.14	0.78	0.43
Uniform Delay, d1	59.7	51.2	16.9	1.1	65.1	2.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	1.3	23.9	0.0	31.6	0.9
Delay (s)	61.6	52.6	40.8	1.1	96.7	3.5
Level of Service	E	D	D	A	F	A
Approach Delay (s)	55.0		35.6			13.4
Approach LOS	E		D			B

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	883	0	1044	0	0	0	957	774	0	0	192	502
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	1.00			0.89	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1770	1583				1770	1863			1661	
Flt Permitted		0.76	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1410	1583				1770	1863			1661	
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)	960	0	1135	0	0	0	1040	841	0	0	209	546
RTOR Reduction (vph)	0	0	390	0	0	0	0	0	0	0	78	0
Lane Group Flow (vph)	0	960	745	0	0	0	1040	841	0	0	677	0
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		44.0	44.0				34.0	68.0			30.0	
Effective Green, g (s)		44.0	44.0				34.0	68.0			30.0	
Actuated g/C Ratio		0.37	0.37				0.28	0.57			0.25	
Clearance Time (s)		4.0	4.0				4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		517	580				502	1056			415	
v/s Ratio Prot							c0.59	0.45			c0.41	
v/s Ratio Perm		c0.68	0.47									
v/c Ratio		1.86	1.28				2.07	0.80			1.63	
Uniform Delay, d1		38.0	38.0				43.0	20.5			45.0	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		393.0	140.7				489.1	6.2			294.9	
Delay (s)		431.0	178.7				532.1	26.8			339.9	
Level of Service		F	F				F	C			F	
Approach Delay (s)		294.3			0.0			306.2			339.9	
Approach LOS		F			A			F			F	

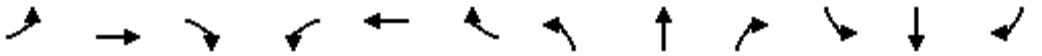
Intersection Summary			
HCM Average Control Delay	306.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	152.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Mitigation

Movement	EBL	EBR	NBL	NBR	SWL	SWR
Lane Configurations						
Volume (veh/h)	0	694	0	1657	0	0
Sign Control	Yield		Free		Yield	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	754	0	1801	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage veh)						
Upstream signal (ft)			726			
pX, platoon unblocked						
vC, conflicting volume	0	0	0		0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0	0		0	0
tC, single (s)	6.5	6.2	4.1		7.1	6.5
tC, 2 stage (s)						
tF (s)	4.0	3.3	2.2		3.5	4.0
p0 queue free %	100	30	100		100	100
cM capacity (veh/h)	896	1085	1623		312	896

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	377	377	901	901
Volume Left	0	0	0	0
Volume Right	377	377	901	901
cSH	1085	1085	1700	1700
Volume to Capacity	0.35	0.35	0.53	0.53
Queue Length 95th (ft)	39	39	0	0
Control Delay (s)	10.1	10.1	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	10.1		0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

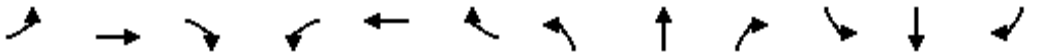


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	883	0	1044	0	0	0	957	774	0	0	192	502
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	4.0			4.0	4.0
Lane Util. Factor	0.97		1.00				0.97	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)	3433		1583				3433	1863			1863	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		1583				3433	1863			1863	1583
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)	960	0	1135	0	0	0	1040	841	0	0	209	546
RTOR Reduction (vph)	0	0	51	0	0	0	0	0	0	0	0	452
Lane Group Flow (vph)	960	0	1084	0	0	0	1040	841	0	0	209	94
Turn Type	Prot		pt+ov	Perm		Perm	Prot			Prot		Perm
Protected Phases	7	4	4 5		8		5	2		1	6	
Permitted Phases				8		8						6
Actuated Green, G (s)	49.5		91.4				37.9	62.5			20.6	20.6
Effective Green, g (s)	49.5		91.4				37.9	62.5			20.6	20.6
Actuated g/C Ratio	0.41		0.76				0.32	0.52			0.17	0.17
Clearance Time (s)	4.0						4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0						3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	1416		1206				1084	970			320	272
v/s Ratio Prot	0.28		c0.68				c0.30	c0.45			0.11	
v/s Ratio Perm												0.06
v/c Ratio	0.68		0.90				0.96	0.87			0.65	0.34
Uniform Delay, d1	28.7		10.8				40.3	25.1			46.4	43.8
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	1.3		9.1				18.1	10.3			4.7	0.8
Delay (s)	30.1		20.0				58.4	35.4			51.1	44.5
Level of Service	C		B				E	D			D	D
Approach Delay (s)		24.6			0.0			48.1			46.3	
Approach LOS		C			A			D			D	

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2020 Plus Project Phase-2

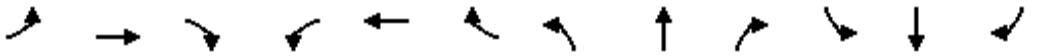
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	398	0	115	0	0	0	0	600	594	609	1044	0
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	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1601	1447					3406	1524	1770	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1601	1447					3406	1524	1770	3406	
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)	433	0	125	0	0	0	0	652	646	662	1135	0
RTOR Reduction (vph)	0	3	92	0	0	0	0	0	324	0	0	0
Lane Group Flow (vph)	225	218	20	0	0	0	0	652	322	662	1135	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Perm		Perm						Perm	Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.4	14.4	14.4					21.8	21.8	31.8	57.6	
Effective Green, g (s)	14.4	14.4	14.4					21.8	21.8	31.8	57.6	
Actuated g/C Ratio	0.18	0.18	0.18					0.27	0.27	0.40	0.72	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	303	288	260					928	415	704	2452	
v/s Ratio Prot								0.19		c0.37	0.33	
v/s Ratio Perm	0.13	0.14	0.01						c0.21			
v/c Ratio	0.74	0.76	0.08					0.70	0.78	0.94	0.46	
Uniform Delay, d1	31.0	31.1	27.3					26.2	26.9	23.2	4.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.91	0.41	
Incremental Delay, d2	9.4	10.8	0.1					4.4	13.3	8.3	0.2	
Delay (s)	40.5	41.9	27.4					30.6	40.2	29.5	2.1	
Level of Service	D	D	C					C	D	C	A	
Approach Delay (s)		38.4			0.0			35.4			12.2	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

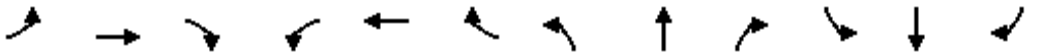
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	546	0	553	361	637	0	0	1107	538
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
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.92	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1494	1504	1703	3539			3539	1583
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1494	1504	1703	3539			3539	1583
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)	0	0	0	593	0	601	392	692	0	0	1203	585
RTOR Reduction (vph)	0	0	0	0	56	195	0	0	0	0	0	380
Lane Group Flow (vph)	0	0	0	415	344	184	392	692	0	0	1203	205
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				21.0	21.0	21.0	19.0	51.0			28.0	28.0
Effective Green, g (s)				21.0	21.0	21.0	19.0	51.0			28.0	28.0
Actuated g/C Ratio				0.26	0.26	0.26	0.24	0.64			0.35	0.35
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				425	392	395	404	2256			1239	554
v/s Ratio Prot							c0.23	0.20			c0.34	
v/s Ratio Perm				c0.26	0.23	0.12						0.13
v/c Ratio				0.98	0.88	0.46	0.97	0.31			0.97	0.37
Uniform Delay, d1				29.3	28.3	24.8	30.2	6.5			25.6	19.4
Progression Factor				1.00	1.00	1.00	1.14	0.03			0.91	1.48
Incremental Delay, d2				37.1	19.3	0.9	30.2	0.3			16.9	1.5
Delay (s)				66.4	47.6	25.6	64.6	0.4			40.3	30.2
Level of Service				E	D	C	E	A			D	C
Approach Delay (s)		0.0			47.1			23.6			37.0	
Approach LOS		A			D			C			D	

Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

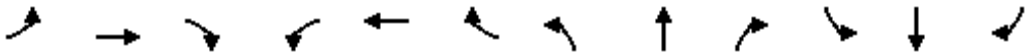


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	83	149	457	229	360	150	530	220	167	578	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.90		1.00	0.91		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3198		1770	3215		1770	3539	1583	1770	3383	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3198		1770	3215		1770	3539	1583	1770	3383	
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)	174	90	162	497	249	391	163	576	239	182	628	263
RTOR Reduction (vph)	0	146	0	0	253	0	0	0	179	0	50	0
Lane Group Flow (vph)	174	106	0	497	387	0	163	576	60	182	841	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	12.7	8.3		25.9	21.5		9.0	20.6	20.6	11.5	23.1	
Effective Green, g (s)	12.7	8.3		25.9	21.5		9.0	20.6	20.6	11.5	23.1	
Actuated g/C Ratio	0.15	0.10		0.31	0.26		0.11	0.25	0.25	0.14	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	273	323		557	840		194	886	396	247	950	
v/s Ratio Prot	0.10	0.03		c0.28	c0.12		0.09	0.16		c0.10	c0.25	
v/s Ratio Perm									0.04			
v/c Ratio	0.64	0.33		0.89	0.46		0.84	0.65	0.15	0.74	0.89	
Uniform Delay, d1	32.6	34.4		26.9	25.5		35.9	27.6	24.0	33.9	28.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.8	0.6		16.5	0.4		26.5	1.7	0.2	10.9	9.9	
Delay (s)	37.5	35.0		43.3	25.9		62.5	29.3	24.2	44.8	38.3	
Level of Service	D	D		D	C		E	C	C	D	D	
Approach Delay (s)		36.0			33.5			33.6			39.4	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	82.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	170	164	1022	168	1	1475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3464		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3464		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	178	1111	183	1	1603
RTOR Reduction (vph)	0	137	13	0	0	0
Lane Group Flow (vph)	185	41	1281	0	1	1603
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	13.4	13.4	53.8		0.8	58.6
Effective Green, g (s)	13.4	13.4	53.8		0.8	58.6
Actuated g/C Ratio	0.17	0.17	0.67		0.01	0.73
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	296	265	2330		18	2592
v/s Ratio Prot	c0.10		0.37		0.00	c0.45
v/s Ratio Perm		0.03				
v/c Ratio	0.62	0.16	0.55		0.06	0.62
Uniform Delay, d1	31.0	28.5	6.8		39.2	5.2
Progression Factor	1.00	1.00	0.99		1.00	1.00
Incremental Delay, d2	4.1	0.3	0.8		1.3	1.1
Delay (s)	35.0	28.7	7.6		40.5	6.4
Level of Service	D	C	A		D	A
Approach Delay (s)	32.0		7.6			6.4
Approach LOS	C		A			A

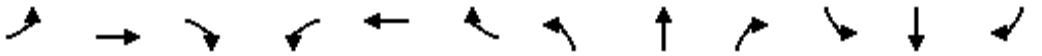
Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	1	1	0	1	1	477	2	1	694	1
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			0.93			1.00			1.00	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1695			1695			1862			1862	
Flt Permitted		0.95			0.95			1.00			1.00	
Satd. Flow (perm)		1651			1651			1860			1862	
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)	1	0	1	1	0	1	1	518	2	1	754	1
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	1	0	0	521	0	0	756	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.0			16.0			31.0			31.0	
Effective Green, g (s)		16.0			16.0			31.0			31.0	
Actuated g/C Ratio		0.29			0.29			0.56			0.56	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		480			480			1048			1049	
v/s Ratio Prot												
v/s Ratio Perm		c0.00			0.00			0.28			0.41	
v/c Ratio		0.00			0.00			0.50			0.72	
Uniform Delay, d1		13.8			13.8			7.3			8.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			0.0			1.7			4.3	
Delay (s)		13.8			13.8			9.0			13.1	
Level of Service		B			B			A			B	
Approach Delay (s)		13.8			13.8			9.0			13.1	
Approach LOS		B			B			A			B	

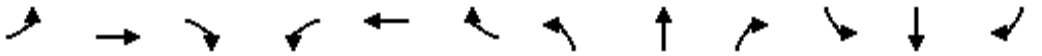
Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



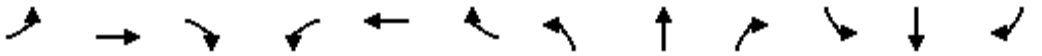
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	792	116	144	1004	114	221	45	346	108	69	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.87		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3471		1770	3485		1770	1616		1770	1819	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3471		1770	3485		1770	1616		1770	1819	
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)	34	861	126	157	1091	124	240	49	376	117	75	14
RTOR Reduction (vph)	0	15	0	0	10	0	0	142	0	0	9	0
Lane Group Flow (vph)	34	972	0	157	1205	0	240	283	0	117	80	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	1.4	25.8		7.2	31.6		11.4	16.4		5.2	10.2	
Effective Green, g (s)	1.4	25.8		7.2	31.6		11.4	16.4		5.2	10.2	
Actuated g/C Ratio	0.02	0.37		0.10	0.45		0.16	0.23		0.07	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	35	1268		181	1560		286	375		130	263	
v/s Ratio Prot	0.02	0.28		c0.09	c0.35		c0.14	c0.18		0.07	0.04	
v/s Ratio Perm												
v/c Ratio	0.97	0.77		0.87	0.77		0.84	0.75		0.90	0.30	
Uniform Delay, d1	34.6	19.7		31.2	16.5		28.7	25.2		32.4	27.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	140.0	2.8		32.6	2.4		18.9	8.4		49.7	0.7	
Delay (s)	174.6	22.6		63.9	18.9		47.7	33.6		82.2	27.7	
Level of Service	F	C		E	B		D	C		F	C	
Approach Delay (s)		27.6			24.1			38.7			58.6	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



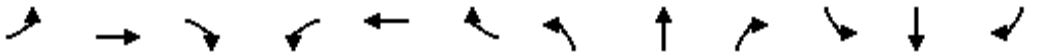
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	252	325	55	476	373	401	219	994	295	119	1600	623
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86		0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3462		3433	3539	1583	1770	6188		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3462		3433	3539	1583	1770	6188		3433	5085	1583
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)	274	353	60	517	405	436	238	1080	321	129	1739	677
RTOR Reduction (vph)	0	13	0	0	0	0	0	54	0	0	0	260
Lane Group Flow (vph)	274	400	0	517	405	436	238	1347	0	129	1739	417
Turn Type	Split			Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	15.5	15.5		28.5	28.5	28.5	14.0	34.4		15.6	36.0	36.0
Effective Green, g (s)	15.5	15.5		28.5	28.5	28.5	14.0	34.4		15.6	36.0	36.0
Actuated g/C Ratio	0.14	0.14		0.26	0.26	0.26	0.13	0.31		0.14	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	484	488		889	917	410	225	1935		487	1664	518
v/s Ratio Prot	0.08	c0.12		0.15	0.11		c0.13	0.22		0.04	c0.34	
v/s Ratio Perm						c0.28						0.26
v/c Ratio	0.57	0.82		0.58	0.44	1.06	1.06	0.70		0.26	1.05	0.80
Uniform Delay, d1	44.1	45.9		35.5	34.1	40.8	48.0	33.2		42.1	37.0	33.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.55	0.49	0.78
Incremental Delay, d2	1.5	10.4		1.0	0.3	62.3	76.1	2.1		0.2	30.9	8.4
Delay (s)	45.6	56.3		36.5	34.4	103.0	124.1	35.3		23.5	48.9	34.8
Level of Service	D	E		D	C	F	F	D		C	D	C
Approach Delay (s)		52.0			57.3			48.2			43.9	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	48.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



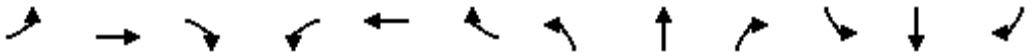
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1544	0	0	472	0	1417	255	644	1646	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1678	0	0	513	0	1540	277	700	1789	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1678	0	0	513	0	1540	277	700	1789	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases						Free			Free			
Actuated Green, G (s)			69.0			110.0		74.9	110.0	27.1	33.0	
Effective Green, g (s)			69.0			110.0		74.9	110.0	27.1	33.0	
Actuated g/C Ratio			0.63			1.00		0.68	1.00	0.25	0.30	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			1748			1611		3462	1583	846	1922	
v/s Ratio Prot			c0.60					0.30		0.20	c0.28	
v/s Ratio Perm						0.32			0.17			
v/c Ratio			0.96			0.32		0.44	0.17	0.83	0.93	
Uniform Delay, d1			19.2			0.0		8.0	0.0	39.2	37.4	
Progression Factor			1.00			1.00		0.29	1.00	0.92	0.65	
Incremental Delay, d2			13.1			0.5		0.3	0.2	1.6	2.7	
Delay (s)			32.3			0.5		2.7	0.2	37.9	26.8	
Level of Service			C			A		A	A	D	C	
Approach Delay (s)		32.3			0.5			2.3			29.9	
Approach LOS		C			A			A			C	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



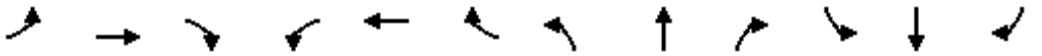
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	85	771	168	197	58	862	858	169	69	1351	827
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1737	1583	1681	1763	1583	3433	6250		1770	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1737	1583	1681	1763	1583	3433	6250		1770	5085	1583
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)	199	92	838	183	214	63	937	933	184	75	1468	899
RTOR Reduction (vph)	0	0	46	0	0	49	0	30	0	0	0	0
Lane Group Flow (vph)	143	148	792	165	232	14	937	1087	0	75	1468	899
Turn Type	Split		pm+ov	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4	5	8	8	1	5	2		1	6	
Permitted Phases			4			8						Free
Actuated Green, G (s)	13.6	13.6	45.4	16.8	16.8	24.5	31.8	55.9		7.7	31.8	110.0
Effective Green, g (s)	13.6	13.6	45.4	16.8	16.8	24.5	31.8	55.9		7.7	31.8	110.0
Actuated g/C Ratio	0.12	0.12	0.41	0.15	0.15	0.22	0.29	0.51		0.07	0.29	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	208	215	711	257	269	410	992	3176		124	1470	1583
v/s Ratio Prot	0.09	0.09	c0.32	0.10	c0.13	0.00	0.27	0.17		0.04	c0.29	
v/s Ratio Perm			0.18			0.01						0.57
v/c Ratio	0.69	0.69	1.11	0.64	0.86	0.03	0.94	0.34		0.60	1.00	0.57
Uniform Delay, d1	46.2	46.2	32.3	43.8	45.5	33.5	38.2	16.1		49.7	39.1	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.37		1.12	0.69	1.00
Incremental Delay, d2	9.1	8.8	69.3	5.4	23.6	0.0	15.8	0.3		4.8	17.6	0.9
Delay (s)	55.2	55.0	101.6	49.2	69.1	33.5	43.0	6.3		60.6	44.7	0.9
Level of Service	E	E	F	D	E	C	D	A		E	D	A
Approach Delay (s)		89.6			57.1			23.0			29.0	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	287	2	30	0	0	0	0	86	17	125	22	0
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	
Lane Util. Factor		1.00						1.00		1.00	1.00	
Frt		0.99						0.98		1.00	1.00	
Flt Protected		0.96						1.00		0.95	1.00	
Satd. Flow (prot)		1760						1822		1770	1863	
Flt Permitted		0.96						1.00		0.69	1.00	
Satd. Flow (perm)		1760						1822		1277	1863	
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)	312	2	33	0	0	0	0	93	18	136	24	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	338	0	0	0	0	0	104	0	136	24	0
Turn Type	Perm									Perm		
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		17.0						35.0		35.0	35.0	
Effective Green, g (s)		17.0						35.0		35.0	35.0	
Actuated g/C Ratio		0.28						0.58		0.58	0.58	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		499						1063		745	1087	
v/s Ratio Prot								0.06			0.01	
v/s Ratio Perm		0.19								c0.11		
v/c Ratio		0.68						0.10		0.18	0.02	
Uniform Delay, d1		19.1						5.5		5.8	5.3	
Progression Factor		1.00						1.00		1.06	1.06	
Incremental Delay, d2		3.6						0.2		0.5	0.0	
Delay (s)		22.7						5.7		6.7	5.6	
Level of Service		C						A		A	A	
Approach Delay (s)		22.7			0.0			5.7			6.5	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

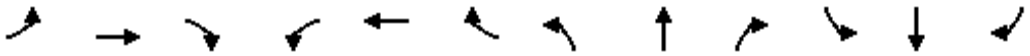


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	41	0	260	48	325	0	0	106	682
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	4.0
Lane Util. Factor					1.00			1.00			1.00	1.00
Frt					0.88			1.00			1.00	0.85
Flt Protected					0.99			0.99			1.00	1.00
Satd. Flow (prot)					1635			1851			1863	1583
Flt Permitted					0.99			0.96			1.00	1.00
Satd. Flow (perm)					1635			1784			1863	1583
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)	0	0	0	45	0	283	52	353	0	0	115	741
RTOR Reduction (vph)	0	0	0	0	241	0	0	0	0	0	0	209
Lane Group Flow (vph)	0	0	0	0	87	0	0	405	0	0	115	532
Turn Type				Perm			Perm					Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					8.9			43.1			43.1	43.1
Effective Green, g (s)					8.9			43.1			43.1	43.1
Actuated g/C Ratio					0.15			0.72			0.72	0.72
Clearance Time (s)					4.0			4.0			4.0	4.0
Vehicle Extension (s)					3.0			3.0			3.0	3.0
Lane Grp Cap (vph)					243			1282			1338	1137
v/s Ratio Prot											0.06	
v/s Ratio Perm					0.05			0.23				c0.34
v/c Ratio					0.36			0.32			0.09	0.47
Uniform Delay, d1					23.0			3.1			2.5	3.6
Progression Factor					1.00			0.50			1.00	1.00
Incremental Delay, d2					0.9			0.6			0.1	1.4
Delay (s)					23.9			2.2			2.7	5.0
Level of Service					C			A			A	A
Approach Delay (s)		0.0			23.9			2.2			4.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

2020 Plus Project Phase-2

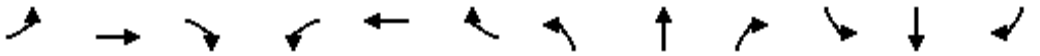
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	502	0	192	0	0	0	0	957	774	883	1079	0
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	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1597	1447					3406	1524	1770	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1597	1447					3406	1524	1770	3406	
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)	546	0	209	0	0	0	0	1040	841	960	1173	0
RTOR Reduction (vph)	0	3	129	0	0	0	0	0	219	0	0	0
Lane Group Flow (vph)	284	280	59	0	0	0	0	1040	622	960	1173	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Split		Perm						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	18.0	18.0	18.0					39.0	39.0	51.0	94.0	
Effective Green, g (s)	18.0	18.0	18.0					39.0	39.0	51.0	94.0	
Actuated g/C Ratio	0.15	0.15	0.15					0.32	0.32	0.42	0.78	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	252	240	217					1107	495	752	2668	
v/s Ratio Prot	0.17	c0.18						0.31		c0.54	0.34	
v/s Ratio Perm			0.04						c0.41			
v/c Ratio	1.13	1.17	0.27					0.94	1.26	1.28	0.44	
Uniform Delay, d1	51.0	51.0	45.2					39.4	40.5	34.5	4.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.92	0.18	
Incremental Delay, d2	95.2	111.3	0.7					15.9	131.4	127.4	0.1	
Delay (s)	146.2	162.3	45.9					55.3	171.9	159.3	0.9	
Level of Service	F	F	D					E	F	F	A	
Approach Delay (s)		127.2			0.0			107.4			72.2	
Approach LOS		F			A			F			E	

Intersection Summary			
HCM Average Control Delay	94.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.9%	ICU Level of Service	H
Analysis Period (min)	15		

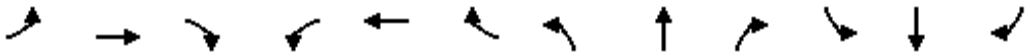
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	944	0	556	337	1122	0	0	1018	357
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
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.97	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1536	1504	1703	3539			3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1536	1504	1703	3539			3539	1583
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)	0	0	0	1026	0	604	366	1220	0	0	1107	388
RTOR Reduction (vph)	0	0	0	0	6	41	0	0	0	0	0	219
Lane Group Flow (vph)	0	0	0	564	553	466	366	1220	0	0	1107	169
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				43.0	43.0	43.0	26.0	69.0			39.0	39.0
Effective Green, g (s)				43.0	43.0	43.0	26.0	69.0			39.0	39.0
Actuated g/C Ratio				0.36	0.36	0.36	0.22	0.57			0.32	0.32
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				580	550	539	369	2035			1150	514
v/s Ratio Prot				0.35	c0.36		c0.21	0.34			c0.31	
v/s Ratio Perm						0.31						0.11
v/c Ratio				0.97	1.00	0.86	0.99	0.60			0.96	0.33
Uniform Delay, d1				37.9	38.5	35.8	46.9	16.5			39.8	30.6
Progression Factor				1.00	1.00	1.00	0.87	0.07			0.91	1.05
Incremental Delay, d2				30.3	39.5	13.5	12.2	0.1			17.4	1.5
Delay (s)				68.2	78.0	49.3	53.1	1.3			53.5	33.7
Level of Service				E	E	D	D	A			D	C
Approach Delay (s)		0.0			65.7			13.3			48.4	
Approach LOS		A			E			B			D	

Intersection Summary			
HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

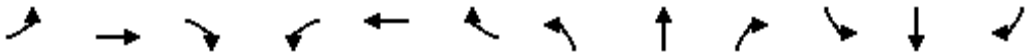


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	236	182	376	116	151	200	721	390	232	461	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.92		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3308		1770	3239		1770	3539	1583	1770	3432	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3308		1770	3239		1770	3539	1583	1770	3432	
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)	198	257	198	409	126	164	217	784	424	252	501	127
RTOR Reduction (vph)	0	162	0	0	126	0	0	0	317	0	24	0
Lane Group Flow (vph)	198	293	0	409	164	0	217	784	107	252	604	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	14.3	12.4		21.7	19.8		13.3	21.7	21.7	14.0	22.4	
Effective Green, g (s)	14.3	12.4		21.7	19.8		13.3	21.7	21.7	14.0	22.4	
Actuated g/C Ratio	0.17	0.14		0.25	0.23		0.16	0.25	0.25	0.16	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	295	478		448	747		274	895	400	289	896	
v/s Ratio Prot	0.11	c0.09		c0.23	0.05		0.12	c0.22		c0.14	0.18	
v/s Ratio Perm									0.07			
v/c Ratio	0.67	0.61		0.91	0.22		0.79	0.88	0.27	0.87	0.67	
Uniform Delay, d1	33.5	34.5		31.1	26.7		34.9	30.8	25.7	35.0	28.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.9	2.3		22.8	0.1		14.4	9.6	0.4	23.8	2.0	
Delay (s)	39.4	36.8		53.9	26.9		49.3	40.4	26.0	58.8	30.4	
Level of Service	D	D		D	C		D	D	C	E	C	
Approach Delay (s)		37.6			42.7			37.5			38.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	33	214	1404	274	0	1342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Frt	1.00	0.85	0.98			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3452			3539
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3452			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	233	1526	298	0	1459
RTOR Reduction (vph)	0	88	8	0	0	0
Lane Group Flow (vph)	36	145	1816	0	0	1459
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	15.9	15.9	96.1			96.1
Effective Green, g (s)	15.9	15.9	96.1			96.1
Actuated g/C Ratio	0.13	0.13	0.80			0.80
Clearance Time (s)	4.0	4.0	4.0			4.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	235	210	2764			2834
v/s Ratio Prot	0.02		c0.53			0.41
v/s Ratio Perm		c0.09				
v/c Ratio	0.15	0.69	0.66			0.51
Uniform Delay, d1	46.1	49.7	5.0			4.0
Progression Factor	1.00	1.00	0.86			1.00
Incremental Delay, d2	0.3	9.0	0.9			0.7
Delay (s)	46.4	58.7	5.2			4.7
Level of Service	D	E	A			A
Approach Delay (s)	57.1		5.2			4.7
Approach LOS	E		A			A

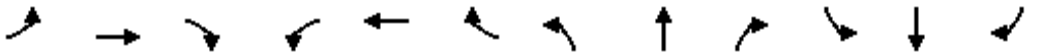
Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	0	1	1	0	1	1	838	2	1	470	1
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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.93			0.93			1.00			1.00	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1695			1695			1862			1862	
Flt Permitted		0.95			0.95			1.00			1.00	
Satd. Flow (perm)		1650			1650			1862			1861	
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)	1	0	1	1	0	1	1	911	2	1	511	1
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	0	1	0	0	914	0	0	513	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.0			16.0			36.0			36.0	
Effective Green, g (s)		16.0			16.0			36.0			36.0	
Actuated g/C Ratio		0.27			0.27			0.60			0.60	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		440			440			1117			1117	
v/s Ratio Prot												
v/s Ratio Perm		c0.00			0.00			0.49			0.28	
v/c Ratio		0.00			0.00			0.82			0.46	
Uniform Delay, d1		16.1			16.1			9.4			6.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.0			0.0			6.7			1.4	
Delay (s)		16.2			16.2			16.1			8.0	
Level of Service		B			B			B			A	
Approach Delay (s)		16.2			16.2			16.1			8.0	
Approach LOS		B			B			B			A	

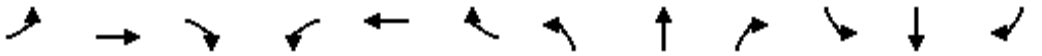
Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



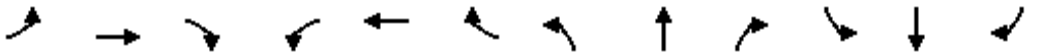
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	1303	245	330	891	146	161	54	228	305	114	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.88		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3455		1770	3464		1770	1637		1770	1814	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3455		1770	3464		1770	1637		1770	1814	
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)	13	1416	266	359	968	159	175	59	248	332	124	26
RTOR Reduction (vph)	0	10	0	0	8	0	0	101	0	0	5	0
Lane Group Flow (vph)	13	1672	0	359	1119	0	175	206	0	332	145	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	2.0	68.4		27.0	93.4		17.7	16.0		25.0	23.3	
Effective Green, g (s)	2.0	68.4		27.0	93.4		17.7	16.0		25.0	23.3	
Actuated g/C Ratio	0.01	0.45		0.18	0.61		0.12	0.10		0.16	0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	23	1551		314	2123		206	172		290	277	
v/s Ratio Prot	0.01	c0.48		c0.20	0.32		0.10	c0.13		c0.19	0.08	
v/s Ratio Perm												
v/c Ratio	0.57	1.08		1.14	0.53		0.85	1.20		1.14	0.52	
Uniform Delay, d1	74.8	42.0		62.7	16.9		66.0	68.2		63.7	59.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.1	47.1		95.4	0.2		26.4	131.5		97.9	1.8	
Delay (s)	102.9	89.1		158.1	17.1		92.4	199.7		161.6	61.2	
Level of Service	F	F		F	B		F	F		F	E	
Approach Delay (s)		89.2			51.2			160.7			130.3	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM Average Control Delay	88.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	152.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



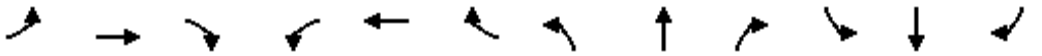
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	323	477	74	443	283	282	283	1462	541	414	1316	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86		0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3468		3433	3539	1583	1770	6148		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3468		3433	3539	1583	1770	6148		3433	5085	1583
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)	351	518	80	482	308	307	308	1589	588	450	1430	368
RTOR Reduction (vph)	0	9	0	0	0	0	0	51	0	0	0	246
Lane Group Flow (vph)	351	589	0	482	308	307	308	2126	0	450	1430	122
Turn Type	Split			Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	22.0	22.0		26.0	26.0	26.0	23.0	48.0		18.0	43.0	43.0
Effective Green, g (s)	22.0	22.0		26.0	26.0	26.0	23.0	48.0		18.0	43.0	43.0
Actuated g/C Ratio	0.17	0.17		0.20	0.20	0.20	0.18	0.37		0.14	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	581	587		687	708	317	313	2270		475	1682	524
v/s Ratio Prot	0.10	c0.17		0.14	0.09		0.17	c0.35		0.13	c0.28	
v/s Ratio Perm						c0.19						0.08
v/c Ratio	0.60	1.00		0.70	0.44	0.97	0.98	0.94		0.95	0.85	0.23
Uniform Delay, d1	50.0	54.0		48.4	45.6	51.6	53.3	39.5		55.5	40.5	31.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		0.79	0.73	1.14
Incremental Delay, d2	1.8	37.9		3.2	0.4	41.5	46.2	8.9		21.4	3.8	0.7
Delay (s)	51.7	91.9		51.6	46.0	93.1	99.5	48.4		65.1	33.3	36.8
Level of Service	D	F		D	D	F	F	D		E	C	D
Approach Delay (s)		77.1			61.7			54.8			40.2	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	54.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



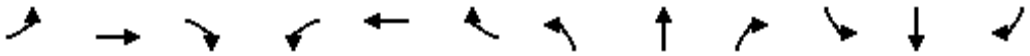
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1482	0	0	1074	0	2009	645	549	1013	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1611	0	0	1167	0	2184	701	597	1101	0
RTOR Reduction (vph)	0	0	1	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1610	0	0	1167	0	2184	701	597	1101	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases						Free			Free			
Actuated Green, G (s)			89.3			130.0		94.9	130.0	27.1	32.7	
Effective Green, g (s)			89.3			130.0		94.9	130.0	27.1	32.7	
Actuated g/C Ratio			0.69			1.00		0.73	1.00	0.21	0.25	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			1914			1611		3712	1583	716	1612	
v/s Ratio Prot			c0.58					0.43		0.17	0.17	
v/s Ratio Perm						c0.72			0.44			
v/c Ratio			0.84			0.72		0.59	0.44	0.83	0.68	
Uniform Delay, d1			15.1			0.0		8.3	0.0	49.3	44.0	
Progression Factor			1.00			1.00		0.17	1.00	0.80	0.46	
Incremental Delay, d2			3.5			2.9		0.1	0.1	5.7	1.6	
Delay (s)			18.6			2.9		1.4	0.1	45.3	22.0	
Level of Service			B			A		A	A	D	C	
Approach Delay (s)		18.6			2.9			1.1			30.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



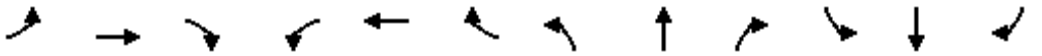
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	221	73	315	221	161	95	1028	1757	298	56	1026	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1726	1583	1681	1755	1583	3433	6268		1770	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1726	1583	1681	1755	1583	3433	6268		1770	5085	1583
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)	240	79	342	240	175	103	1117	1910	324	61	1115	477
RTOR Reduction (vph)	0	0	25	0	0	17	0	24	0	0	0	0
Lane Group Flow (vph)	158	161	317	204	211	86	1117	2210	0	61	1115	477
Turn Type	Split		pm+ov	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4	5	8	8	1	5	2		1	6	
Permitted Phases			4			8						Free
Actuated Green, G (s)	15.0	15.0	60.2	18.2	18.2	32.1	45.2	66.9		13.9	35.6	130.0
Effective Green, g (s)	15.0	15.0	60.2	18.2	18.2	32.1	45.2	66.9		13.9	35.6	130.0
Actuated g/C Ratio	0.12	0.12	0.46	0.14	0.14	0.25	0.35	0.51		0.11	0.27	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	199	782	235	246	391	1194	3226		189	1393	1583
v/s Ratio Prot	c0.09	0.09	0.14	c0.12	0.12	0.02	c0.33	0.35		0.03	c0.22	
v/s Ratio Perm			0.06			0.03						0.30
v/c Ratio	0.81	0.81	0.41	0.87	0.86	0.22	0.94	0.68		0.32	0.80	0.30
Uniform Delay, d1	56.1	56.1	23.1	54.7	54.6	39.0	41.0	23.7		53.7	43.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.02	0.58		0.91	0.64	1.00
Incremental Delay, d2	22.4	21.0	0.3	26.9	24.3	0.3	10.9	0.9		0.8	3.9	0.4
Delay (s)	78.5	77.1	23.4	81.6	78.9	39.3	52.8	14.6		49.9	31.8	0.4
Level of Service	E	E	C	F	E	D	D	B		D	C	A
Approach Delay (s)		49.6			72.1			27.4			23.4	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	671	2	59	0	0	0	0	45	12	135	24	0
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	
Lane Util. Factor		1.00						1.00		1.00	1.00	
Frt		0.99						0.97		1.00	1.00	
Flt Protected		0.96						1.00		0.95	1.00	
Satd. Flow (prot)		1762						1810		1770	1863	
Flt Permitted		0.96						1.00		0.72	1.00	
Satd. Flow (perm)		1762						1810		1335	1863	
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)	729	2	64	0	0	0	0	49	13	147	26	0
RTOR Reduction (vph)	0	6	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	789	0	0	0	0	0	53	0	147	26	0
Turn Type	Perm									Perm		
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		32.4						19.6		19.6	19.6	
Effective Green, g (s)		32.4						19.6		19.6	19.6	
Actuated g/C Ratio		0.54						0.33		0.33	0.33	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		951						591		436	609	
v/s Ratio Prot								0.03			0.01	
v/s Ratio Perm		0.45								c0.11		
v/c Ratio		0.83						0.09		0.34	0.04	
Uniform Delay, d1		11.5						14.0		15.3	13.8	
Progression Factor		1.00						1.00		1.19	1.21	
Incremental Delay, d2		6.1						0.3		2.0	0.1	
Delay (s)		17.6						14.3		20.2	16.9	
Level of Service		B						B		C	B	
Approach Delay (s)		17.6			0.0			14.3			19.7	
Approach LOS		B			A			B			B	

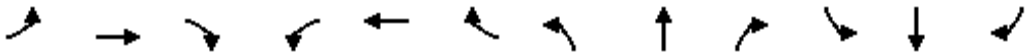
Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	44	0	294	22	694	0	0	115	311
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
Lane Util. Factor					1.00			1.00			1.00	1.00
Frt					0.88			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1633			1860			1863	1583
Flt Permitted					0.99			0.99			1.00	1.00
Satd. Flow (perm)					1633			1847			1863	1583
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)	0	0	0	48	0	320	24	754	0	0	125	338
RTOR Reduction (vph)	0	0	0	0	171	0	0	0	0	0	0	109
Lane Group Flow (vph)	0	0	0	0	197	0	0	778	0	0	125	229
Turn Type				Perm			Perm					Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					11.4			40.6			40.6	40.6
Effective Green, g (s)					11.4			40.6			40.6	40.6
Actuated g/C Ratio					0.19			0.68			0.68	0.68
Clearance Time (s)					4.0			4.0			4.0	4.0
Vehicle Extension (s)					3.0			3.0			3.0	3.0
Lane Grp Cap (vph)					310			1250			1261	1071
v/s Ratio Prot											0.07	
v/s Ratio Perm					0.12			c0.42				0.14
v/c Ratio					0.64			0.62			0.10	0.21
Uniform Delay, d1					22.4			5.4			3.4	3.7
Progression Factor					1.00			0.25			1.00	1.00
Incremental Delay, d2					4.2			1.6			0.2	0.5
Delay (s)					26.6			3.0			3.5	4.1
Level of Service					C			A			A	A
Approach Delay (s)		0.0			26.6			3.0			4.0	
Approach LOS		A			C			A			A	

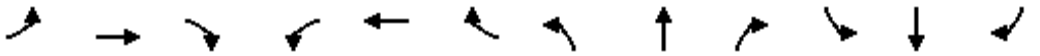
Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	1303	245	330	891	146	161	54	228	305	114	24
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	
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.88		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3455		3433	3464		1770	1637		1770	1814	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3455		3433	3464		1770	1637		1770	1814	
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)	13	1416	266	359	968	159	175	59	248	332	124	26
RTOR Reduction (vph)	0	12	0	0	10	0	0	117	0	0	6	0
Lane Group Flow (vph)	13	1670	0	359	1117	0	175	190	0	332	144	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	1.6	62.4		14.0	74.8		17.3	16.0		24.0	22.7	
Effective Green, g (s)	1.6	62.4		14.0	74.8		17.3	16.0		24.0	22.7	
Actuated g/C Ratio	0.01	0.47		0.11	0.56		0.13	0.12		0.18	0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	21	1628		363	1957		231	198		321	311	
v/s Ratio Prot	0.01	c0.48		c0.10	0.32		0.10	c0.12		c0.19	0.08	
v/s Ratio Perm												
v/c Ratio	0.62	1.03		0.99	0.57		0.76	0.96		1.03	0.46	
Uniform Delay, d1	65.1	35.0		59.1	18.5		55.5	57.9		54.2	49.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	43.9	29.2		43.8	0.4		13.2	51.8		59.4	1.1	
Delay (s)	109.0	64.2		102.9	18.9		68.8	109.7		113.6	50.5	
Level of Service	F	E		F	B		E	F		F	D	
Approach Delay (s)		64.5			39.2			94.8			93.9	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM Average Control Delay	62.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



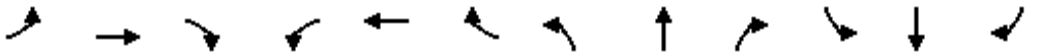
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	502	0	192	0	0	0	0	957	774	883	1079	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	0.97	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1597	1447					3406	1524	3433	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1597	1447					3406	1524	3433	3406	
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)	546	0	209	0	0	0	0	1040	841	960	1173	0
RTOR Reduction (vph)	0	3	110	0	0	0	0	0	253	0	0	0
Lane Group Flow (vph)	284	280	78	0	0	0	0	1040	588	960	1173	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Prot		Prot						Perm	Prot		
Protected Phases	7	4	4					2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	18.6	18.6	18.6					40.4	40.4	29.0	73.4	
Effective Green, g (s)	18.6	18.6	18.6					40.4	40.4	29.0	73.4	
Actuated g/C Ratio	0.19	0.19	0.19					0.40	0.40	0.29	0.73	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	313	297	269					1376	616	996	2500	
v/s Ratio Prot	0.17	c0.18	0.05					0.31		c0.28	0.34	
v/s Ratio Perm									c0.39			
v/c Ratio	0.91	0.94	0.29					0.76	0.95	0.96	0.47	
Uniform Delay, d1	39.9	40.2	35.0					25.6	28.9	35.0	5.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.95	0.05	
Incremental Delay, d2	28.2	36.9	0.6					3.9	26.6	7.4	0.2	
Delay (s)	68.1	77.0	35.6					29.5	55.5	40.7	0.4	
Level of Service	E	E	D					C	E	D	A	
Approach Delay (s)		63.3			0.0			41.1			18.5	
Approach LOS		E			A			D			B	

Intersection Summary			
HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2020 Plus Project Phase-3

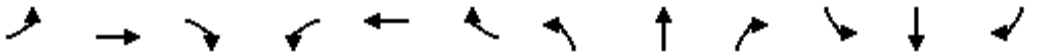
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	398	0	115	0	0	0	0	600	594	0	1044	609
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
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00		0.95	1.00
Frt	1.00	0.99	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1681	1601	1447					3406	1524		3406	1583
Flt Permitted	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1681	1601	1447					3406	1524		3406	1583
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)	433	0	125	0	0	0	0	652	646	0	1135	662
RTOR Reduction (vph)	0	4	59	0	0	0	0	0	231	0	0	237
Lane Group Flow (vph)	225	217	53	0	0	0	0	652	415	0	1135	425
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Split		Perm						Perm			Perm
Protected Phases	4	4						2			6	
Permitted Phases			4						2			6
Actuated Green, G (s)	13.5	13.5	13.5					38.5	38.5		38.5	38.5
Effective Green, g (s)	13.5	13.5	13.5					38.5	38.5		38.5	38.5
Actuated g/C Ratio	0.22	0.22	0.22					0.64	0.64		0.64	0.64
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	378	360	326					2186	978		2186	1016
v/s Ratio Prot	0.13	c0.14						0.19			c0.33	
v/s Ratio Perm			0.04						0.27			0.27
v/c Ratio	0.60	0.60	0.16					0.30	0.42		0.52	0.42
Uniform Delay, d1	20.8	20.8	18.7					4.8	5.3		5.8	5.3
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.84	1.19
Incremental Delay, d2	2.5	2.8	0.2					0.3	1.3		0.7	1.0
Delay (s)	23.3	23.7	18.9					5.1	6.6		5.5	7.2
Level of Service	C	C	B					A	A		A	A
Approach Delay (s)		22.6			0.0			5.9			6.2	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



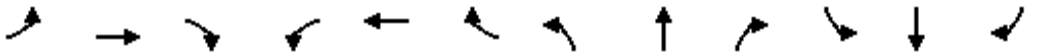
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	546	0	553	0	637	361	0	1107	538
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.95	0.91	0.95		0.95	1.00		0.95	1.00
Frt				1.00	0.92	0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95	0.98	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1618	1494	1504		3539	1524		3539	1583
Flt Permitted				0.95	0.98	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1618	1494	1504		3539	1524		3539	1583
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)	0	0	0	593	0	601	0	692	392	0	1203	585
RTOR Reduction (vph)	0	0	0	0	81	100	0	0	190	0	0	284
Lane Group Flow (vph)	0	0	0	415	319	279	0	692	202	0	1203	301
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Perm			Perm			Perm
Protected Phases				8	8			2			6	
Permitted Phases						8			2			6
Actuated Green, G (s)				21.1	21.1	21.1		30.9	30.9		30.9	30.9
Effective Green, g (s)				21.1	21.1	21.1		30.9	30.9		30.9	30.9
Actuated g/C Ratio				0.35	0.35	0.35		0.52	0.52		0.52	0.52
Clearance Time (s)				4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)				569	525	529		1823	785		1823	815
v/s Ratio Prot				c0.26	0.21			0.20			c0.34	
v/s Ratio Perm						0.19			0.13			0.19
v/c Ratio				0.73	0.61	0.53		0.38	0.26		0.66	0.37
Uniform Delay, d1				17.0	16.0	15.5		8.8	8.1		10.7	8.7
Progression Factor				1.00	1.00	1.00		0.69	0.61		0.70	0.63
Incremental Delay, d2				4.7	2.0	0.9		0.6	0.8		1.4	1.0
Delay (s)				21.6	18.0	16.4		6.6	5.7		8.9	6.5
Level of Service				C	B	B		A	A		A	A
Approach Delay (s)		0.0			18.8			6.3			8.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2020 Plus Project Phase-3

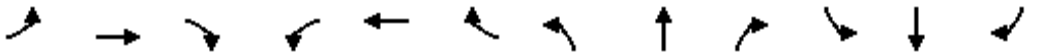
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	502	0	192	0	0	0	0	957	774	0	1079	883
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
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00		0.95	1.00
Frt	1.00	0.99	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1681	1597	1447					3406	1524		3406	1583
Flt Permitted	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1681	1597	1447					3406	1524		3406	1583
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)	546	0	209	0	0	0	0	1040	841	0	1173	960
RTOR Reduction (vph)	0	5	56	0	0	0	0	0	321	0	0	366
Lane Group Flow (vph)	284	278	132	0	0	0	0	1040	520	0	1173	594
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Split		Perm						Perm			Perm
Protected Phases	4	4						2			6	
Permitted Phases			4						2			6
Actuated Green, G (s)	14.9	14.9	14.9					37.1	37.1		37.1	37.1
Effective Green, g (s)	14.9	14.9	14.9					37.1	37.1		37.1	37.1
Actuated g/C Ratio	0.25	0.25	0.25					0.62	0.62		0.62	0.62
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	417	397	359					2106	942		2106	979
v/s Ratio Prot	0.17	c0.17						0.31			0.34	
v/s Ratio Perm			0.09						0.34			c0.37
v/c Ratio	0.68	0.70	0.37					0.49	0.55		0.56	0.61
Uniform Delay, d1	20.4	20.5	18.6					6.3	6.6		6.7	7.0
Progression Factor	1.00	1.00	1.00					1.00	1.00		1.04	1.80
Incremental Delay, d2	4.5	5.3	0.6					0.8	2.3		0.7	1.8
Delay (s)	24.9	25.8	19.3					7.1	9.0		7.6	14.4
Level of Service	C	C	B					A	A		A	B
Approach Delay (s)		23.9			0.0			7.9			10.7	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



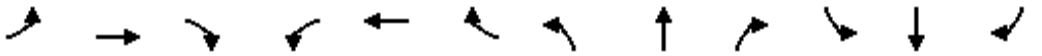
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	944	0	556	0	1122	337	0	1018	357
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor				0.95	0.91	0.95		0.95	1.00		0.95	1.00
Frt				1.00	0.97	0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95	0.96	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1618	1536	1504		3539	1524		3539	1583
Flt Permitted				0.95	0.96	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1618	1536	1504		3539	1524		3539	1583
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)	0	0	0	1026	0	604	0	1220	366	0	1107	388
RTOR Reduction (vph)	0	0	0	0	13	14	0	0	201	0	0	213
Lane Group Flow (vph)	0	0	0	564	546	493	0	1220	165	0	1107	175
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Perm			Perm			Perm
Protected Phases				8	8			2			6	
Permitted Phases						8			2			6
Actuated Green, G (s)				25.0	25.0	25.0		27.0	27.0		27.0	27.0
Effective Green, g (s)				25.0	25.0	25.0		27.0	27.0		27.0	27.0
Actuated g/C Ratio				0.42	0.42	0.42		0.45	0.45		0.45	0.45
Clearance Time (s)				4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)				674	640	627		1593	686		1593	712
v/s Ratio Prot				0.35	c0.36			c0.34			0.31	
v/s Ratio Perm						0.33			0.11			0.11
v/c Ratio				0.84	0.85	0.79		0.77	0.24		0.69	0.25
Uniform Delay, d1				15.7	15.8	15.2		13.8	10.2		13.2	10.2
Progression Factor				1.00	1.00	1.00		0.76	0.77		0.73	0.67
Incremental Delay, d2				8.9	10.7	6.5		3.1	0.7		2.1	0.7
Delay (s)				24.6	26.5	21.6		13.7	8.5		11.8	7.6
Level of Service				C	C	C		B	A		B	A
Approach Delay (s)		0.0			24.3			12.5			10.7	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2030 Plus Project Phase-2

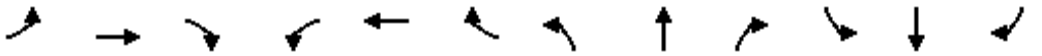
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	543	0	180	0	0	0	0	950	987	575	1707	0
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	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1599	1447					3406	1524	1770	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1599	1447					3406	1524	1770	3406	
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)	590	0	196	0	0	0	0	1033	1073	625	1855	0
RTOR Reduction (vph)	0	3	37	0	0	0	0	0	233	0	0	0
Lane Group Flow (vph)	307	300	139	0	0	0	0	1033	840	625	1855	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Split		Perm						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	19.0	19.0	19.0					54.0	54.0	35.0	93.0	
Effective Green, g (s)	19.0	19.0	19.0					54.0	54.0	35.0	93.0	
Actuated g/C Ratio	0.16	0.16	0.16					0.45	0.45	0.29	0.78	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	266	253	229					1533	686	516	2640	
v/s Ratio Prot	0.18	c0.19						0.30		c0.35	0.54	
v/s Ratio Perm			0.10						c0.55			
v/c Ratio	1.15	1.19	0.61					0.67	1.22	1.21	0.70	
Uniform Delay, d1	50.5	50.5	47.0					26.0	33.0	42.5	6.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	0.06	
Incremental Delay, d2	103.4	117.0	4.5					2.4	113.6	96.8	0.1	
Delay (s)	153.9	167.5	51.5					28.4	146.6	139.2	0.5	
Level of Service	F	F	D					C	F	F	A	
Approach Delay (s)		136.2			0.0			88.6			35.5	
Approach LOS		F			A			F			D	

Intersection Summary			
HCM Average Control Delay	71.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	119.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

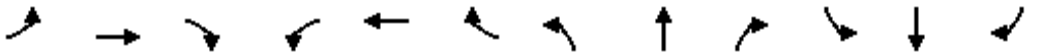


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	856	0	553	570	923	0	0	1426	739
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.97	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1530	1504	1703	3539			3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1530	1504	1703	3539			3539	1583
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)	0	0	0	930	0	601	620	1003	0	0	1550	803
RTOR Reduction (vph)	0	0	0	0	9	115	0	0	0	0	0	325
Lane Group Flow (vph)	0	0	0	530	511	366	620	1003	0	0	1550	478
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				31.0	31.0	31.0	34.0	81.0			43.0	43.0
Effective Green, g (s)				31.0	31.0	31.0	34.0	81.0			43.0	43.0
Actuated g/C Ratio				0.26	0.26	0.26	0.28	0.68			0.36	0.36
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				418	395	389	483	2389			1268	567
v/s Ratio Prot				0.33	c0.33		c0.36	0.28			c0.44	
v/s Ratio Perm						0.24						0.30
v/c Ratio				1.27	1.29	0.94	1.28	0.42			1.22	0.84
Uniform Delay, d1				44.5	44.5	43.6	43.0	8.8			38.5	35.4
Progression Factor				1.00	1.00	1.00	0.88	0.07			0.85	0.54
Incremental Delay, d2				138.3	150.0	30.9	135.5	0.3			104.4	8.7
Delay (s)				182.8	194.5	74.5	173.4	0.9			137.0	27.8
Level of Service				F	F	E	F	A			F	C
Approach Delay (s)		0.0			152.7			66.8			99.7	
Approach LOS		A			F			E			F	

Intersection Summary			
HCM Average Control Delay	104.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	119.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

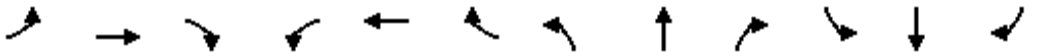
Mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	543	0	180	0	0	0	0	950	987	575	1707	0
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	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	0.97	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1599	1447					3406	1524	3433	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1599	1447					3406	1524	3433	3406	
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)	590	0	196	0	0	0	0	1033	1073	625	1855	0
RTOR Reduction (vph)	0	3	24	0	0	0	0	0	308	0	0	0
Lane Group Flow (vph)	307	300	152	0	0	0	0	1033	765	625	1855	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Prot		Prot						Perm	Prot		
Protected Phases	7	4	4					2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	16.0	16.0	16.0					38.0	38.0	14.0	56.0	
Effective Green, g (s)	16.0	16.0	16.0					38.0	38.0	14.0	56.0	
Actuated g/C Ratio	0.20	0.20	0.20					0.48	0.48	0.18	0.70	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	336	320	289					1618	724	601	2384	
v/s Ratio Prot	0.18	c0.19	0.11					0.30		c0.18	0.54	
v/s Ratio Perm									c0.50			
v/c Ratio	0.91	0.94	0.53					0.64	1.06	1.04	0.78	
Uniform Delay, d1	31.3	31.5	28.6					15.8	21.0	33.0	7.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.14	0.15	
Incremental Delay, d2	28.1	33.8	1.7					1.9	49.6	23.4	0.2	
Delay (s)	59.5	65.3	30.3					17.8	70.6	61.1	1.4	
Level of Service	E	E	C					B	E	E	A	
Approach Delay (s)		55.2			0.0			44.7			16.5	
Approach LOS		E			A			D			B	

Intersection Summary			
HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



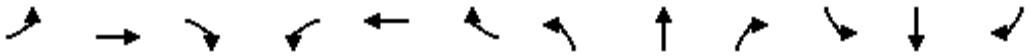
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	856	0	553	570	923	0	0	1426	739
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.91	0.86	0.95	0.97	0.95			0.95	1.00
Frt				1.00	0.91	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3099	1406	1504	3303	3539			3539	1583
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				3099	1406	1504	3303	3539			3539	1583
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)	0	0	0	930	0	601	620	1003	0	0	1550	803
RTOR Reduction (vph)	0	0	0	0	71	114	0	0	0	0	0	356
Lane Group Flow (vph)	0	0	0	781	312	253	620	1003	0	0	1550	448
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Prot		Prot	Prot					Perm
Protected Phases				3	8	8	5	2			6	
Permitted Phases												6
Actuated Green, G (s)				19.0	19.0	19.0	14.0	53.0			35.0	35.0
Effective Green, g (s)				19.0	19.0	19.0	14.0	53.0			35.0	35.0
Actuated g/C Ratio				0.24	0.24	0.24	0.18	0.66			0.44	0.44
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				736	334	357	578	2345			1548	693
v/s Ratio Prot				c0.25	0.22	0.17	c0.19	0.28			c0.44	
v/s Ratio Perm												0.28
v/c Ratio				1.06	0.93	0.71	1.07	0.43			1.00	0.65
Uniform Delay, d1				30.5	29.9	28.0	33.0	6.4			22.5	17.6
Progression Factor				1.00	1.00	1.00	0.88	0.17			1.00	1.00
Incremental Delay, d2				50.6	32.5	6.3	51.6	0.4			23.2	4.6
Delay (s)				81.1	62.4	34.3	80.7	1.4			45.7	22.2
Level of Service				F	E	C	F	A			D	C
Approach Delay (s)		0.0			65.2			31.7			37.7	
Approach LOS		A			E			C			D	

Intersection Summary			
HCM Average Control Delay	43.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

2030 Plus Project Phase-2

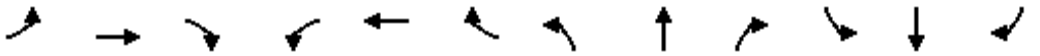
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	653	0	209	0	0	0	0	1513	1274	648	1750	0
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	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1600	1447					3406	1524	1770	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1600	1447					3406	1524	1770	3406	
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)	710	0	227	0	0	0	0	1645	1385	704	1902	0
RTOR Reduction (vph)	0	2	34	0	0	0	0	0	226	0	0	0
Lane Group Flow (vph)	369	362	170	0	0	0	0	1645	1159	704	1902	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Split		Perm						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	25.0	25.0	25.0					71.0	71.0	42.0	117.0	
Effective Green, g (s)	25.0	25.0	25.0					71.0	71.0	42.0	117.0	
Actuated g/C Ratio	0.17	0.17	0.17					0.47	0.47	0.28	0.78	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	280	267	241					1612	721	496	2657	
v/s Ratio Prot	0.22	c0.23						0.48		c0.40	0.56	
v/s Ratio Perm			0.12						c0.76			
v/c Ratio	1.32	1.36	0.70					1.02	1.61	1.42	0.72	
Uniform Delay, d1	62.5	62.5	59.0					39.5	39.5	54.0	8.2	
Progression Factor	1.00	1.00	1.00					0.52	0.72	1.25	0.13	
Incremental Delay, d2	166.0	183.2	9.0					12.8	273.7	189.8	0.2	
Delay (s)	228.5	245.7	68.0					33.2	302.2	257.2	1.2	
Level of Service	F	F	E					C	F	F	A	
Approach Delay (s)		200.2			0.0			156.1			70.4	
Approach LOS		F			A			F			E	

Intersection Summary			
HCM Average Control Delay	128.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	145.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

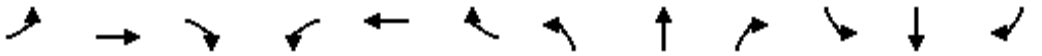


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1051	0	600	599	1567	0	0	1347	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.98	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1538	1504	1703	3539			3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1538	1504	1703	3539			3539	1583
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)	0	0	0	1142	0	652	651	1703	0	0	1464	445
RTOR Reduction (vph)	0	0	0	0	4	22	0	0	0	0	0	152
Lane Group Flow (vph)	0	0	0	617	612	539	651	1703	0	0	1464	293
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				45.0	45.0	45.0	44.0	97.0			49.0	49.0
Effective Green, g (s)				45.0	45.0	45.0	44.0	97.0			49.0	49.0
Actuated g/C Ratio				0.30	0.30	0.30	0.29	0.65			0.33	0.33
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				485	461	451	500	2289			1156	517
v/s Ratio Prot				0.38	c0.40		c0.38	0.48			c0.41	
v/s Ratio Perm						0.36						0.18
v/c Ratio				1.27	1.33	1.20	1.30	0.74			1.27	0.57
Uniform Delay, d1				52.5	52.5	52.5	53.0	18.0			50.5	41.7
Progression Factor				1.00	1.00	1.00	0.85	0.74			0.75	0.44
Incremental Delay, d2				137.9	161.6	108.0	137.3	0.2			124.7	3.0
Delay (s)				190.4	214.1	160.5	182.4	13.5			162.6	21.3
Level of Service				F	F	F	F	B			F	C
Approach Delay (s)		0.0			189.2			60.2			129.6	
Approach LOS		A			F			E			F	

Intersection Summary			
HCM Average Control Delay	120.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	145.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

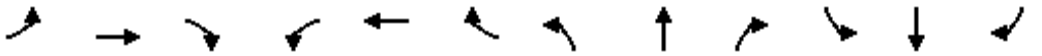
Mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	653	0	209	0	0	0	0	1513	1274	648	1750	0
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	
Lane Util. Factor	0.91	0.86	0.95					0.95	1.00	0.97	0.95	
Frt	1.00	0.99	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3221	1505	1447					3406	1524	3433	3406	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3221	1505	1447					3406	1524	3433	3406	
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)	710	0	227	0	0	0	0	1645	1385	704	1902	0
RTOR Reduction (vph)	0	3	31	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	490	240	173	0	0	0	0	1645	1385	704	1902	0
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	2%
Turn Type	Prot		Prot						Free	Prot		
Protected Phases	7	4	4					2		1	6	
Permitted Phases									Free			
Actuated Green, G (s)	16.2	16.2	16.2					50.8	100.0	21.0	75.8	
Effective Green, g (s)	16.2	16.2	16.2					50.8	100.0	21.0	75.8	
Actuated g/C Ratio	0.16	0.16	0.16					0.51	1.00	0.21	0.76	
Clearance Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)	522	244	234					1730	1524	721	2582	
v/s Ratio Prot	0.15	0.16	0.12					0.48		0.21	0.56	
v/s Ratio Perm									c0.91			
v/c Ratio	0.94	0.98	0.74					0.95	0.91	0.98	0.74	
Uniform Delay, d1	41.4	41.8	39.9					23.4	0.0	39.3	6.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.09	0.02	
Incremental Delay, d2	24.7	52.3	11.6					12.8	9.5	5.7	0.2	
Delay (s)	66.1	94.1	51.4					36.2	9.5	48.5	0.3	
Level of Service	E	F	D					D	A	D	A	
Approach Delay (s)		70.2			0.0			24.0			13.3	
Approach LOS		E			A			C			B	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



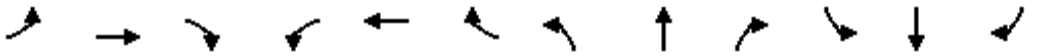
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1051	0	600	599	1567	0	0	1347	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.91	0.86	0.95	0.97	0.95			0.95	1.00
Frt				1.00	0.93	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3099	1419	1504	3303	3539			3539	1583
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				3099	1419	1504	3303	3539			3539	1583
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)	0	0	0	1142	0	652	651	1703	0	0	1464	445
RTOR Reduction (vph)	0	0	0	0	20	20	0	0	0	0	0	229
Lane Group Flow (vph)	0	0	0	914	430	410	651	1703	0	0	1464	216
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%
Turn Type				Prot		Prot	Prot					Perm
Protected Phases				3	8	8	5	2			6	
Permitted Phases												6
Actuated Green, G (s)				29.0	29.0	29.0	19.0	63.0			40.0	40.0
Effective Green, g (s)				29.0	29.0	29.0	19.0	63.0			40.0	40.0
Actuated g/C Ratio				0.29	0.29	0.29	0.19	0.63			0.40	0.40
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				899	412	436	628	2230			1416	633
v/s Ratio Prot				0.29	c0.30	0.27	c0.20	0.48			c0.41	
v/s Ratio Perm												0.14
v/c Ratio				1.02	1.04	0.94	1.04	0.76			1.03	0.34
Uniform Delay, d1				35.5	35.5	34.7	40.5	13.2			30.0	20.9
Progression Factor				1.00	1.00	1.00	1.02	0.18			1.00	1.00
Incremental Delay, d2				34.3	56.3	28.6	30.6	0.8			33.1	1.5
Delay (s)				69.8	91.8	63.2	71.9	3.2			63.1	22.3
Level of Service				E	F	E	E	A			E	C
Approach Delay (s)		0.0			73.7			22.2			53.6	
Approach LOS		A			E			C			D	

Intersection Summary			
HCM Average Control Delay	47.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2030 Plus Project Phase-3

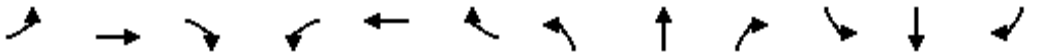
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	543	0	180	0	0	0	0	950	987	0	1707	575
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
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00		0.95	1.00
Frt	1.00	0.99	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1681	1599	1447					3406	1524		3406	1524
Flt Permitted	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1681	1599	1447					3406	1524		3406	1524
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)	590	0	196	0	0	0	0	1033	1073	0	1855	625
RTOR Reduction (vph)	0	4	17	0	0	0	0	0	368	0	0	214
Lane Group Flow (vph)	307	299	159	0	0	0	0	1033	705	0	1855	411
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	6%
Turn Type	Split		Prot						Perm			Perm
Protected Phases	4	4	4					2			6	
Permitted Phases									2			6
Actuated Green, G (s)	16.0	16.0	16.0					46.0	46.0		46.0	46.0
Effective Green, g (s)	16.0	16.0	16.0					46.0	46.0		46.0	46.0
Actuated g/C Ratio	0.23	0.23	0.23					0.66	0.66		0.66	0.66
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	384	365	331					2238	1001		2238	1001
v/s Ratio Prot	0.18	c0.19	0.11					0.30			c0.54	
v/s Ratio Perm									0.46			0.27
v/c Ratio	0.80	0.82	0.48					0.46	0.70		0.83	0.41
Uniform Delay, d1	25.5	25.6	23.4					5.9	7.7		9.0	5.6
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.74	0.82
Incremental Delay, d2	11.1	13.4	1.1					0.7	4.2		1.9	0.6
Delay (s)	36.6	39.0	24.5					6.6	11.8		8.6	5.2
Level of Service	D	D	C					A	B		A	A
Approach Delay (s)		34.8			0.0			9.3			7.7	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

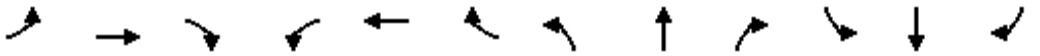
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	856	0	553	0	923	570	0	1426	739
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
Lane Util. Factor				0.95	0.91	0.95		0.95	1.00		0.95	1.00
Frt				1.00	0.97	0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95	0.96	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1618	1530	1504		3539	1524		3539	1583
Flt Permitted				0.95	0.96	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1618	1530	1504		3539	1524		3539	1583
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)	0	0	0	930	0	601	0	1003	620	0	1550	803
RTOR Reduction (vph)	0	0	0	0	16	47	0	0	301	0	0	390
Lane Group Flow (vph)	0	0	0	530	504	434	0	1003	319	0	1550	413
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Prot			Perm			Perm
Protected Phases				8	8	8		2			6	
Permitted Phases									2			6
Actuated Green, G (s)				26.0	26.0	26.0		36.0	36.0		36.0	36.0
Effective Green, g (s)				26.0	26.0	26.0		36.0	36.0		36.0	36.0
Actuated g/C Ratio				0.37	0.37	0.37		0.51	0.51		0.51	0.51
Clearance Time (s)				4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)				601	568	559		1820	784		1820	814
v/s Ratio Prot				0.33	c0.33	0.29		0.28			c0.44	
v/s Ratio Perm									0.21			0.26
v/c Ratio				0.88	0.89	0.78		0.55	0.41		0.85	0.51
Uniform Delay, d1				20.6	20.6	19.4		11.5	10.4		14.7	11.2
Progression Factor				1.00	1.00	1.00		0.63	0.22		0.66	0.26
Incremental Delay, d2				14.2	15.5	6.7		1.0	1.3		2.6	1.1
Delay (s)				34.8	36.1	26.1		8.3	3.6		12.3	3.9
Level of Service				C	D	C		A	A		B	A
Approach Delay (s)		0.0			32.5			6.5			9.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

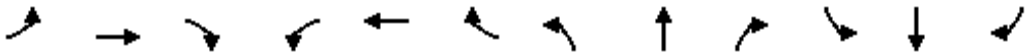


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	161	83	182	613	230	360	150	785	289	168	818	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.90		1.00	0.91		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3174		1770	3215		1770	3539	1583	1770	3418	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3174		1770	3215		1770	3539	1583	1770	3418	
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)	175	90	198	666	250	391	163	853	314	183	889	263
RTOR Reduction (vph)	0	182	0	0	186	0	0	0	130	0	18	0
Lane Group Flow (vph)	175	106	0	666	455	0	163	853	184	183	1134	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	18.9	10.0		55.0	46.1		14.0	45.2	45.2	17.8	49.0	
Effective Green, g (s)	18.9	10.0		55.0	46.1		14.0	45.2	45.2	17.8	49.0	
Actuated g/C Ratio	0.13	0.07		0.38	0.32		0.10	0.31	0.31	0.12	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	232	220		676	1029		172	1111	497	219	1163	
v/s Ratio Prot	0.10	0.03		c0.38	c0.14		c0.09	0.24		0.10	c0.33	
v/s Ratio Perm									0.12			
v/c Ratio	0.75	0.48		0.99	0.44		0.95	0.77	0.37	0.84	0.98	
Uniform Delay, d1	60.3	64.5		44.1	38.8		64.6	44.7	38.3	61.7	46.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.0	1.7		30.6	0.3		52.8	3.2	0.5	23.2	20.5	
Delay (s)	73.3	66.1		74.7	39.1		117.5	47.9	38.8	84.8	67.4	
Level of Service	E	E		E	D		F	D	D	F	E	
Approach Delay (s)		68.9			57.2			54.3			69.8	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM Average Control Delay	61.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	144.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	340	328	1141	335	1	1825
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3419		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3419		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	357	1240	364	1	1984
RTOR Reduction (vph)	0	111	34	0	0	0
Lane Group Flow (vph)	370	246	1570	0	1	1984
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	17.1	17.1	40.1		0.8	44.9
Effective Green, g (s)	17.1	17.1	40.1		0.8	44.9
Actuated g/C Ratio	0.24	0.24	0.57		0.01	0.64
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	432	387	1959		20	2270
v/s Ratio Prot	c0.21		0.46		0.00	c0.56
v/s Ratio Perm		0.16				
v/c Ratio	0.86	0.64	0.80		0.05	0.87
Uniform Delay, d1	25.3	23.7	11.8		34.2	10.2
Progression Factor	1.00	1.00	0.71		1.00	1.00
Incremental Delay, d2	15.3	3.4	2.8		1.0	5.1
Delay (s)	40.6	27.1	11.1		35.3	15.3
Level of Service	D	C	B		D	B
Approach Delay (s)	33.9		11.1			15.3
Approach LOS	C		B			B

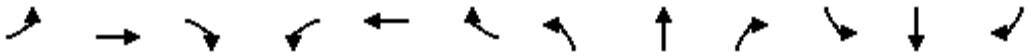
Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	2	2	0	2	8	1933	0	0	1883	4
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)	2	0	2	2	0	2	9	2101	0	0	2047	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			10			10						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											726	
pX, platoon unblocked	0.70	0.70	0.70	0.70	0.70		0.70					
vC, conflicting volume	2767	4167	684	2802	4170	700	2051			2101		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2017	4024	0	2067	4027	700	992			2101		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	100	90	100	99	98			100		
cM capacity (veh/h)	23	2	757	22	2	382	484			258		

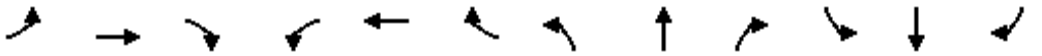
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	4	4	9	840	840	420	0	819	819	414
Volume Left	2	2	9	0	0	0	0	0	0	0
Volume Right	2	2	0	0	0	0	0	0	0	4
cSH	47	43	484	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.10	0.02	0.49	0.49	0.25	0.00	0.48	0.48	0.24
Queue Length 95th (ft)	7	8	1	0	0	0	0	0	0	0
Control Delay (s)	91.6	102.3	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	B							
Approach Delay (s)	91.6	102.3	0.1				0.0			
Approach LOS	F	F								

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	54.0%	ICU Level of Service	A	
Analysis Period (min)	15			



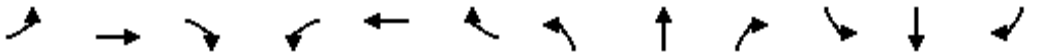
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1290	190	211	1689	184	329	73	591	141	123	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.87		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4987		1770	5010		1770	1614		1770	1823	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4987		1770	5010		1770	1614		1770	1823	
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)	51	1402	207	229	1836	200	358	79	642	153	134	22
RTOR Reduction (vph)	0	16	0	0	11	0	0	148	0	0	5	0
Lane Group Flow (vph)	51	1593	0	229	2025	0	358	573	0	153	151	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	4.0	40.0		15.0	51.0		27.1	38.0		11.0	21.9	
Effective Green, g (s)	4.0	40.0		15.0	51.0		27.1	38.0		11.0	21.9	
Actuated g/C Ratio	0.03	0.33		0.12	0.42		0.23	0.32		0.09	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	59	1662		221	2129		400	511		162	333	
v/s Ratio Prot	0.03	0.32		c0.13	c0.40		c0.20	c0.35		0.09	0.08	
v/s Ratio Perm												
v/c Ratio	0.86	0.96		1.04	0.95		0.90	1.12		0.94	0.45	
Uniform Delay, d1	57.7	39.2		52.5	33.3		45.1	41.0		54.2	43.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	70.2	13.4		70.3	10.3		21.7	77.3		54.0	1.0	
Delay (s)	127.9	52.6		122.8	43.6		66.7	118.3		108.2	44.7	
Level of Service	F	D		F	D		E	F		F	D	
Approach Delay (s)		54.9			51.6			101.2			76.2	
Approach LOS		D			D			F			E	

Intersection Summary			
HCM Average Control Delay	64.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



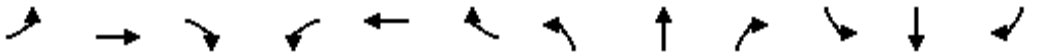
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	576	94	791	560	510	332	1131	550	162	1940	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3465		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3465		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	380	626	102	860	609	554	361	1229	598	176	2109	718
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	105	0	0	15
Lane Group Flow (vph)	380	728	0	860	609	554	361	1229	493	176	2109	703
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	25.9	25.0		28.0	27.1	53.1	22.0	45.0	73.0	26.0	49.0	74.9
Effective Green, g (s)	25.9	25.0		28.0	27.1	53.1	22.0	45.0	73.0	26.0	49.0	74.9
Actuated g/C Ratio	0.18	0.18		0.20	0.19	0.38	0.16	0.32	0.52	0.19	0.35	0.54
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	635	619		687	685	600	278	2060	825	638	1780	892
v/s Ratio Prot	0.11	c0.21		c0.25	0.17	0.17	c0.20	0.19	0.12	0.05	c0.41	0.15
v/s Ratio Perm						0.18			0.19			0.30
v/c Ratio	0.60	1.18		1.25	0.89	0.92	1.30	0.60	0.60	0.28	1.18	0.79
Uniform Delay, d1	52.3	57.5		56.0	55.0	41.5	59.0	39.9	23.3	48.9	45.5	26.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.52	0.20
Incremental Delay, d2	1.5	95.4		125.1	13.4	20.0	158.3	1.3	1.2	0.1	86.4	2.5
Delay (s)	53.8	152.9		181.1	68.4	61.5	217.3	41.2	24.5	39.3	110.2	7.6
Level of Service	D	F		F	E	E	F	D	C	D	F	A
Approach Delay (s)		118.9			114.4			65.7			81.5	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	90.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



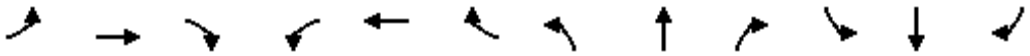
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1668	0	0	461	0	1764	171	804	2066	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	1813	0	0	501	0	1917	186	874	2246	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1813	0	0	501	0	1917	186	874	2246	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases			1			Free			Free			
Actuated Green, G (s)			114.3			140.0		84.0	140.0	48.0	65.7	
Effective Green, g (s)			114.3			140.0		84.0	140.0	48.0	65.7	
Actuated g/C Ratio			0.82			1.00		0.60	1.00	0.34	0.47	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			2355			1611		3051	1583	1177	3007	
v/s Ratio Prot			c0.36					0.38		0.25	c0.35	
v/s Ratio Perm			0.29			0.31			0.12			
v/c Ratio			0.77			0.31		0.63	0.12	0.74	0.75	
Uniform Delay, d1			6.3			0.0		18.0	0.0	40.6	30.4	
Progression Factor			1.00			1.00		0.96	1.00	0.46	0.34	
Incremental Delay, d2			1.6			0.5		0.8	0.1	1.0	0.7	
Delay (s)			7.9			0.5		18.0	0.1	19.7	10.9	
Level of Service			A			A		B	A	B	B	
Approach Delay (s)		7.9			0.5			16.5			13.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



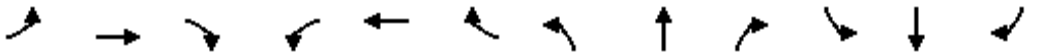
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	196	89	780	168	200	58	950	1106	169	69	1922	654
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1736	1583	1681	1763	1583	3433	6280		1770	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1736	1583	1681	1763	1583	3433	6280		1770	5085	1583
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)	213	97	848	183	217	63	1033	1202	184	75	2089	711
RTOR Reduction (vph)	0	0	0	0	0	50	0	19	0	0	0	0
Lane Group Flow (vph)	153	157	848	165	235	13	1033	1367	0	75	2089	711
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	15.3	15.3	140.0	17.7	17.7	28.0	38.0	80.7		10.3	53.0	140.0
Effective Green, g (s)	15.3	15.3	140.0	17.7	17.7	28.0	38.0	80.7		10.3	53.0	140.0
Actuated g/C Ratio	0.11	0.11	1.00	0.13	0.13	0.20	0.27	0.58		0.07	0.38	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	184	190	1583	213	223	362	932	3620		130	1925	1583
v/s Ratio Prot	c0.09	0.09		0.10	c0.13	0.00	c0.30	0.22		0.04	c0.41	
v/s Ratio Perm			0.54			0.01						0.45
v/c Ratio	0.83	0.83	0.54	0.77	1.05	0.03	1.11	0.38		0.58	1.09	0.45
Uniform Delay, d1	61.1	61.0	0.0	59.2	61.2	45.1	51.0	16.1		62.7	43.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.09	0.53		1.15	0.63	1.00
Incremental Delay, d2	26.1	24.4	1.3	16.0	75.1	0.0	61.8	0.3		0.6	39.4	0.1
Delay (s)	87.2	85.5	1.3	75.2	136.3	45.2	117.1	8.8		72.6	66.8	0.1
Level of Service	F	F	A	E	F	D	F	A		E	E	A
Approach Delay (s)		24.1			102.1			55.1			50.4	
Approach LOS		C			F			E			D	

Intersection Summary			
HCM Average Control Delay	51.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	359	3	54	0	0	0	0	132	27	156	37	0
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	
Lane Util. Factor		1.00						1.00		1.00	1.00	
Frt		0.98						0.98		1.00	1.00	
Flt Protected		0.96						1.00		0.95	1.00	
Satd. Flow (prot)		1754						1820		1770	1863	
Flt Permitted		0.96						1.00		0.65	1.00	
Satd. Flow (perm)		1754						1820		1208	1863	
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)	390	3	59	0	0	0	0	143	29	170	40	0
RTOR Reduction (vph)	0	10	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	442	0	0	0	0	0	164	0	170	40	0
Turn Type	Perm									Perm		
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		23.7						38.3		38.3	38.3	
Effective Green, g (s)		23.7						38.3		38.3	38.3	
Actuated g/C Ratio		0.34						0.55		0.55	0.55	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		594						996		661	1019	
v/s Ratio Prot								0.09			0.02	
v/s Ratio Perm		0.25								c0.14		
v/c Ratio		0.74						0.16		0.26	0.04	
Uniform Delay, d1		20.5						7.9		8.4	7.3	
Progression Factor		1.00						1.00		1.25	1.26	
Incremental Delay, d2		5.0						0.4		0.9	0.1	
Delay (s)		25.5						8.2		11.3	9.3	
Level of Service		C						A		B	A	
Approach Delay (s)		25.5			0.0			8.2			10.9	
Approach LOS		C			A			A			B	

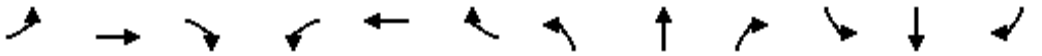
Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	67	0	440	65	426	0	0	126	1049
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
Lane Util. Factor					1.00			1.00			1.00	1.00
Frt					0.88			1.00			1.00	0.85
Flt Protected					0.99			0.99			1.00	1.00
Satd. Flow (prot)					1634			1850			1863	1583
Flt Permitted					0.99			0.95			1.00	1.00
Satd. Flow (perm)					1634			1763			1863	1583
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)	0	0	0	73	0	478	71	463	0	0	137	1140
RTOR Reduction (vph)	0	0	0	0	353	0	0	0	0	0	0	321
Lane Group Flow (vph)	0	0	0	0	198	0	0	534	0	0	137	819
Turn Type				Perm			Perm					Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					12.6			49.4			49.4	49.4
Effective Green, g (s)					12.6			49.4			49.4	49.4
Actuated g/C Ratio					0.18			0.71			0.71	0.71
Clearance Time (s)					4.0			4.0			4.0	4.0
Vehicle Extension (s)					3.0			3.0			3.0	3.0
Lane Grp Cap (vph)					294			1244			1315	1117
v/s Ratio Prot											0.07	
v/s Ratio Perm					0.12			0.30				c0.52
v/c Ratio					0.67			0.43			0.10	0.73
Uniform Delay, d1					26.8			4.3			3.3	6.3
Progression Factor					1.00			0.31			1.00	1.00
Incremental Delay, d2					5.9			1.0			0.2	4.3
Delay (s)					32.7			2.3			3.4	10.6
Level of Service					C			A			A	B
Approach Delay (s)		0.0			32.7			2.3			9.8	
Approach LOS		A			C			A			A	

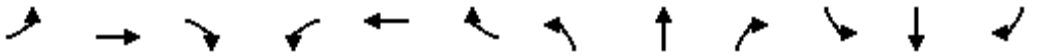
Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	131.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	576	94	791	560	510	332	1131	550	162	1940	661
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	0.88	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
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)	3433	3539	1583	3433	3539	1583	3433	6408	2787	3433	5085	1583
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)	3433	3539	1583	3433	3539	1583	3433	6408	2787	3433	5085	1583
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)	380	626	102	860	609	554	361	1229	598	176	2109	718
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	198	0	0	7
Lane Group Flow (vph)	380	626	102	860	609	554	361	1229	400	176	2109	711
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	22.0	19.0	30.0	27.0	24.0	46.6	11.0	35.4	62.4	22.6	47.0	69.0
Effective Green, g (s)	22.0	19.0	30.0	27.0	24.0	46.6	11.0	35.4	62.4	22.6	47.0	69.0
Actuated g/C Ratio	0.18	0.16	0.25	0.22	0.20	0.39	0.09	0.30	0.52	0.19	0.39	0.57
Clearance 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
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	629	560	396	772	708	615	315	1890	1542	647	1992	963
v/s Ratio Prot	0.11	c0.18	0.02	c0.25	0.17	0.17	c0.11	0.19	0.06	0.05	c0.41	c0.14
v/s Ratio Perm			0.04			0.18			0.09			0.31
v/c Ratio	0.60	1.12	0.26	1.11	0.86	0.90	1.15	0.65	0.26	0.27	1.06	0.74
Uniform Delay, d1	45.0	50.5	36.1	46.5	46.4	34.5	54.5	36.9	16.0	41.7	36.5	18.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.41	0.25
Incremental Delay, d2	1.6	74.7	0.3	68.4	10.4	16.3	96.3	1.8	0.1	0.1	32.5	1.4
Delay (s)	46.6	125.2	36.4	114.9	56.8	50.9	150.8	38.7	16.1	38.5	47.4	6.0
Level of Service	D	F	D	F	E	D	F	D	B	D	D	A
Approach Delay (s)		90.1			79.9			51.0			37.0	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM Average Control Delay	58.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

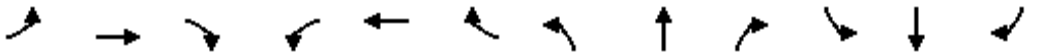


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1290	190	211	1689	184	460	73	591	141	123	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91		0.95	0.95	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	3433	5010		1681	1708	1583	3433	1823	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	3433	5010		1681	1708	1583	3433	1823	
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)	51	1402	207	229	1836	200	500	79	642	153	134	22
RTOR Reduction (vph)	0	0	138	0	14	0	0	0	86	0	7	0
Lane Group Flow (vph)	51	1402	69	229	2022	0	290	289	556	153	149	0
Turn Type	Prot		Perm	Prot			Split		pm+ov	Split		
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	3.2	28.8	28.8	13.9	39.5		16.0	16.0	29.9	11.9	11.9	
Effective Green, g (s)	3.2	28.8	28.8	13.9	39.5		16.0	16.0	29.9	11.9	11.9	
Actuated g/C Ratio	0.04	0.33	0.33	0.16	0.46		0.18	0.18	0.35	0.14	0.14	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	65	1691	526	551	2285		311	316	620	472	251	
v/s Ratio Prot	0.03	0.28		0.07	c0.40		0.17	0.17	c0.14	0.04	c0.08	
v/s Ratio Perm			0.04						0.21			
v/c Ratio	0.78	0.83	0.13	0.42	0.89		0.93	0.91	0.90	0.32	0.59	
Uniform Delay, d1	41.4	26.6	20.2	32.7	21.5		34.8	34.6	26.9	33.7	35.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	44.9	3.5	0.1	0.5	4.5		33.7	29.5	15.6	0.4	3.7	
Delay (s)	86.3	30.1	20.3	33.2	26.0		68.4	64.2	42.5	34.1	38.8	
Level of Service	F	C	C	C	C		E	E	D	C	D	
Approach Delay (s)		30.6			26.7			53.8			36.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2030 Plus Project Phase-3

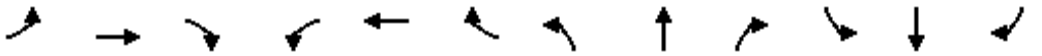
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	653	0	209	0	0	0	0	1513	1274	0	1750	648
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
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00		0.95	1.00
Frt	1.00	0.99	0.85					1.00	0.85		1.00	0.85
Flt Protected	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (prot)	1681	1600	1447					3406	1524		3406	1524
Flt Permitted	0.95	0.96	1.00					1.00	1.00		1.00	1.00
Satd. Flow (perm)	1681	1600	1447					3406	1524		3406	1524
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)	710	0	227	0	0	0	0	1645	1385	0	1902	704
RTOR Reduction (vph)	0	3	18	0	0	0	0	0	352	0	0	227
Lane Group Flow (vph)	369	361	186	0	0	0	0	1645	1033	0	1902	477
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	6%	2%	6%	6%
Turn Type	Split		Prot						Perm			Perm
Protected Phases	4	4	4					2			6	
Permitted Phases									2			6
Actuated Green, G (s)	21.0	21.0	21.0					61.0	61.0		61.0	61.0
Effective Green, g (s)	21.0	21.0	21.0					61.0	61.0		61.0	61.0
Actuated g/C Ratio	0.23	0.23	0.23					0.68	0.68		0.68	0.68
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	392	373	338					2309	1033		2309	1033
v/s Ratio Prot	0.22	c0.23	0.13					0.48			0.56	
v/s Ratio Perm									c0.68			0.31
v/c Ratio	0.94	0.97	0.55					0.71	1.00		0.82	0.46
Uniform Delay, d1	33.9	34.2	30.3					9.0	14.5		10.6	6.8
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.80	0.98
Incremental Delay, d2	30.8	37.7	1.8					1.9	28.1		1.6	0.7
Delay (s)	64.7	71.8	32.2					10.9	42.6		10.1	7.4
Level of Service	E	E	C					B	D		B	A
Approach Delay (s)		60.4			0.0			25.4			9.4	
Approach LOS		E			A			C			A	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	105.8%	ICU Level of Service	G
Analysis Period (min)	15		

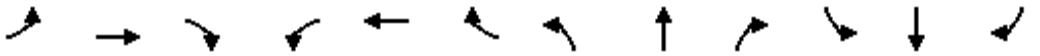
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1051	0	600	0	1567	599	0	1347	409
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
Lane Util. Factor				0.95	0.91	0.95		0.95	1.00		0.95	1.00
Frt				1.00	0.98	0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95	0.96	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1618	1538	1504		3539	1524		3539	1583
Flt Permitted				0.95	0.96	1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1618	1538	1504		3539	1524		3539	1583
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)	0	0	0	1142	0	652	0	1703	651	0	1464	445
RTOR Reduction (vph)	0	0	0	0	7	7	0	0	318	0	0	218
Lane Group Flow (vph)	0	0	0	617	609	554	0	1703	333	0	1464	227
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Prot			Perm			Perm
Protected Phases				8	8	8		2			6	
Permitted Phases									2			6
Actuated Green, G (s)				36.0	36.0	36.0		46.0	46.0		46.0	46.0
Effective Green, g (s)				36.0	36.0	36.0		46.0	46.0		46.0	46.0
Actuated g/C Ratio				0.40	0.40	0.40		0.51	0.51		0.51	0.51
Clearance Time (s)				4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)				647	615	602		1809	779		1809	809
v/s Ratio Prot				0.38	c0.40	0.37		c0.48			0.41	
v/s Ratio Perm									0.22			0.14
v/c Ratio				0.95	0.99	0.92		0.94	0.43		0.81	0.28
Uniform Delay, d1				26.2	26.8	25.6		20.7	13.8		18.3	12.6
Progression Factor				1.00	1.00	1.00		0.76	0.61		0.67	0.80
Incremental Delay, d2				24.3	33.8	19.6		7.4	1.0		2.8	0.6
Delay (s)				50.5	60.7	45.2		23.1	9.4		15.0	10.6
Level of Service				D	E	D		C	A		B	B
Approach Delay (s)		0.0			52.4			19.3			13.9	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

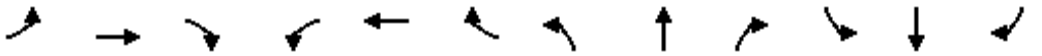


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	182	237	189	501	116	151	200	1066	529	232	686	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.92		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3304		1770	3239		1770	3539	1583	1770	3462	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3304		1770	3239		1770	3539	1583	1770	3462	
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)	198	258	205	545	126	164	217	1159	575	252	746	127
RTOR Reduction (vph)	0	121	0	0	121	0	0	0	225	0	11	0
Lane Group Flow (vph)	198	342	0	545	169	0	217	1159	350	252	862	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	17.9	15.2		34.0	31.3		17.6	38.0	38.0	16.0	36.4	
Effective Green, g (s)	17.9	15.2		34.0	31.3		17.6	38.0	38.0	16.0	36.4	
Actuated g/C Ratio	0.15	0.13		0.29	0.26		0.15	0.32	0.32	0.13	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	266	421		505	851		261	1128	505	238	1057	
v/s Ratio Prot	0.11	c0.10		c0.31	0.05		0.12	c0.33		c0.14	0.25	
v/s Ratio Perm									0.22			
v/c Ratio	0.74	0.81		1.08	0.20		0.83	1.03	0.69	1.06	0.82	
Uniform Delay, d1	48.5	50.6		42.6	34.2		49.4	40.6	35.5	51.6	38.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.7	11.3		63.1	0.1		19.7	34.0	4.1	74.7	4.9	
Delay (s)	59.2	61.9		105.7	34.3		69.0	74.6	39.6	126.3	43.2	
Level of Service	E	E		F	C		E	E	D	F	D	
Approach Delay (s)		61.1			80.9			63.7			61.8	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM Average Control Delay	66.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	119.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	65	426	1621	546	0	1691
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Frt	1.00	0.85	0.96			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3406			3539
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3406			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	463	1762	593	0	1838
RTOR Reduction (vph)	0	74	28	0	0	0
Lane Group Flow (vph)	71	389	2327	0	0	1838
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	19.0	19.0	63.0			63.0
Effective Green, g (s)	19.0	19.0	63.0			63.0
Actuated g/C Ratio	0.21	0.21	0.70			0.70
Clearance Time (s)	4.0	4.0	4.0			4.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	374	334	2384			2477
v/s Ratio Prot	0.04		c0.68			0.52
v/s Ratio Perm		c0.25				
v/c Ratio	0.19	1.16	0.98			0.74
Uniform Delay, d1	29.2	35.5	12.8			8.4
Progression Factor	1.00	1.00	0.42			1.00
Incremental Delay, d2	0.2	101.7	6.6			2.1
Delay (s)	29.4	137.2	11.9			10.5
Level of Service	C	F	B			B
Approach Delay (s)	122.8		11.9			10.5
Approach LOS	F		B			B

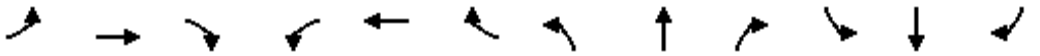
Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	2	0	0	0	2	2785	0	0	1957	2
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)	2	0	2	0	0	0	2	3027	0	0	2127	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			10			10						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											726	
pX, platoon unblocked	0.68	0.68	0.68	0.68	0.68		0.68					
vC, conflicting volume	3142	5160	710	3742	5161	1009	2129			3027		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2491	5476	0	3378	5478	1009	993			3027		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	100	100	100	100	100			100		
cM capacity (veh/h)	10	0	733	2	0	238	468			110		

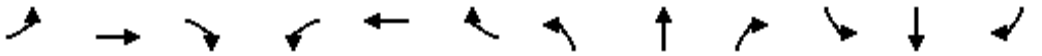
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	4	0	2	1211	1211	605	0	851	851	428
Volume Left	2	0	2	0	0	0	0	0	0	0
Volume Right	2	0	0	0	0	0	0	0	0	2
cSH	20	1700	468	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.22	0.00	0.00	0.71	0.71	0.36	0.00	0.50	0.50	0.25
Queue Length 95th (ft)	16	0	0	0	0	0	0	0	0	0
Control Delay (s)	228.7	0.0	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	A	B							
Approach Delay (s)	228.7	0.0	0.0				0.0			
Approach LOS	F	A								

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	63.8%	ICU Level of Service	B	
Analysis Period (min)	15			



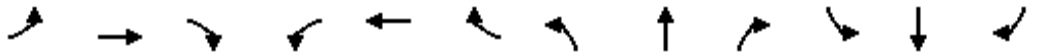
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	2074	314	534	1396	192	272	85	356	492	158	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.88		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4985		1770	4993		1770	1637		1770	1822	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4985		1770	4993		1770	1637		1770	1822	
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)	13	2254	341	580	1517	209	296	92	387	535	172	29
RTOR Reduction (vph)	0	13	0	0	11	0	0	101	0	0	4	0
Lane Group Flow (vph)	13	2582	0	580	1715	0	296	378	0	535	197	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	2.0	56.4		30.0	84.4		27.9	23.0		27.0	22.1	
Effective Green, g (s)	2.0	56.4		30.0	84.4		27.9	23.0		27.0	22.1	
Actuated g/C Ratio	0.01	0.37		0.20	0.55		0.18	0.15		0.18	0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	23	1845		348	2765		324	247		314	264	
v/s Ratio Prot	0.01	c0.52		c0.33	0.34		0.17	c0.23		c0.30	0.11	
v/s Ratio Perm												
v/c Ratio	0.57	1.40		1.67	0.62		0.91	1.53		1.70	0.75	
Uniform Delay, d1	74.8	48.0		61.2	23.1		61.1	64.7		62.7	62.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.1	183.1		312.4	0.4		28.9	258.0		330.0	10.9	
Delay (s)	102.9	231.1		373.6	23.5		89.9	322.7		392.7	73.3	
Level of Service	F	F		F	C		F	F		F	E	
Approach Delay (s)		230.4			111.6			233.8			305.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	196.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	152.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	143.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



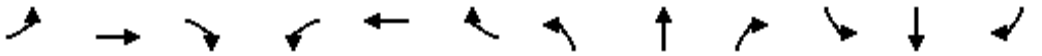
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	768	127	798	485	401	451	1585	842	508	1614	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3464		3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3464		3433	3539	1583	1770	6408	1583	3433	5085	1583
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)	446	835	138	867	527	436	490	1723	915	552	1754	418
RTOR Reduction (vph)	0	9	0	0	0	9	0	0	3	0	0	25
Lane Group Flow (vph)	446	964	0	867	527	427	490	1723	912	552	1754	393
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	24.3	31.0		30.0	36.7	61.7	30.0	48.0	78.0	25.0	43.0	67.3
Effective Green, g (s)	24.3	31.0		30.0	36.7	61.7	30.0	48.0	78.0	25.0	43.0	67.3
Actuated g/C Ratio	0.16	0.21		0.20	0.24	0.41	0.20	0.32	0.52	0.17	0.29	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	556	716		687	866	651	354	2051	823	572	1458	710
v/s Ratio Prot	0.13	c0.28		c0.25	0.15	0.11	c0.28	0.27	c0.22	0.16	c0.34	0.09
v/s Ratio Perm						0.16			0.35			0.16
v/c Ratio	0.80	1.35		1.26	0.61	0.66	1.38	0.84	1.11	0.97	1.20	0.55
Uniform Delay, d1	60.5	59.5		60.0	50.3	35.6	60.0	47.4	36.0	62.1	53.5	30.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.62	0.78
Incremental Delay, d2	8.2	165.3		129.4	1.2	2.4	189.6	4.3	65.2	21.4	95.7	0.6
Delay (s)	68.7	224.8		189.4	51.5	38.0	249.6	51.8	101.2	74.7	128.8	24.3
Level of Service	E	F		F	D	D	F	D	F	E	F	C
Approach Delay (s)		175.7			113.6			97.2			101.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	114.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



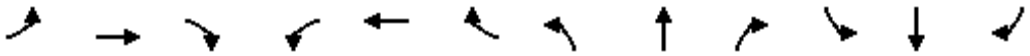
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1953	0	0	1049	0	2317	500	798	1145	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor			0.88			1.00		0.91	1.00	0.97	0.86	
Frt			0.85			0.86		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			2787			1611		5085	1583	3433	6408	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			2787			1611		5085	1583	3433	6408	
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)	0	0	2123	0	0	1140	0	2518	543	867	1245	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2123	0	0	1140	0	2518	543	867	1245	0
Turn Type			custom			Free			Free	Prot		
Protected Phases			5					2		1	6	
Permitted Phases			1			Free			Free			
Actuated Green, G (s)			138.0			150.0		92.0	150.0	50.0	54.0	
Effective Green, g (s)			138.0			150.0		92.0	150.0	50.0	54.0	
Actuated g/C Ratio			0.92			1.00		0.61	1.00	0.33	0.36	
Clearance Time (s)			4.0					4.0		4.0	4.0	
Vehicle Extension (s)			3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)			2638			1611		3119	1583	1144	2307	
v/s Ratio Prot			c0.47					0.50		0.25	0.19	
v/s Ratio Perm			0.29			c0.71			0.34			
v/c Ratio			0.80			0.71		0.81	0.34	0.76	0.54	
Uniform Delay, d1			1.8			0.0		22.2	0.0	44.6	38.1	
Progression Factor			1.00			1.00		0.36	1.00	0.30	0.31	
Incremental Delay, d2			1.9			2.7		0.6	0.1	1.2	0.4	
Delay (s)			3.7			2.7		8.5	0.1	14.7	12.1	
Level of Service			A			A		A	A	B	B	
Approach Delay (s)		3.7			2.7			7.0			13.2	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



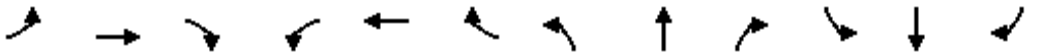
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	73	229	221	161	95	1125	1943	298	56	1493	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	0.97	0.86		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583	1681	1755	1583	3433	6280		1770	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583	1681	1755	1583	3433	6280		1770	5085	1583
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)	245	79	249	240	175	103	1223	2112	324	61	1623	314
RTOR Reduction (vph)	0	0	0	0	0	12	0	18	0	0	0	0
Lane Group Flow (vph)	159	165	249	204	211	91	1223	2418	0	61	1623	314
Turn Type	Split		Free	Split		pm+ov	Prot			Prot		Free
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			Free			8						Free
Actuated Green, G (s)	15.8	15.8	150.0	18.2	18.2	29.2	52.0	89.0		11.0	48.0	150.0
Effective Green, g (s)	15.8	15.8	150.0	18.2	18.2	29.2	52.0	89.0		11.0	48.0	150.0
Actuated g/C Ratio	0.11	0.11	1.00	0.12	0.12	0.19	0.35	0.59		0.07	0.32	1.00
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	177	182	1583	204	213	308	1190	3726		130	1627	1583
v/s Ratio Prot	0.09	c0.10		c0.12	0.12	0.02	c0.36	0.38		0.03	c0.32	
v/s Ratio Perm			0.16			0.04						0.20
v/c Ratio	0.90	0.91	0.16	1.00	0.99	0.30	1.03	0.65		0.47	1.00	0.20
Uniform Delay, d1	66.3	66.4	0.0	65.9	65.8	51.6	49.0	20.2		66.7	50.9	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.48		0.74	0.64	1.00
Incremental Delay, d2	39.7	40.9	0.2	63.0	58.8	0.5	27.8	0.5		1.0	13.0	0.1
Delay (s)	106.0	107.2	0.2	128.9	124.6	52.1	62.7	10.2		50.1	45.7	0.1
Level of Service	F	F	A	F	F	D	E	B		D	D	A
Approach Delay (s)		60.4			111.9			27.7			38.7	
Approach LOS		E			F			C			D	

Intersection Summary			
HCM Average Control Delay	40.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	724	2	99	0	0	0	0	74	21	153	39	0
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	
Lane Util. Factor		1.00						1.00		1.00	1.00	
Frt		0.98						0.97		1.00	1.00	
Flt Protected		0.96						1.00		0.95	1.00	
Satd. Flow (prot)		1755						1807		1770	1863	
Flt Permitted		0.96						1.00		0.69	1.00	
Satd. Flow (perm)		1755						1807		1286	1863	
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)	787	2	108	0	0	0	0	80	23	166	42	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	889	0	0	0	0	0	89	0	166	42	0
Turn Type	Perm									Perm		
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		42.2						19.8		19.8	19.8	
Effective Green, g (s)		42.2						19.8		19.8	19.8	
Actuated g/C Ratio		0.60						0.28		0.28	0.28	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		1058						511		364	527	
v/s Ratio Prot								0.05			0.02	
v/s Ratio Perm		0.51								c0.13		
v/c Ratio		0.84						0.17		0.46	0.08	
Uniform Delay, d1		11.2						18.9		20.7	18.4	
Progression Factor		1.00						1.00		1.21	1.26	
Incremental Delay, d2		6.1						0.7		3.8	0.3	
Delay (s)		17.3						19.7		28.8	23.4	
Level of Service		B						B		C	C	
Approach Delay (s)		17.3			0.0			19.7			27.7	
Approach LOS		B			A			B			C	

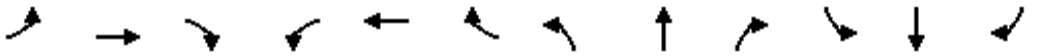
Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	69	0	497	31	767	0	0	123	498
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
Lane Util. Factor					1.00			1.00			1.00	1.00
Frt					0.88			1.00			1.00	0.85
Flt Protected					0.99			1.00			1.00	1.00
Satd. Flow (prot)					1632			1859			1863	1583
Flt Permitted					0.99			0.99			1.00	1.00
Satd. Flow (perm)					1632			1838			1863	1583
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)	0	0	0	75	0	540	34	834	0	0	134	541
RTOR Reduction (vph)	0	0	0	0	101	0	0	0	0	0	0	242
Lane Group Flow (vph)	0	0	0	0	514	0	0	868	0	0	134	299
Turn Type				Perm			Perm					Perm
Protected Phases					8			2			6	
Permitted Phases				8			2					6
Actuated Green, G (s)					23.3			38.7			38.7	38.7
Effective Green, g (s)					23.3			38.7			38.7	38.7
Actuated g/C Ratio					0.33			0.55			0.55	0.55
Clearance Time (s)					4.0			4.0			4.0	4.0
Vehicle Extension (s)					3.0			3.0			3.0	3.0
Lane Grp Cap (vph)					543			1016			1030	875
v/s Ratio Prot											0.07	
v/s Ratio Perm					0.31			c0.47				0.19
v/c Ratio					0.95			0.85			0.13	0.34
Uniform Delay, d1					22.7			13.3			7.5	8.6
Progression Factor					1.00			0.58			1.00	1.00
Incremental Delay, d2					25.6			5.9			0.3	1.1
Delay (s)					48.3			13.6			7.8	9.7
Level of Service					D			B			A	A
Approach Delay (s)		0.0			48.3			13.6			9.3	
Approach LOS		A			D			B			A	

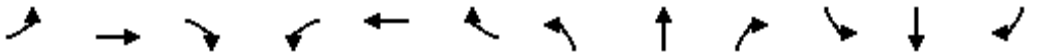
Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	117.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Mitigation



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	768	127	798	485	401	451	1585	842	508	1614	385
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	0.88	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
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)	3433	3539	1583	3433	3539	1583	3433	6408	2787	3433	5085	1583
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)	3433	3539	1583	3433	3539	1583	3433	6408	2787	3433	5085	1583
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)	446	835	138	867	527	436	490	1723	915	552	1754	418
RTOR Reduction (vph)	0	0	1	0	0	10	0	0	5	0	0	21
Lane Group Flow (vph)	446	835	137	867	527	426	490	1723	910	552	1754	397
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	21.5	27.0	43.0	29.0	34.5	54.5	16.0	38.0	67.0	20.0	42.0	63.5
Effective Green, g (s)	21.5	27.0	43.0	29.0	34.5	54.5	16.0	38.0	67.0	20.0	42.0	63.5
Actuated g/C Ratio	0.17	0.21	0.33	0.22	0.27	0.42	0.12	0.29	0.52	0.15	0.32	0.49
Clearance 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
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	568	735	572	766	939	664	423	1873	1436	528	1643	822
v/s Ratio Prot	0.13	c0.24	0.03	c0.25	0.15	0.10	c0.14	0.27	0.14	0.16	c0.34	0.08
v/s Ratio Perm			0.06			0.17			0.19			0.17
v/c Ratio	0.79	1.14	0.24	1.13	0.56	0.64	1.16	0.92	0.63	1.05	1.07	0.48
Uniform Delay, d1	52.0	51.5	31.6	50.5	41.2	30.0	57.0	44.5	22.7	55.0	44.0	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.65	0.57	0.68
Incremental Delay, d2	7.0	77.4	0.2	75.2	0.8	2.1	94.7	8.9	0.9	41.4	37.9	0.2
Delay (s)	59.1	128.9	31.8	125.7	42.0	32.1	151.7	53.4	23.6	77.1	63.0	15.4
Level of Service	E	F	C	F	D	C	F	D	C	E	E	B
Approach Delay (s)		97.5			79.3			60.1			58.5	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	69.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	2074	314	534	1396	192	381	85	356	492	158	27
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	0.91	1.00	0.97	0.91		0.95	0.95	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	3433	4993		1681	1715	1583	3433	1822	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	3433	4993		1681	1715	1583	3433	1822	
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)	13	2254	341	580	1517	209	414	92	387	535	172	29
RTOR Reduction (vph)	0	0	124	0	13	0	0	0	1	0	4	0
Lane Group Flow (vph)	13	2254	217	580	1713	0	253	253	386	535	197	0
Turn Type	Prot		Perm	Prot			Split		pm+ov	Split		
Protected Phases	5	2		1	6		8	8	1	4	4	
Permitted Phases			2						8			
Actuated Green, G (s)	1.6	58.4	58.4	21.0	77.8		18.0	18.0	39.0	19.0	19.0	
Effective Green, g (s)	1.6	58.4	58.4	21.0	77.8		18.0	18.0	39.0	19.0	19.0	
Actuated g/C Ratio	0.01	0.44	0.44	0.16	0.59		0.14	0.14	0.29	0.14	0.14	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	21	2243	698	545	2934		229	233	514	493	261	
v/s Ratio Prot	0.01	c0.44		c0.17	0.34		c0.15	0.15	c0.12	c0.16	0.11	
v/s Ratio Perm			0.14						0.12			
v/c Ratio	0.62	1.00	0.31	1.06	0.58		1.10	1.09	0.75	1.09	0.75	
Uniform Delay, d1	65.1	37.0	24.0	55.7	17.1		57.2	57.2	42.3	56.7	54.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	43.9	20.2	0.3	56.8	0.3		90.4	83.7	6.1	65.5	11.6	
Delay (s)	109.0	57.2	24.2	112.5	17.4		147.6	140.9	48.4	122.2	66.1	
Level of Service	F	E	C	F	B		F	F	D	F	E	
Approach Delay (s)		53.1			41.3			102.7			106.9	
Approach LOS		D			D			F			F	

Intersection Summary			
HCM Average Control Delay	61.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

Highway Capacity Manual Calculation Worksheets

2007 Eastbound US 50 – AM Peak Hour

US 50 EB		Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	FP Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																			
West of El Dorado Hills		0.9	3	F	65.00	3655	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.52	1255	65.00	19.31	C
El Dorado Hills to Bass Lake		2.37	3	M	65.00	2473	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.42	997	65.00	15.34	B
East of Bass Lake		1.48	2	F	65.00	2345	1	6.0%	0.0%	0.0%	1.0	0.971	4800	4660	0.50	1208	65.00	18.58	C

2007 Eastbound US 50 – PM Peak Hour

US 50 EB		Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																			
West of El Dorado Hills		0.9	2	F	65.00	4992	1	6.0%	0.0%	0.0%	1.0	0.971	4800	4660	1.07	2571	40.73	63.12	F
El Dorado Hills to Bass Lake		2.37	3	M	65.00	4221	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.71	1702	63.78	26.68	D
East of Bass Lake		1.48	2	F	65.00	3694	1	6.0%	0.0%	0.0%	1.0	0.971	4800	4660	0.79	1902	61.52	30.92	D

2007 Westbound US 50 – AM Peak Hour

US 50 WB		Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																			
East of Bass Lake		1.48	2	F	65.00	2759	1	6.0%	0.0%	0.0%	1.0	0.971	4800	4660	0.59	1421	64.95	21.88	C
Bass Lake to El Dorado Hills		2.37	3	M	65.00	3458	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.58	1395	64.97	21.47	C
West of El Dorado Hills		0.9	3	F	65.00	4138	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.59	1421	64.95	21.88	C

2007 Westbound US 50 – PM Peak Hour

US 50 WB		Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																			
East of Bass Lake		1.48	2	F	65.00	2929	1	6.0%	0.0%	0.0%	1.0	0.971	4800	4660	0.63	1508	64.78	23.28	C
Bass Lake to El Dorado Hills		2.37	3	M	65.00	2825	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.47	1139	65.00	17.52	B
West of El Dorado Hills		0.9	3	F	65.00	4198	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.60	1441	64.92	22.20	C

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2010 AM PEAK HOUR

WEEKDAY AM PEAK HOUR

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	FP Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
West of El Dorado Hills	0.9	4	F	65.00	2694	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.29	694	65.00	10.68	A
El Dorado Hills to Bass Lake	2.37	3	M	65.00	2135	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.36	861	65.00	13.25	B
East of Bass Lake	1.48	3	F	65.00	2326	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.33	799	65.00	12.29	B
Plus Project																		
West of El Dorado Hills	0.9	4	F	65.00	3088	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.33	795	65.00	12.23	B
El Dorado Hills to Silva Valley	0.8	4	R	65.00	2135	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.24	582	65.00	8.95	A
Silva Valley to Bass Lake	1.57	3	R	65.00	2611	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.40	949	65.00	14.60	B
East of Bass Lake	1.48	3	F	65.00	2505	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.36	860	65.00	13.23	B

No Project		
West of El Dorado Hills	5	3044
El Dorado Hills to Bass Lake	4	2412
East of Bass Lake	4	2628
Plus Project		
West of El Dorado Hills	5	3489
El Dorado Hills to Silva Valley	5	2412
Silva Valley to Bass Lake	4	2950
East of Bass Lake	4	2831

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2010 PM PEAK HOUR

WEEKDAY PM PEAK HOUR

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
West of El Dorado Hills	0.9	4	F	65.00	4548	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.49	1171	65.00	18.02	C
El Dorado Hills to Bass Lake	2.37	3	M	65.00	3644	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.61	1470	65.00	22.62	C
East of Bass Lake	1.48	3	F	65.00	3478	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.50	1194	65.00	18.37	C
Plus Project																		
West of El Dorado Hills	0.9	4	F	65.00	4546	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.49	1171	65.00	18.02	C
El Dorado Hills to Silva Valley	0.8	4	R	65.00	3644	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.41	993	65.00	15.28	B
Silva Valley to Bass Lake	1.57	3	R	65.00	3916	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.59	1423	65.00	21.89	C
East of Bass Lake	1.48	3	F	65.00	3458	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.49	1187	65.00	18.26	C

No Project		
West of El Dorado Hills	5	5139
El Dorado Hills to Bass Lake	4	4118
East of Bass Lake	4	3930
Plus Project		
West of El Dorado Hills	5	5137
El Dorado Hills to Silva Valley	5	4118
Silva Valley to Bass Lake	4	4425
East of Bass Lake	4	3907

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2010 AM PEAK HOUR

WEEKDAY AM PEAK HOUR

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
East of Bass Lake	1.48	3	F	65.00	2549	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.36	875	65.00	13.46	B
Bass Lake to El Dorado Hills	2.37	3	M	65.00	2985	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.50	1204	65.00	18.52	C
West of El Dorado Hills	0.9	3	F	65.00	3517	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.50	1208	65.00	18.58	C
Plus Project																		
East of Bass Lake	1.48	3	F	65.00	2742	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.39	941	65.00	14.48	B
Bass Lake to Silva Valley	1.57	3	R	65.00	3252	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.49	1182	65.00	18.18	C
Silva Valley to El Dorado Hills	0.8	4	R	65.00	2985	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.34	813	65.00	12.51	B
West of El Dorado Hills	0.9	3	F	65.00	3857	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.55	1324	65.00	20.37	C
No Project																		
East of Bass Lake		4			2880													
Bass Lake to El Dorado Hills		4			3373													
West of El Dorado Hills		4			3974													
Plus Project																		
East of Bass Lake		4			3098													
Bass Lake to Silva Valley		4			3675													
Silva Valley to El Dorado Hills		5			3373													
West of El Dorado Hills		4			4358													

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2010 PM PEAK HOUR

WEEKDAY PM PEAK HOUR

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
East of Bass Lake	1.48	3	F	65.00	2778	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.40	954	65.00	14.68	B
Bass Lake to El Dorado Hills	2.37	3	M	65.00	2756	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.46	1112	65.00	17.11	B
West of El Dorado Hills	0.9	3	F	65.00	3446	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.49	1183	65.00	18.20	C
Plus Project																		
East of Bass Lake	1.48	3	F	65.00	2931	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.42	1006	65.00	15.48	B
Bass Lake to Silva Valley	1.57	3	R	65.00	3108	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.47	1129	65.00	17.37	B
Silva Valley to El Dorado Hills	0.8	4	R	65.00	2756	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.31	751	65.00	11.55	B
West of El Dorado Hills	0.9	3	F	65.00	3624	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.52	1244	65.00	19.14	C
No Project																		
East of Bass Lake		4			3139													
Bass Lake to El Dorado Hills		4			3114													
West of El Dorado Hills		4			3894													
Plus Project																		
East of Bass Lake		4			3312													
Bass Lake to Silva Valley		4			3512													
Silva Valley to El Dorado Hills		5			3114													
West of El Dorado Hills		4			4095													

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2020 AM PEAK HOUR

WEEKDAY AM PEAK HOUR

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	FP Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
West of El Dorado Hills	0.9	4	F	65.00	3733	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.40	961	65.00	14.78	B
El Dorado Hills to Bass Lake	2.37	3	M	65.00	3129	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.53	1262	65.00	19.42	C
East of Bass Lake	1.48	3	F	65.00	3277	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.47	1125	65.00	17.31	B
Plus Project																		
West of El Dorado Hills	0.9	4	F	65.00	4036	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.43	1039	65.00	15.98	B
El Dorado Hills to Silva Valley	0.8	4	R	65.00	3047	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.35	830	65.00	12.77	B
Silva Valley to Bass Lake	1.57	3	R	65.00	3658	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.55	1329	65.00	20.45	C
East of Bass Lake	1.48	3	F	65.00	3501	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.50	1202	65.00	18.49	C

No Project		
West of El Dorado Hills	5	4218
El Dorado Hills to Bass Lake	4	3536
East of Bass Lake	4	3703
Plus Project		
West of El Dorado Hills	5	4560
El Dorado Hills to Silva Valley	5	3443
Silva Valley to Bass Lake	4	4133
East of Bass Lake	4	3956

Mitigated LOS

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	FP Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
El Dorado Hills to Bass Lake	2.37	4	M	65.00	3536	1	6.0%	0.0%	0.0%	1.0	0.826	9600	7934	0.45	1070	65.00	16.46	B
Mitigated Plus Project																		
Silva Valley to Bass Lake	1.57	4	R	65.00	4133	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.47	1126	65.00	17.32	B

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2020 PM PEAK HOUR

WEEKDAY PM PEAK HOUR

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
West of El Dorado Hills	0.9	4	F	65.00	6034	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.65	1554	64.95	23.92	C
El Dorado Hills to Bass Lake	2.37	3	M	65.00	5341	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.90	2154	58.25	36.98	E
East of Bass Lake	1.48	3	F	65.00	5074	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.73	1742	64.32	27.09	D
Plus Project																		
West of El Dorado Hills	0.9	4	F	65.00	6407	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.69	1650	64.74	25.48	C
El Dorado Hills to Silva Valley	0.8	4	R	65.00	5201	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.59	1417	65.00	21.80	C
Silva Valley to Bass Lake	1.57	3	R	65.00	6053	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.92	2199	57.07	38.53	E
East of Bass Lake	1.48	3	F	65.00	5536	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.79	1901	62.88	30.23	D

No Project																		
West of El Dorado Hills		5			6818													
El Dorado Hills to Bass Lake		4			6035													
East of Bass Lake		4			5733													
Plus Project																		
West of El Dorado Hills		5			7239													
El Dorado Hills to Silva Valley		5			5877													
Silva Valley to Bass Lake		4			6840													
East of Bass Lake		4			6255													

Mitigations

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
El Dorado Hills to Bass Lake	2.37	4	M	65.00	6035	1	6.0%	0.0%	0.0%	1.0	0.826	9600	7934	0.76	1826	63.68	28.68	D
Mitigated Plus Project																		
Silva Valley to Bass Lake	1.57	4	R	65.00	6840	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.78	1864	63.30	29.45	D

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2020 AM PEAK HOUR

WEEKDAY AM PEAK HOUR

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
East of Bass Lake	1.48	3	F	65.00	4459	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.64	1531	64.98	23.56	C
Bass Lake to El Dorado Hills	2.37	3	M	65.00	4375	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.74	1765	64.17	27.51	D
West of El Dorado Hills	0.9	3	F	65.00	4679	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.67	1606	64.87	24.76	C
Plus Project																		
East of Bass Lake	1.48	3	F	65.00	4058	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.58	1393	65.00	21.43	C
Bass Lake to Silva Valley	1.57	3	R	65.00	4437	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.67	1612	64.85	24.86	C
Silva Valley to El Dorado Hills	0.8	4	R	65.00	4260	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.48	1161	65.00	17.86	B
West of El Dorado Hills	0.9	3	F	65.00	5010	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.72	1720	64.44	26.69	D

No Project																		
East of Bass Lake		4			5038													
Bass Lake to El Dorado Hills		4			4944													
West of El Dorado Hills		4			5287													
Plus Project																		
East of Bass Lake		4			4585													
Bass Lake to Silva Valley		4			5014													
Silva Valley to El Dorado Hills		5			4814													
West of El Dorado Hills		4			5661													

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
East of Bass Lake	1.48	4	F	65.00	5038	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.54	1297	65.00	19.95	C
Bass Lake to El Dorado Hills	2.37	5	M	65.00	4944	1	6.0%	0.0%	0.0%	1.0	0.826	12000	9917	0.50	1196	65.00	18.40	C
West of El Dorado Hills	0.9	3	F	65.00	4679	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.67	1606	64.87	24.76	C
Mitigated Plus Project																		
East of Bass Lake	1.48	4	F	65.00	4058	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.44	1045	65.00	16.08	B
Bass Lake to Silva Valley	1.57	4	R	65.00	4437	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.50	1209	65.00	18.60	C
Silva Valley to El Dorado Hills	0.8	4	R	65.00	4260	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.48	1161	65.00	17.86	B
West of El Dorado Hills	0.9	3	F	65.00	5010	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.72	1720	64.44	26.69	D

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2020 PM PEAK HOUR

WEEKDAY PM PEAK HOUR

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
East of Bass Lake	1.48	3	F	65.00	4203	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.60	1443	65.00	22.20	C
Bass Lake to El Dorado Hills	2.37	3	M	65.00	4039	1	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.68	1629	64.81	25.14	C
West of El Dorado Hills	0.9	3	F	65.00	4335	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.62	1488	65.00	22.89	C
Plus Project																		
East of Bass Lake	1.48	3	F	65.00	4651	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.67	1597	64.89	24.61	C
Bass Lake to Silva Valley	1.57	3	R	65.00	4646	1	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.70	1688	64.60	26.13	D
Silva Valley to El Dorado Hills	0.8	4	R	65.00	3933	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.45	1072	65.00	16.49	B
West of El Dorado Hills	0.9	3	F	65.00	4835	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.69	1660	64.71	25.65	C

No Project		
East of Bass Lake	4	4749
Bass Lake to El Dorado Hills	4	4564
West of El Dorado Hills	4	4898
Plus Project		
East of Bass Lake	4	5255
Bass Lake to Silva Valley	4	5250
Silva Valley to El Dorado Hills	5	4444
West of El Dorado Hills	4	5463

Mitigations

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
East of Bass Lake	1.48	4	F	65.00	4749	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.51	1223	65.00	18.82	C
Bass Lake to El Dorado Hills	2.37	4	M	65.00	4564	1	6.0%	0.0%	0.0%	1.0	0.826	9600	7934	0.58	1381	65.00	21.25	C
West of El Dorado Hills	0.9	3	F	65.00	4335	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.62	1488	65.00	22.89	C
Mitigated Plus Project																		
East of Bass Lake	1.48	4	F	65.00	4651	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.50	1198	65.00	18.43	C
Bass Lake to Silva Valley	1.57	4	R	65.00	4646	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.53	1266	65.00	19.48	C
Silva Valley to El Dorado Hills	0.8	4	R	65.00	3933	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.45	1072	65.00	16.49	B
West of El Dorado Hills	0.9	3	F	65.00	4835	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.69	1660	64.71	25.65	C

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2030 AM PEAK HOUR

WEEKDAY AM PEAK HOUR

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	FP Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
West of El Dorado Hills	0.9	4	F	65.00	4987	1.0	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.54	1284	65.00	19.75	C
El Dorado Hills to Bass Lake	2.37	3	M	65.00	4544	1.0	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.76	1833	63.61	28.81	D
East of Bass Lake	1.48	3	F	65.00	4496	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.64	1544	64.96	23.77	C
Plus Project																		
West of El Dorado Hills	0.9	4	F	65.00	4987	1.0	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.54	1284	65.00	19.75	C
El Dorado Hills to Silva Valley	0.8	4	R	65.00	3959	1.0	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.45	1079	65.00	16.60	B
Silva Valley to Bass Lake	1.57	3	R	65.00	4702	1.0	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.71	1708	64.50	26.48	D
East of Bass Lake	1.48	3	F	65.00	4496	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.64	1544	64.96	23.77	C

No Project		
West of El Dorado Hills	5	5635
El Dorado Hills to Bass Lake	4	5134
East of Bass Lake	4	5080
Plus Project		
West of El Dorado Hills	5	5635
El Dorado Hills to Silva Valley	5	4474
Silva Valley to Bass Lake	4	5313
East of Bass Lake	4	5080

Mitigated LOS

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	FP Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
El Dorado Hills to Bass Lake	2.37	4	M	65.00	5134	1	6.0%	0.0%	0.0%	1.0	0.826	9600	7934	0.65	1553	64.95	23.91	C
Mitigated Plus Project																		
Silva Valley to Bass Lake	1.57	4	R	65.00	5313	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.60	1448	65.00	22.28	C

No Project		MIT	
El Dorado Hills to Bass Lake	4	Convert HOV to MU	5134
Plus Project			
Silva Valley to Bass Lake	4	Convert MU to HOV	5313

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2030 PM PEAK HOUR

WEEKDAY PM PEAK HOUR

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
West of El Dorado Hills	0.9	4	F	65.00	8267	1.0	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.89	2129	58.86	36.17	**E**
El Dorado Hills to Bass Lake	2.37	3	M	65.00	7283	1.0	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	1.22	2937	17.86	164.49	**F**
East of Bass Lake	1.48	3	F	65.00	7121	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	1.02	2445	48.41	50.50	**F**
Plus Project																		
West of El Dorado Hills	0.9	4	F	65.00	8267	1.0	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.89	2129	58.86	36.17	**E**
El Dorado Hills to Silva Valley	0.8	4	R	65.00	6758	1.0	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.77	1842	63.53	29.00	D
Silva Valley to Bass Lake	1.57	3	R	65.00	7696	1.0	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	1.17	2796	28.61	97.72	**F**
East of Bass Lake	1.48	3	F	65.00	7120	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	1.02	2445	48.41	50.50	**F**

No Project																		
West of El Dorado Hills		5			9341													
El Dorado Hills to Bass Lake		4			8229													
East of Bass Lake		4			8046													
Plus Project																		
West of El Dorado Hills		5			9341													
El Dorado Hills to Silva Valley		5			7636													
Silva Valley to Bass Lake		4			8696													
East of Bass Lake		4			8045													

Mitigations

US 50 EB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
El Dorado Hills to Bass Lake	2.37	4	M	65.00	8229	1	6.0%	0.0%	0.0%	1.0	0.826	9600	7934	1.04	2489	46.44	53.60	F
Mitigated Plus Project																		
Silva Valley to Bass Lake	1.57	4	R	65.00	8696	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.99	2370	51.47	46.05	F

No Project				MIT														
El Dorado Hills to Bass Lake		4		Convert HOV to MU	8229													
Plus Project																		
Silva Valley to Bass Lake		4		Convert MU to HOV	8696													

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2030 AM PEAK HOUR

WEEKDAY AM PEAK HOUR

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
East of Bass Lake	1.48	3	F	65.00	5089	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.73	1747	64.28	27.18	D
Bass Lake to El Dorado Hills	2.37	3	M	65.00	5404	1.0	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.91	2180	57.59	37.86	E
West of El Dorado Hills	0.9	3	F	65.00	6164	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.88	2116	59.16	35.77	E
Plus Project																		
East of Bass Lake	1.48	3	F	65.00	5087	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.73	1747	64.28	27.18	D
Bass Lake to Silva Valley	1.57	3	R	65.00	5624	1.0	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.85	2043	60.68	33.67	D
Silva Valley to El Dorado Hills	0.8	4	R	65.00	5536	1.0	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.63	1509	64.99	23.22	C
West of El Dorado Hills	0.9	3	F	65.00	6164	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.88	2116	59.16	35.77	E

No Project																		
East of Bass Lake		4			5750													
Bass Lake to El Dorado Hills		4			6106													
West of El Dorado Hills		4			6965													
Plus Project																		
East of Bass Lake		4			5748													
Bass Lake to Silva Valley		4			6355													
Silva Valley to El Dorado Hills		5			6255													
West of El Dorado Hills		4			6965													

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
East of Bass Lake	1.48	4	F	65.00	5750	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.62	1481	65.00	22.79	C
Bass Lake to El Dorado Hills	2.37	5	M	65.00	6106	1	6.0%	0.0%	0.0%	1.0	0.826	12000	9917	0.62	1478	65.00	22.74	C
West of El Dorado Hills	0.9	3	F	65.00	6164	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.88	2116	59.16	35.77	E
Mitigated Plus Project																		
East of Bass Lake	1.48	4	F	65.00	5087	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.55	1310	65.00	20.15	C
Bass Lake to Silva Valley	1.57	4	R	65.00	5624	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.64	1533	64.97	23.59	C
Silva Valley to El Dorado Hills	0.8	4	R	65.00	5536	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.63	1509	64.99	23.22	C
West of El Dorado Hills	0.9	3	F	65.00	6164	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.88	2116	59.16	35.77	E

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2000)

2030 PM PEAK HOUR

WEEKDAY PM PEAK HOUR

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
No Project																		
East of Bass Lake	1.48	3	F	65.00	5712	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.82	1961	62.07	31.59	D
Bass Lake to El Dorado Hills	2.37	3	M	65.00	5398	1.0	6.0%	0.0%	0.0%	1.0	0.826	7200	5950	0.91	2177	57.66	37.75	**E**
West of El Dorado Hills	0.9	3	F	65.00	6045	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.86	2075	60.05	34.56	D
Plus Project																		
East of Bass Lake	1.48	3	F	65.00	5712	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.82	1961	62.07	31.59	D
Bass Lake to Silva Valley	1.57	3	R	65.00	5679	1.0	6.0%	0.0%	0.0%	1.0	0.917	7200	6606	0.86	2063	60.29	34.22	D
Silva Valley to El Dorado Hills	0.8	4	R	65.00	5110	1.0	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.58	1392	65.00	21.42	C
West of El Dorado Hills	0.9	3	F	65.00	6045	1.0	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.86	2075	60.05	34.56	D

No Project																		
East of Bass Lake		4			6454													
Bass Lake to El Dorado Hills		4			6099													
West of El Dorado Hills		4			6831													
Plus Project																		
East of Bass Lake		4			6454													
Bass Lake to Silva Valley		4			6417													
Silva Valley to El Dorado Hills		5			5774													
West of El Dorado Hills		4			6831													

Mitigations

US 50 WB	Miles	Lanes	Terrain	Free Flow Speed (mph)	Peak Hr Vol	PHF	% Truck	% BUS	% RV	Fp Adj	FHV Adj	Max. Flow Rate (pc/h/ln)	Service Flow Rate (pc/h/ln)	V/C	Vp (pc/h/ln)	S (mph)	Density (pc/mi/ln)	LOS
Mitigated No Project																		
East of Bass Lake	1.48	4	F	65.00	6454	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.69	1662	64.70	25.69	C
Bass Lake to El Dorado Hills	2.37	4	M	65.00	6099	1	6.0%	0.0%	0.0%	1.0	0.826	9600	7934	0.77	1845	63.50	29.06	D
West of El Dorado Hills	0.9	3	F	65.00	6045	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.86	2075	60.05	34.56	D
Mitigated Plus Project																		
East of Bass Lake	1.48	4	F	65.00	5712	1	6.0%	0.0%	0.0%	1.0	0.971	9600	9320	0.61	1471	65.00	22.63	C
Bass Lake to Silva Valley	1.57	4	R	65.00	5679	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.64	1548	64.96	23.83	C
Silva Valley to El Dorado Hills	0.8	4	R	65.00	5110	1	6.0%	0.0%	0.0%	1.0	0.917	9600	8807	0.58	1392	65.00	21.42	C
West of El Dorado Hills	0.9	3	F	65.00	6045	1	6.0%	0.0%	0.0%	1.0	0.971	7200	6990	0.86	2075	60.05	34.56	D

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CS
Agency/Co.:	DAI
Date Performed:	2/13/2009
Analysis Time Period:	AM Peak
Freeway/Dir of Travel:	US 50 EB
Weaving Location:	El Dorado Hills/Silva Valley
Jurisdiction:	El Dorado County
Analysis Year:	2010
Description:	El Dorado Interchange and HOV Traffic Analysis

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	4	
Weaving segment length, L	2150	ft
Terrain type	Grade	
Grade	4.00	%
Length	0.40	mi
Weaving type	B	
Volume ratio, VR	0.46	
Weaving ratio, R	0.25	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	1173	41	785	261	veh/h
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	
Peak 15-min volume, v15	293	11	197	66	v
Trucks and buses	6	6	6	6	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	2.0	2.0	2.0	2.0	
Recreational vehicle PCE, ER	2.5	2.5	2.5	2.5	
Heavy vehicle adjustment, fHV	0.943	0.943	0.943	0.943	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	1243	43	832	276	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.08	0.0020
b (Exhibit 24-6)	2.20	6.00
c (Exhibit 24-6)	0.70	1.00
d (Exhibit 24-6)	0.50	0.50
Weaving intensity factor, Wi	0.35	0.25
Weaving and non-weaving speeds, Si	55.74	58.90
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.85
Maximum number of lanes, Nw (max) (Exhibit 24-7)	3.50
Type of operation is	Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	57.39	mph
Weaving segment density, D	10.43	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	7806	pc/h
Capacity as a 15-minute flow rate, c	7364	pc/h
Capacity as a full-hour volume, ch	7364	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1108	4000	a
Average flow rate (pcphpl)	598	2350	b
Volume ratio, VR	0.46	0.80	c
Weaving ratio, R	0.25	N/A	d
Weaving length (ft)	2150	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CS
Agency/Co.:	DAI
Date Performed:	2/13/2009
Analysis Time Period:	PM Peak
Freeway/Dir of Travel:	US 50 EB
Weaving Location:	El Dorado Hills/Silva Valley
Jurisdiction:	El Dorado County
Analysis Year:	2010
Description:	El Dorado Interchange and HOV Traffic Analysis

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	4	
Weaving segment length, L	2150	ft
Terrain type	Grade	
Grade	4.00	%
Length	0.40	mi
Weaving type	B	
Volume ratio, VR	0.40	
Weaving ratio, R	0.32	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	2263	56	480	1036	veh/h
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	
Peak 15-min volume, v15	566	14	120	259	v
Trucks and buses	6	6	6	6	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	2.0	2.0	2.0	2.0	
Recreational vehicle PCE, ER	2.5	2.5	2.5	2.5	
Heavy vehicle adjustment, fHV	0.943	0.943	0.943	0.943	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2398	59	508	1098	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.08	0.0020
b (Exhibit 24-6)	2.20	6.00
c (Exhibit 24-6)	0.70	1.00
d (Exhibit 24-6)	0.50	0.50
Weaving intensity factor, Wi	0.46	0.32
Weaving and non-weaving speeds, Si	52.75	56.56
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.61
Maximum number of lanes, Nw (max) (Exhibit 24-7)	3.50
Type of operation is	Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	54.99	mph
Weaving segment density, D	18.47	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	8183	pc/h
Capacity as a 15-minute flow rate, c	7720	pc/h
Capacity as a full-hour volume, ch	7720	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1606	4000	a
Average flow rate (pcphpl)	1015	2350	b
Volume ratio, VR	0.40	0.80	c
Weaving ratio, R	0.32	N/A	d
Weaving length (ft)	2150	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CS
Agency/Co.:	DAI
Date Performed:	2/13/2009
Analysis Time Period:	AM Peak
Freeway/Dir of Travel:	US 50 EB
Weaving Location:	El Dorado Hills/Silva Valley
Jurisdiction:	El Dorado County
Analysis Year:	2030
Description:	El Dorado Interchange and HOV Traffic Analysis

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	4	
Weaving segment length, L	2150	ft
Terrain type	Grade	
Grade	4.00	%
Length	0.40	mi
Weaving type	B	
Volume ratio, VR	0.38	
Weaving ratio, R	0.42	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	2506	48	675	920	veh/h
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	
Peak 15-min volume, v15	627	12	169	230	v
Trucks and buses	6	6	6	6	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	2.0	2.0	2.0	2.0	
Recreational vehicle PCE, ER	2.5	2.5	2.5	2.5	
Heavy vehicle adjustment, fHV	0.943	0.943	0.943	0.943	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	2656	50	715	975	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.08	0.0020
b (Exhibit 24-6)	2.20	6.00
c (Exhibit 24-6)	0.70	1.00
d (Exhibit 24-6)	0.50	0.50
Weaving intensity factor, Wi	0.47	0.33
Weaving and non-weaving speeds, Si	52.30	56.24
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.57
Maximum number of lanes, Nw (max) (Exhibit 24-7)	3.50
Type of operation is	Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	54.65	mph
Weaving segment density, D	20.11	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	8253	pc/h
Capacity as a 15-minute flow rate, c	7786	pc/h
Capacity as a full-hour volume, ch	7786	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1690	4000	a
Average flow rate (pcphpl)	1099	2350	b
Volume ratio, VR	0.38	0.80	c
Weaving ratio, R	0.42	N/A	d
Weaving length (ft)	2150	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CS
Agency/Co.:	DAI
Date Performed:	2/13/2009
Analysis Time Period:	PM Peak
Freeway/Dir of Travel:	US 50 EB
Weaving Location:	El Dorado Hills/Silva Valley
Jurisdiction:	El Dorado County
Analysis Year:	2030
Description:	El Dorado Interchange and HOV Traffic Analysis

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	4	
Weaving segment length, L	2150	ft
Terrain type	Grade	
Grade	4.00	%
Length	0.40	mi
Weaving type	B	
Volume ratio, VR	0.29	
Weaving ratio, R	0.39	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	4905	65	797	1232	veh/h
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	
Peak 15-min volume, v15	1226	17	200	308	v
Trucks and buses	6	6	6	6	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	2.0	2.0	2.0	2.0	
Recreational vehicle PCE, ER	2.5	2.5	2.5	2.5	
Heavy vehicle adjustment, fHV	0.943	0.943	0.943	0.943	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	5199	68	844	1305	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.08	0.0020
b (Exhibit 24-6)	2.20	6.00
c (Exhibit 24-6)	0.70	1.00
d (Exhibit 24-6)	0.50	0.50
Weaving intensity factor, Wi	0.59	0.37
Weaving and non-weaving speeds, Si	49.68	55.20
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.19
Maximum number of lanes, Nw (max) (Exhibit 24-7)	3.50
Type of operation is	Unconstrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	53.48	mph
Weaving segment density, D	34.67	pc/mi/ln
Level of service, LOS	D	
Capacity of base condition, cb	8859	pc/h
Capacity as a 15-minute flow rate, c	8358	pc/h
Capacity as a full-hour volume, ch	8358	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	2149	4000	a
Average flow rate (pcphpl)	1854	2350	b
Volume ratio, VR	0.29	0.80	c
Weaving ratio, R	0.39	N/A	d
Weaving length (ft)	2150	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CS
Agency/Company	DAI
Date Performed	2/13/2009
Analysis Time Period	AM Peak

Site Information

Freeway/Dir of Travel	US 50 EB
Weaving Seg Location	El Dorado Hills/Silva Valley
Jurisdiction	El Dorado County
Analysis Year	2030

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	65	Weaving type	B
Weaving number of lanes, N	4	Volume ratio, VR	0.41
Weaving seg length, L (ft)	2150	Weaving ratio, R	0.35
Terrain	Grade		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	1874	1.00	6	0	2.0	2.5	0.943	1.00	1986
V_{o2}	46	1.00	6	0	2.0	2.5	0.943	1.00	48
V_{w1}	477	1.00	6	0	2.0	2.5	0.943	1.00	505
V_{w2}	871	1.00	6	0	2.0	2.5	0.943	1.00	923
V_w				1428	V_{nw}				2034
V									3462

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.08	0.00		
b (Exhibit 24-6)	2.20	6.00		
c (Exhibit 24-6)	0.70	1.00		
d (Exhibit 24-6)	0.50	0.50		
Weaving intensity factor, Wi	0.42	0.30		
Weaving and non-weaving speeds, Si (mi/h)	53.74	57.42		

Number of lanes required for unconstrained operation, Nw 1.67
Maximum number of lanes, Nw (max) 3.50

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	55.84
Weaving segment density, D (pc/mi/ln)	15.50
Level of service, LOS	B
Capacity of base condition, c_b (pc/h)	8084
Capacity as a 15-minute flow rate, c (veh/h)	7626
Capacity as a full-hour volume, c_h (veh/h)	7626

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

FREEWAY WEAVING WORKSHEET

General Information

Analyst	CS
Agency/Company	DAI
Date Performed	2/13/2009
Analysis Time Period	PM Peak

Site Information

Freeway/Dir of Travel	US 50 EB
Weaving Seg Location	El Dorado Hills/Silva Valley
Jurisdiction	El Dorado County
Analysis Year	2030

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	65	Weaving type	B
Weaving number of lanes, N	4	Volume ratio, VR	0.33
Weaving seg length, L (ft)	2150	Weaving ratio, R	0.36
Terrain	Grade		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	f_p	v
V_{o1}	3654	1.00	6	0	2.0	2.5	0.943	1.00	3873
V_{o2}	61	1.00	6	0	2.0	2.5	0.943	1.00	64
V_{w1}	647	1.00	6	0	2.0	2.5	0.943	1.00	685
V_{w2}	1157	1.00	6	0	2.0	2.5	0.943	1.00	1226
V_w				1911	V_{nw}				3937
V									5848

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.08	0.00		
b (Exhibit 24-6)	2.20	6.00		
c (Exhibit 24-6)	0.70	1.00		
d (Exhibit 24-6)	0.50	0.50		
Weaving intensity factor, Wi	0.53	0.34		
Weaving and non-weaving speeds, Si (mi/h)	51.00	55.92		

Number of lanes required for unconstrained operation, Nw 1.34
Maximum number of lanes, Nw (max) 3.50

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	54.21
Weaving segment density, D (pc/mi/ln)	26.97
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	8625
Capacity as a 15-minute flow rate, c (veh/h)	8137
Capacity as a full-hour volume, c_h (veh/h)	8137

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

APPENDIX D

Highway Traffic Index Calculation Worksheets

Average Annual Daily Truck Traffic on US 50

Location	Direction [1]	2010 AADT	2010 DHV Truck	2010 %	2010 AADTT	2030 AADT	2030 DHV Truck	2030 %	2030 AADTT
US 50 West of El Dorado Hills Blvd	Total	95,000	9,500		6,080	161,723	16,170		10,350
	EB	47,500		6.40%	3,040	80,862		6.40%	5,175
	WB	47,500		6.40%	3,040	80,861		6.40%	5,175
US 50 West of Silva Valley Interchange	Total	72,317	7,230		4,628	134,103	13,410		8,582
	EB	36,159		6.40%	2,314	67,052		6.40%	4,291
	WB	36,158		6.40%	2,314	67,051		6.40%	4,291
US 50 West of Bass Lake	Total	79,367	7,935		5,080	151,133	15,115		9,672
	EB	39,684		6.40%	2,540	75,567		6.40%	4,836
	WB	39,683		6.40%	2,540	75,566		6.40%	4,836
US 50 East of Bass Lake	Total	71,667	7,165		4,586	144,993	14,500		9,280
	EB	35,834		6.40%	2,293	72,497		6.40%	4,640
	WB	35,833		6.40%	2,293	72,496		6.40%	4,640

Note 1: Truck volume assumes a 50-50 split for both directions.

Note 2 AADT = Average Annual Daily Traffic, AADTT = Average Annual Daily Truck Traffic

Note 3: DHV = Two way design hourly volumes, vehicles. DHV = 10 percent of the daily traffic will occur during the PM peak hour.

Note 4:AADTT = Average Annual Daily Truck Traffic.

Shaded pattern indicates either AADT is greater than 150,000 and/or AADTT is greater than 15,000

Lane Assumptions for US 50 Main Line
5 Lanes (1 HOV, 2 Mixed, 1 truck climbing, 1 aux)
5 Lanes (1 HOV, 3 Mixed, 1 aux)
5 Lanes (1 HOV, 2 Mixed, 1 truck climbing, 1 aux)
5 Lanes (1 HOV, 3 Mixed, 1 aux)
5 Lanes (1 HOV, 2 Mixed, 1 truck climbing, 1 aux)
5 Lanes (1 HOV, 3 Mixed, 1 aux)
5 Lanes (1 HOV, 2 Mixed, 1 truck climbing, 1 aux)
5 Lanes (1 HOV, 3 Mixed, 1 aux)

Lane Distribution Factors	Eastbound
Note: Same assumptions for all locations	

Axle Distribution Factors		42.70%	13.70%	2.40%	41.20%	100.00%

Table 1: Axle Distribution of Truck Traffic on US 50

2007

Location	Total Truck Volume	2-Axle	3-Axle	4-Axle	5 or more Axle	Total
US 50 West of El Dorado Hills Blvd						
EB	3,326	1,420	456	80	1,370	3,326
WB	3,326	1,420	456	80	1,370	3,326
US 50 West of Silva Valley						
EB	2,372	1,013	325	57	977	2,372
WB	2,372	1,013	325	57	977	2,372
US 50 West of Bass Lake						
EB	2,372	1,013	325	57	977	2,372
WB	2,372	1,013	325	57	977	2,372
US 50 East of Bass Lake						
EB	2,140	914	293	51	882	2,140
WB	2,140	914	293	51	882	2,140

Axle Distribution Factors		42.70%	13.70%	2.40%	41.20%	100.00%

2010

Location	Total Truck Volume	2-Axle	3-Axle	4-Axle	5 or more Axle	Total
US 50 West of El Dorado Hills Blvd						
EB	3,040	1,298	416	73	1,252	3,039
WB	3,040	1,298	416	73	1,252	3,039
US 50 West of Silva Valley						
EB	2,314	988	317	56	953	2,314
WB	2,314	988	317	56	953	2,314
US 50 West of Bass Lake						
EB	2,540	1,085	348	61	1,046	2,540
WB	2,540	1,085	348	61	1,046	2,540
US 50 East of Bass Lake						
EB	2,293	979	314	55	945	2,293
WB	2,293	979	314	55	945	2,293

Axle Distribution Factors		42.70%	13.70%	2.40%	41.20%	100.00%

2030

Location	Total Truck Volume	2-Axle	3-Axle	4-Axle	5 or more Axle	Total
US 50 West of El Dorado Hills Blvd						
EB	5,175	2,210	709	124	2,132	5,175
WB	5,175	2,209	709	124	2,132	5,175
US 50 West of Silva Valley						
EB	4,291	1,832	588	103	1,768	4,291
WB	4,291	1,832	588	103	1,768	4,291
US 50 West of Bass Lake						
EB	4,836	2,064	663	116	1,992	4,836
WB	4,836	2,064	663	116	1,992	4,836
US 50 East of Bass Lake						
EB	4,640	1,981	636	111	1,912	4,641
WB	4,640	1,982	636	111	1,912	4,641

TI 10 Constants	690	1840	2940	6890

Table 1: ESAL Distribution of Truck Traffic on US 50

2007

Location	2-Axle ESALS	3-Axle ESALS	4 Axle ESALS	5 or More Axle ESALS	Total ESALS
US 50 West of El Dorado Hills Blvd					
EB	979,800	839,040	235,200	9,439,300	11,493,340
WB	979,800	839,040	235,200	9,439,300	11,493,340
US 50 West of Silva Valley					
EB	698,970	598,000	167,580	6,731,530	8,196,080
WB	698,970	598,000	167,580	6,731,530	8,196,080
US 50 West of Bass Lake					
EB	698,970	598,000	167,580	6,731,530	8,196,080
WB	698,970	598,000	167,580	6,731,530	8,196,080
US 50 East of Bass Lake					
EB	630,660	539,120	149,940	6,076,980	7,396,700
WB	630,660	539,120	149,940	6,076,980	7,396,700

TI 10 Constants	690	1840	2940	6890

Year 2010 - ESAL Distribution of Truck Traffic on US 50

Location	2-Axle ESALS	3-Axle ESALS	4 Axle ESALS	5 or More Axle ESALS	Total ESALS
US 50 West of El Dorado Hills Blvd					
EB	895,620	765,440	214,620	8,626,280	10,501,960
WB	895,620	765,440	214,620	8,626,280	10,501,960
US 50 West of Silva Valley					
EB	681,720	583,280	164,640	6,566,170	7,995,810
WB	681,720	583,280	164,640	6,566,170	7,995,810
US 50 West of Bass Lake					
EB	748,650	640,320	179,340	7,206,940	8,775,250
WB	748,650	640,320	179,340	7,206,940	8,775,250
US 50 East of Bass Lake					
EB	675,510	577,760	161,700	6,511,050	7,926,020
WB	675,510	577,760	161,700	6,511,050	7,926,020

TI 10 Constants	690	1840	2940	6890

Year 2030 - ESAL Distribution of Truck Traffic on US 50

Location	2-Axle ESALS	3-Axle ESALS	4 Axle ESALS	5 or More Axle ESALS	Total ESALS
US 50 West of El Dorado Hills Blvd					
EB	1,524,900	1,304,560	364,560	14,689,480	17,883,500
WB	1,524,210	1,304,560	364,560	14,689,480	17,882,810
US 50 West of Silva Valley					
EB	1,264,080	1,081,920	302,820	12,181,520	14,830,340
WB	1,264,080	1,081,920	302,820	12,181,520	14,830,340
US 50 West of Bass Lake					
EB	1,424,160	1,219,920	341,040	13,724,880	16,710,000
WB	1,424,160	1,219,920	341,040	13,724,880	16,710,000
US 50 East of Bass Lake					
EB	1,366,890	1,170,240	326,340	13,173,680	16,037,150
WB	1,367,580	1,170,240	326,340	13,173,680	16,037,840

TI 20 Constants	1380	3680	5880	13780

Table 1: ESAL Distribution of Truck Traffic on US 50

2007

Location	2-Axle ESALS	3-Axle ESALS	4 Axle ESALS	5 or More Axle ESALS	Total ESALS
US 50 West of El Dorado Hills Blvd					
EB	1,959,600	1,678,080	470,400	18,878,600	22,986,680
WB	1,959,600	1,678,080	470,400	18,878,600	22,986,680
US 50 West of Silva Valley					
EB	1,397,940	1,196,000	335,160	13,463,060	16,392,160
WB	1,397,940	1,196,000	335,160	13,463,060	16,392,160
US 50 West of Bass Lake					
EB	1,397,940	1,196,000	335,160	13,463,060	16,392,160
WB	1,397,940	1,196,000	335,160	13,463,060	16,392,160
US 50 East of Bass Lake					
EB	1,261,320	1,078,240	299,880	12,153,960	14,793,400
WB	1,261,320	1,078,240	299,880	12,153,960	14,793,400

TI 20 Constants	1380	3680	5880	13780

2010

Location	2-Axle ESALS	3-Axle ESALS	4 Axle ESALS	5 or More Axle ESALS	Total ESALS
US 50 West of El Dorado Hills Blvd					
EB	1,791,240	1,530,880	429,240	17,252,560	21,003,920
WB	1,791,240	1,530,880	429,240	17,252,560	21,003,920
US 50 West of Silva Valley					
EB	1,363,440	1,166,560	329,280	13,132,340	15,991,620
WB	1,363,440	1,166,560	329,280	13,132,340	15,991,620
US 50 West of Bass Lake					
EB	1,497,300	1,280,640	358,680	14,413,880	17,550,500
WB	1,497,300	1,280,640	358,680	14,413,880	17,550,500
US 50 East of Bass Lake					
EB	1,351,020	1,155,520	323,400	13,022,100	15,852,040
WB	1,351,020	1,155,520	323,400	13,022,100	15,852,040

TI 20 Constants	1380	3680	5880	13780

2030

Location	2-Axle ESALS	3-Axle ESALS	4 Axle ESALS	5 or More Axle ESALS	Total ESALS
US 50 West of El Dorado Hills Blvd					
EB	3,049,800	2,609,120	729,120	29,378,960	35,767,000
WB	3,048,420	2,609,120	729,120	29,378,960	35,765,620
US 50 West of Silva Valley					
EB	2,528,160	2,163,840	605,640	24,363,040	29,660,680
WB	2,528,160	2,163,840	605,640	24,363,040	29,660,680
US 50 West of Bass Lake					
EB	2,848,320	2,439,840	682,080	27,449,760	33,420,000
WB	2,848,320	2,439,840	682,080	27,449,760	33,420,000
US 50 East of Bass Lake					
EB	2,733,780	2,340,480	652,680	26,347,360	32,074,300
WB	2,735,160	2,340,480	652,680	26,347,360	32,075,680

Traffic Index Calculations for Construction Year 2010

	ESALS		US 50 Eastbound					US 50 Westbound				
Location	EB	WB	Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 -Truck Climbing	Lane 5 - Aux Lane	Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 - MU Lane	Lane 5 - Aux Lane
Lane Distribution Factors			0.2	0.2	0.8	1	0.8	0.2	0.2	0.8	0.8	0.8
Upto West of Silva			0.2	0.2	0.8	1	0.8	0.2	0.2	0.8	0.8	0.8
West Of Bass Lake			0.2	1	1	1	0	0.2	1	1	0	0.8
East of Bass Lake			0.2	1	1	1	0	0.2	1	1	0	0.8
US 50 West of El Dorado Hills Blvd												
10 Year Design Constant - TI_{10}	10,501,960	10,501,960	2,100,392	2,100,392	8,401,568	10,501,960	8,401,568	2,100,392	2,100,392	8,401,568	8,401,568	8,401,568
20 Year Design Constant - TI_{20}	21,003,920	21,003,920	4,200,784	4,200,784	16,803,136	21,003,920	16,803,136	4,200,784	4,200,784	16,803,136	16,803,136	16,803,136
US 50 West of Silva Valley Prkwy												
10 Year Design Constant - TI_{10}	7,995,810	7,995,810	1,599,162	1,599,162	6,396,648	7,995,810	6,396,648	1,599,162	1,599,162	6,396,648	6,396,648	6,396,648
20 Year Design Constant - TI_{20}	15,991,620	15,991,620	3,198,324	3,198,324	12,793,296	15,991,620	12,793,296	3,198,324	3,198,324	12,793,296	12,793,296	12,793,296
US 50 West of Bass Lake												
10 Year Design Constant - TI_{10}	8,775,250	8,775,250	1,755,050	8,775,250	8,775,250	8,775,250	0	1,755,050	8,775,250	8,775,250	0	7,020,200
20 Year Design Constant - TI_{20}	17,550,500	17,550,500	3,510,100	17,550,500	17,550,500	17,550,500	0	3,510,100	17,550,500	17,550,500	0	14,040,400
US 50 East of Bass Lake												
10 Year Design Constant - TI_{10}	7,926,020	7,926,020	1,585,204	7,926,020	7,926,020	7,926,020	0	1,585,204	7,926,020	7,926,020	0	6,340,816
20 Year Design Constant - TI_{20}	15,852,040	15,852,040	3,170,408	15,852,040	15,852,040	15,852,040	0	3,170,408	15,852,040	15,852,040	0	12,681,632

Traffic Index Calculations for Design Year 2030

	ESALS		US 50 Eastbound					US 50 Westbound				
Location	EB	WB	Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 -Truck Climbing	Lane 5 - Aux Lane	Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 - MU Lane	Lane 5 - Aux Lane
US 50 West of El Dorado Hills Blvd												
10 Year Design Constant - TI_{10}	17,883,500	17,882,810	3,576,700	3,576,700	14,306,800	17,883,500	14,306,800	3,576,562	3,576,562	14,306,248	14,306,248	14,306,248
20 Year Design Constant - TI_{20}	35,767,000	35,765,620	7,153,400	7,153,400	28,613,600	35,767,000	28,613,600	7,153,124	7,153,124	28,612,496	28,612,496	28,612,496
US 50 West of Silva Valley Prkwy												
10 Year Design Constant - TI_{10}	14,830,340	14,830,340	2,966,068	2,966,068	11,864,272	14,830,340	11,864,272	2,966,068	2,966,068	11,864,272	11,864,272	11,864,272
20 Year Design Constant - TI_{20}	29,660,680	29,660,680	5,932,136	5,932,136	23,728,544	29,660,680	23,728,544	5,932,136	5,932,136	23,728,544	23,728,544	23,728,544
US 50 West of Bass Lake												
10 Year Design Constant - TI_{10}	16,710,000	16,710,000	3,342,000	16,710,000	16,710,000	16,710,000	0	3,342,000	16,710,000	16,710,000	0	13,368,000
20 Year Design Constant - TI_{20}	33,420,000	33,420,000	6,684,000	33,420,000	33,420,000	33,420,000	0	6,684,000	33,420,000	33,420,000	0	26,736,000
US 50 East of Bass Lake												
10 Year Design Constant - TI_{10}	16,037,150	16,037,840	3,207,430	16,037,150	16,037,150	16,037,150	0	3,207,430	16,037,150	16,037,150	0	12,829,720
20 Year Design Constant - TI_{20}	32,074,300	32,075,680	6,414,860	32,074,300	32,074,300	32,074,300	0	6,414,860	32,074,300	32,074,300	0	25,659,440

Traffic Index Calculations for Construction Year 2010

Location	Traffic Index	US 50 Eastbound					US 50 Westbound				
		Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 -Truck Climbing	Lane 5 - Aux Lane	Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 - MU Lane	Lane 5 - Aux Lane
US 50 West of El Dorado Hills Blvd											
	TI_{10}	10.00	10.00	11.50	12.00	11.50	10.00	10.00	11.50	11.50	11.50
	TI_{20}	10.50	10.50	12.50	13.00	12.50	10.50	10.50	12.50	12.50	12.50
US 50 West of Silva Valley Prkwy											
	TI_{10}	9.50	9.50	11.00	11.50	11.00	9.50	9.50	11.00	11.00	11.00
	TI_{20}	10.50	10.50	12.00	12.50	12.00	10.50	10.50	12.00	12.00	12.00
US 50 West of Bass Lake											
	TI_{10}	9.50	11.50	11.50	11.50	NA [1]	9.50	11.50	11.50	NA	11.50
	TI_{20}	10.50	12.50	12.50	12.50	NA	10.50	12.50	12.50	NA	12.50
US 50 East of Bass Lake											
	TI_{10}	9.50	11.50	11.50	11.50	NA	9.50	11.50	11.50	NA	11.00
	TI_{20}	10.50	12.50	12.50	12.50	NA	10.50	12.50	12.50	NA	12.00

Note 1: NA is used for sections that may not consist of the corresponding functional lane.

Traffic Index Calculations for Design Year 2030

Location	Traffic Index	US 50 Eastbound					US 50 Westbound				
		Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 -Truck Climbing	Lane 5 - Aux Lane	Lane 1 - HOV Lane	Lane 2 - MU Lane	Lane 3 - MU Lane	Lane 4 - MU Lane	Lane 5 - Aux Lane
US 50 West of El Dorado Hills Blvd											
	TI_{10}	10.50	10.50	12.50	12.50	12.50	10.50	10.50	12.50	12.50	12.50
	TI_{20}	11.50	11.50	13.50	14.00	13.50	11.50	11.50	13.50	13.50	13.50
US 50 West of Silva Valley Prkwy											
	TI_{10}	10.00	10.00	12.00	12.50	12.00	10.00	10.00	12.00	12.00	12.00
	TI_{20}	11.00	11.00	13.00	13.50	13.00	11.00	11.00	13.00	13.00	13.00
US 50 West of Bass Lake											
	TI_{10}	10.50	12.50	12.50	12.50	NA [1]	10.50	12.50	12.50	NA	12.50
	TI_{20}	11.50	13.50	13.50	13.50	NA	11.50	13.50	13.50	NA	13.50
US 50 East of Bass Lake											
	TI_{10}	10.50	12.50	12.50	12.50	NA	10.50	12.50	12.50	NA	12.00
	TI_{20}	11.00	13.50	13.50	13.50	NA	11.00	13.50	13.50	NA	13.00

APPENDIX E

Model Forecasts Unbalanced Worksheets

WEEKDAY DAILY ADJUSTED VOLUMES

Dir	Location	Ground Count	Ground Count Year	Annual Growth Rate (%)	Adj. 2007 Count	2007[1] Modeled Volume	2010 Modeled Volume	2007 Heavy-Duty Truck %	Peak Month Adjustment	2010 HDT Adj Volume	2010 FINAL Volume	2007-2010 Avg. Annual Growth
Both	EDH s/o Serrano	22,910	2006	1.32%	23,213	29,981	27,640	2	1	28,193	21,425	-2.33
Both	Latrobe s/o Town Ctr	24,247	2006	6.59%	25,845	34,499	43,277	2	1	44,143	35,489	9.87
Both	Latrobe s/o White Rock	18,952	2006	7.87%	20,444	21,994	29,984	2	1	30,584	29,033	12.01
Both	Serrano e/o Silva	11,552	2006	19.04%	13,752	1,994	4,079	2	1	4,161	15,918	17.50
Both	Serrano w/o Silva	10,427	2006	7.61%	11,221	6,090	4,268	2	1	4,353	9,484	-7.95
Both	Silva n/o Serrano	9,174	2006	14.12%	10,469	17,049	22,206	2	1	22,650	16,070	12.71
Both	Silva s/o Serrano	6,495	2006	37.15%	8,908	14,735	20,928	2	1	21,347	15,520	16.85
Both	US50 b/w Silva/Bass Lake	67,680	2005	1.47%	69,684	81,467	90,653	6	1	96,092	84,310	6.11
Both	US50 e/o Bass Lake	60,160	2005	2.21%	62,848	73,648	82,623	6	1	87,580	76,781	6.43
Both	US50 e/o EDH	67,680	2005	1.47%	69,684	80,280	78,219	6	1	82,912	72,317	1.16
EB	US50 off at Bass Lake	5,684	2006	13.09%	6,428	5,792	5,357	2	1	5,464	6,100	-1.83
WB	US50 off at Bass Lake	1,274	2006	4.61%	1,333	1,994	1,329	2	1	1,356	694	-15.64
EB	US50 off at EDH	21,462	2006	13.03%	24,258	10,696	11,813	2	1	12,049	25,612	2.95
WB	US50 off at EDH	6,958	2006	2.67%	7,144	12,658	9,504	2	1	9,694	4,180	-12.26
EB	US50 on at Bass Lake	1,225	2006	12.08%	1,373	1,806	1,308	2	1	1,334	901	-11.31
WB	US50 on at Bass Lake	4,900	2005	3.51%	5,250	5,826	5,309	2	1	5,415	4,839	-2.54
EB	US50 on at EDH	7,115	2005	1.00%	7,258	12,444	10,232	2	1	10,437	5,250	-7.91
WB	US50 on at EDH	21,070	2006	7.69%	22,690	10,820	10,353	2	1	10,560	22,430	-0.59
Both	US50 w/o Bass Lake	67,680	2005	1.47%	69,684	81,467	90,653	6	1	96,092	84,310	6.11
Both	US50 w/o EDH	82,720	2005	8.68%	97,703	76,694	80,649	6	1	85,488	106,497	3.30
Both	White Rock e/o Latrobe	10,141	2006	22.46%	12,419	13,085	9,467	2	1	9,656	8,990	-9.92
Both	White Rock w/o Latrobe	8,350	2006	6.61%	8,902	18,341	16,170	2	1	16,493	7,054	-5.43

Annual Growths for Ramps are based on 9-Year Historical Growth based on Caltrans District 3 Ramp Volumes

Annual Growths for US 50 mainline are based on 3-Year Historical Growth based on Caltrans Traffic and Vehicle Data Systems Unit

Annual Growths for County Roads are based on 5-Year Historical Growth based on El Dorado DOT Traffic Count Summary

[1] Interpolated from El Dorado DOT Traffic Model 2005 and 2025 Raw Model Volumes

2030 WEEKDAY DAILY ADJUSTED VOLUMES

Dir	Location	Ground Count	Ground Count Year	Annual Growth Rate (%)	Adj. 2007 Count	2007[1] Modeled Volume	2030[1] Modeled Volume	2007 Heavy-Duty Truck %	Peak Month Adjustment	2030 HDT Adj Volume	2030 Final Volume	2007-2030 Avg. Annual Growth
Both	EDH s/o Serrano	22,910	2006	1.32%	23,213	29,981	27,141	2	1	27,684	20,916	-0.40
Both	Latrobe s/o Town Ctr	24,247	2006	6.59%	25,845	34,499	64,852	2	1	66,149	57,495	3.22
Both	Latrobe s/o White Rock	18,952	2006	7.87%	20,444	21,994	63,692	2	1	64,966	63,416	4.93
Both	Serrano e/o Silva	11,552	2006	19.04%	13,752	7,816	7,816	2	1	7,972	13,908	0.07
Both	Serrano w/o Silva	10,427	2006	7.61%	11,221	6,090	4,104	2	1	4,186	9,317	-1.19
Both	Silva n/o Serrano	9,174	2006	14.12%	10,469	11,711	21,343	2	1	21,770	20,528	2.85
Both	Silva s/o Serrano	6,495	2006	37.15%	8,908	25,758	25,758	2	1	26,273	9,424	0.17
Both	US50 e/o Bass Lake	60,160	2005	2.21%	62,848	73,648	137,543	6	1	145,796	134,996	3.20
Both	US50 e/o EDH	67,680	2005	1.47%	69,684	80,280	136,518	6	1	144,709	134,113	2.74
EB	US50 off at Bass Lake	5,684	2006	13.09%	6,428	5,792	10,631	2	1	10,844	11,480	2.66
WB	US50 off at Bass Lake	1,274	2006	4.61%	1,333	1,994	4,404	2	1	4,492	3,831	4.18
EB	US50 off at EDH	21,462	2006	13.03%	24,258	10,696	16,065	2	1	16,386	29,949	1.42
WB	US50 off at EDH	6,958	2006	2.67%	7,144	12,658	11,879	2	1	12,298	6,784	-0.17
EB	US50 on at Bass Lake	1,225	2006	12.08%	1,373	1,806	3,350	2	1	3,417	2,984	3.13
WB	US50 on at Bass Lake	4,900	2005	3.51%	5,250	5,826	10,931	2	1	11,150	10,574	2.98
EB	US50 on at EDH	7,115	2005	1.00%	7,258	12,444	11,952	2	1	12,191	7,005	-0.12
WB	US50 on at EDH	21,070	2006	7.69%	22,690	10,820	17,636	2	1	17,989	29,859	1.75
Both	US50 w/o Bass Lake	67,680	2005	1.47%	69,684	81,467	151,352	6	1	160,433	148,651	3.17
Both	US50 w/o EDH	82,720	2005	8.68%	97,703	76,694	146,388	6	1	155,171	176,181	2.86
Both	White Rock e/o Latrobe	10,141	2006	22.46%	12,419	13,085	53,026	2	1	54,087	53,420	6.46
Both	White Rock w/o Latrobe	8,350	2006	6.61%	8,902	18,341	41,879	2	1	42,717	33,277	4.94

Annual Growths for Ramps are based on 9-Year Historical Growth based on Caltrans District 3 Ramp Volumes
Annual Growths for US 50 mainline are based on 3-Year Historical Growth based on Caltrans Traffic and Vehicle Data Systems Unit
Annual Growths for County Roads are based on 5-Year Historical Growth based on El Dorado DOT Traffic Count Summary

[1] Interpolated/Extrapolated from El Dorado DOT Traffic Model 2005 and 2025 Raw Model Volumes

APPENDIX F

RAMP METERING/QUEUE SPILL-BACK SPREADSHEETS

Ramp Metering / Queue Spill-back Analysis - 2010 Plus Project

Description	El Dorado Hills I/C				Silva Valley I/C				Bass Lake I/C			
	WB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Arrival Rate:												
Forecasted Traffic Volumes (vph)	2,004	1,680	826	1,091	487	379	840	832	709	327	101	120
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	0%	0%	0%	0%
HOV Vehicles	230	193	95	125	56	44	97	96	0	0	0	0
Adjusted Traffic Volumes (vph) [2]	1,774	1,487	731	966	431	335	743	736	709	327	101	120
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
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.97
Flow Rate (pcph) [3]	2,101	1,762	866	1,144	511	397	881	872	794	366	113	134
Average Arrival Rate (pcps)	0.58	0.49	0.24	0.32	0.14	0.11	0.24	0.24	0.22	0.10	0.03	0.04
Peak 15-min Arrival Rate (pc)	525	440	217	286	128	99	220	218	198	92	28	34
Peak 5-min Arrival Rate (pc)	175	147	72	95	43	33	73	73	66	31	9	11
Assumptions/Given:												
Average Car Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	850	850	925	925	500	500	700	700	650	650	650	650
Number of On-Ramp Lanes	2	2	2	2	1	1	2	2	1	1	1	1
Approx Total Storage Capacity (ft)	1,700	1,700	1,850	1,850	500	500	1,400	1,400	650	650	650	650
Discharge Rate:												
Maximum Capacity or Discharge Rate (pcph) [5]	1,830	1,490	570	850	430	320	660	650	690	270	270	270
Average Discharge Rate (pcps)	0.51	0.41	0.16	0.24	0.12	0.09	0.18	0.18	0.19	0.08	0.08	0.08
Peak 15-min Discharge Rate (pc)	458	373	143	213	108	80	165	163	173	68	68	68
Peak 5-min Discharge Rate (pc)	153	124	48	71	36	27	55	54	58	23	23	23
Resultant Ramp Flow Rate without HOV (vph) [6]	1,545	1,258	481	717	363	270	557	549	616	241	241	241
Resultant Ramp Flow Rate with HOV (vph)	1775	1451	576	843	419	314	654	644	616	241	241	241
Peak 15-min Results:												
Residual Queue Length (veh) [7]	68	68	74	73	20	19	55	56	26	24	0	0
Residual Queue Length (ft)	1,695	1,697	1,851	1,837	504	484	1,380	1,390	649	601	0	0
Resultant Queue Spillback (ft) [8]	0	0	1	0	4	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0
Peak 5-min Results:												
Residual Queue Length (veh) [7]	23	23	25	24	7	6	18	19	9	8	0	0
Residual Queue Length (ft)	565	566	617	612	168	161	460	463	216	200	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project (Min Storage)

	El Dorado Hills I/C				Silva Valley I/C				Bass Lake I/C			
	WB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp	
Description	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:												
Forecasted Traffic Volumes (vph)	1,886	1,628	899	1,194	899	694	1,203	1,657	730	333	142	147
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	0%	0%	0%	0%
HOV Vehicles	217	187	103	137	103	80	138	191	0	0	0	0
Adjusted Traffic Volumes (vph) [2]	1,669	1,441	796	1,057	796	614	1,065	1,466	730	333	142	147
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
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.97
Flow Rate (pcph) [3]	1,978	1,707	943	1,252	943	728	1,261	1,737	817	373	159	165
Average Arrival Rate (pcps)	0.55	0.47	0.26	0.35	0.26	0.20	0.35	0.48	0.23	0.10	0.04	0.05
Peak 15-min Arrival Rate (pc)	494	427	236	313	236	182	315	434	204	93	40	41
Peak 5-min Arrival Rate (pc)	165	142	79	104	79	61	105	145	68	31	13	14
Assumptions/Given:												
Average Car Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	850	850	925	925	500	500	700	700	650	650	650	650
Number of On-Ramp Lanes	2	2	2	2	1	1	2	2	2	2	1	1
Approx Total Storage Capacity (ft)	1,700	1,700	1,850	1,850	500	500	1,400	1,400	1,300	1,300	650	650
Discharge Rate:												
Maximum Capacity or Discharge Rate (pcph) [5]	1,710	1,440	650	960	865	650	1,040	1,515	610	270	270	270
Average Discharge Rate (pcps)	0.48	0.40	0.18	0.27	0.24	0.18	0.29	0.42	0.17	0.08	0.08	0.08
Peak 15-min Discharge Rate (pc)	428	360	163	240	216	163	260	379	153	68	68	68
Peak 5-min Discharge Rate (pc)	143	120	54	80	72	54	87	126	51	23	23	23
Resultant Ramp Flow Rate without HOV (vph) [6]	1,443	1,215	549	810	730	549	878	1,279	545	241	241	241
Resultant Ramp Flow Rate with HOV (vph)	1660	1403	652	948	833	628	1016	1469	545	241	241	241
Peak 15-min Results:												
Residual Queue Length (veh) [7]	67	67	73	73	19	19	55	56	52	26	0	0
Residual Queue Length (ft)	1,672	1,669	1,829	1,825	485	486	1,384	1,390	1,296	643	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0
Peak 5-min Results:												
Residual Queue Length (veh) [7]	22	22	24	24	6	6	18	19	17	9	0	0
Residual Queue Length (ft)	557	556	610	608	162	162	461	463	432	214	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2010 Plus Project (Min Storage)

	El Dorado Hills I/C				Silva Valley I/C (Two Point Merge)								Silva Valley I/C (Single Point Merge)		Bass Lake I/C			
	WB On-Ramp		EB On-Ramp		NB to WB On-Ramp		SB to WB On-Ramp		NB to EB On-Ramp		SB to EB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp	
Description	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:																		
Forecasted Traffic Volumes (vph)	1,767	1,575	968	1,297	570	599	739	409	987	1,274	575	648	1,562	1,922	1,114	529	183	174
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	23.0%	23.0%	0%	0%	0%	0%
HOV Vehicles	203	181	111	149	66	69	85	47	114	147	66	75	359	442	0	0	0	0
Adjusted Traffic Volumes (vph) [2]	1,564	1,394	857	1,148	504	530	654	362	873	1,127	509	573	1,203	1,480	1,114	529	183	174
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	0.92	0.92	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.97
Flow Rate (pcph) [3]	1,853	1,651	1,015	1,360	598	628	775	429	1,035	1,336	603	679	1,425	1,753	1,247	592	205	195
Average Arrival Rate (pcps)	0.51	0.46	0.28	0.38	0.17	0.17	0.22	0.12	0.29	0.37	0.17	0.19	0.40	0.49	0.35	0.16	0.06	0.05
Peak 15-min Arrival Rate (pc)	463	413	254	340	149	157	194	107	259	334	151	170	356	438	312	148	51	49
Peak 5-min Arrival Rate (pc)	154	138	85	113	50	52	65	36	86	111	50	57	119	146	104	49	17	16
Assumptions/Given:																		
Average Car Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	850	850	925	925	500	500	500	500	700	700	580	580	500	500	650	650	650	650
Number of On-Ramp Lanes	2	2	2	2	1	1	1	1	2	2	1	1	2	2	2	2	1	1
Approx Total Storage Capacity (ft)	1,700	1,700	1,850	1,850	500	500	500	500	1,400	1,400	580	580	1,000	1,000	1,300	1,300	650	650
Discharge Rate:																		
Maximum Capacity or Discharge Rate (pcph) [5]	1,585	1,380	720	1,065	520	550	695	350	815	1,115	510	590	1,265	1,595	1,040	480	270	270
Average Discharge Rate (pcps)	0.44	0.38	0.20	0.30	0.14	0.15	0.19	0.10	0.23	0.31	0.14	0.16	0.35	0.44	0.29	0.13	0.08	0.08
Peak 15-min Discharge Rate (pc)	396	345	180	266	130	138	174	88	204	279	128	148	316	399	260	120	68	68
Peak 5-min Discharge Rate (pc)	132	115	60	89	43	46	58	29	68	93	43	49	105	133	87	40	23	23
Resultant Ramp Flow Rate without HOV (vph) [6]	1,338	1,165	608	899	439	464	587	295	688	941	430	498	1,068	1,346	929	429	241	241
Resultant Ramp Flow Rate with HOV (vph)	1,541	1,346	719	1,048	504	533	672	342	801	1,088	497	573	1,427	1,788	929	429	241	241
Peak 15-min Results:																		
Residual Queue Length (veh) [7]	67	68	74	74	19	20	20	20	55	55	23	22	40	40	52	28	0	0
Residual Queue Length (ft)	1,673	1,696	1,844	1,843	485	488	499	493	1,374	1,380	581	559	1,000	990	1,295	702	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak 5-min Results:																		
Residual Queue Length (veh) [7]	22	23	25	25	6	7	7	7	18	18	8	7	13	13	17	9	0	0
Residual Queue Length (ft)	558	565	615	614	162	163	166	164	458	460	194	186	333	330	432	234	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project (Max Storage)

	El Dorado Hills I/C				Silva Valley I/C				Bass Lake I/C			
	WB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp	
Description	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:												
Forecasted Traffic Volumes (vph)	1,886	1,628	899	1,194	899	694	1,203	1,657	730	333	142	147
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	0%	0%	0%	0%
HOV Vehicles	217	187	103	137	103	80	138	191	0	0	0	0
Adjusted Traffic Volumes (vph) [2]	1,669	1,441	796	1,057	796	614	1,065	1,466	730	333	142	147
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
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.97
Flow Rate (pcph) [3]	1,978	1,707	943	1,252	943	728	1,261	1,737	817	373	159	165
Average Arrival Rate (pcps)	0.55	0.47	0.26	0.35	0.26	0.20	0.35	0.48	0.23	0.10	0.04	0.05
Peak 15-min Arrival Rate (pc)	494	427	236	313	236	182	315	434	204	93	40	41
Peak 5-min Arrival Rate (pc)	165	142	79	104	79	61	105	145	68	31	13	14
Assumptions/Given:												
Average Car Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	850	850	925	925	1,000	1,000	900	900	650	650	650	650
Number of On-Ramp Lanes	2	2	2	2	1	1	2	2	2	2	1	1
Approx Total Storage Capacity (ft)	1,700	1,700	1,850	1,850	1,000	1,000	1,800	1,800	1,300	1,300	650	650
Discharge Rate:												
Maximum Capacity or Discharge Rate (pcph) [5]	1,710	1,440	650	960	785	570	975	1,450	610	270	270	270
Average Discharge Rate (pcps)	0.48	0.40	0.18	0.27	0.22	0.16	0.27	0.40	0.17	0.08	0.08	0.08
Peak 15-min Discharge Rate (pc)	428	360	163	240	196	143	244	363	153	68	68	68
Peak 5-min Discharge Rate (pc)	143	120	54	80	65	48	81	121	51	23	23	23
Resultant Ramp Flow Rate without HOV (vph) [6]	1,443	1,215	549	810	663	481	823	1,224	545	241	241	241
Resultant Ramp Flow Rate with HOV (vph)	1660	1403	652	948	766	561	961	1414	545	241	241	241
Peak 15-min Results:												
Residual Queue Length (veh) [7]	67	67	73	73	39	39	72	72	52	26	0	0
Residual Queue Length (ft)	1,672	1,669	1,829	1,825	985	986	1,790	1,796	1,296	643	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0
Peak 5-min Results:												
Residual Queue Length (veh) [7]	22	22	24	24	13	13	24	24	17	9	0	0
Residual Queue Length (ft)	557	556	610	608	328	329	597	599	432	214	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2010 Plus Project (Max Storage)

	El Dorado Hills I/C				Silva Valley I/C (Two Point Merge)								Silva Valley I/C (Single Point Merge)		Bass Lake I/C			
	WB On-Ramp		EB On-Ramp		NB to WB On-Ramp		SB to WB On-Ramp		NB to EB On-Ramp		SB to EB On-Ramp		EB On-Ramp		WB On-Ramp		EB On-Ramp	
Description	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:																		
Forecasted Traffic Volumes (vph)	1,767	1,575	968	1,297	570	599	739	409	987	1,274	575	648	1,562	1,922	1,114	529	183	174
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	23.0%	23.0%	0%	0%	0%	0%
HOV Vehicles	203	181	111	149	66	69	85	47	114	147	66	75	359	442	0	0	0	0
Adjusted Traffic Volumes (vph) [2]	1,564	1,394	857	1,148	504	530	654	362	873	1,127	509	573	1,203	1,480	1,114	529	183	174
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	0.92	0.92	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	2%	2%	2%	2%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.97
Flow Rate (pcph) [3]	1,853	1,651	1,015	1,360	598	628	775	429	1,035	1,336	603	679	1,425	1,753	1,247	592	205	195
Average Arrival Rate (pcps)	0.51	0.46	0.28	0.38	0.17	0.17	0.22	0.12	0.29	0.37	0.17	0.19	0.40	0.49	0.35	0.16	0.06	0.05
Peak 15-min Arrival Rate (pc)	463	413	254	340	149	157	194	107	259	334	151	170	356	438	312	148	51	49
Peak 5-min Arrival Rate (pc)	154	138	85	113	50	52	65	36	86	111	50	57	119	146	104	49	17	16
Assumptions/Given:																		
Average Car Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	850	850	925	925	1,250	1,250	1,000	1,000	900	900	1,250	1,250	500	500	650	650	650	650
Number of On-Ramp Lanes	2	2	2	2	1	1	1	1	2	2	1	1	2	2	2	2	1	1
Approx Total Storage Capacity (ft)	1,700	1,700	1,850	1,850	1,250	1,250	1,000	1,000	1,800	1,800	1,250	1,250	1,000	1,000	1,300	1,300	650	650
Discharge Rate:																		
Maximum Capacity or Discharge Rate (pcph) [5]	1,585	1,380	720	1,065	400	430	615	285	750	1,050	405	480	1,265	1,595	1,040	480	270	270
Average Discharge Rate (pcps)	0.44	0.38	0.20	0.30	0.11	0.12	0.17	0.08	0.21	0.29	0.11	0.13	0.35	0.44	0.29	0.13	0.08	0.08
Peak 15-min Discharge Rate (pc)	396	345	180	266	100	108	154	71	188	263	101	120	316	399	260	120	68	68
Peak 5-min Discharge Rate (pc)	132	115	60	89	33	36	51	24	63	88	34	40	105	133	87	40	23	23
Resultant Ramp Flow Rate without HOV (vph) [6]	1,338	1,165	608	899	338	363	519	241	633	886	342	405	1,068	1,346	929	429	241	241
Resultant Ramp Flow Rate with HOV (vph)	1,541	1,346	719	1,048	403	432	604	288	747	1,033	408	480	1,427	1,788	929	429	241	241
Peak 15-min Results:																		
Residual Queue Length (veh) [7]	67	68	74	74	49	50	40	36	71	71	49	50	40	40	52	28	0	0
Residual Queue Length (ft)	1,673	1,696	1,844	1,843	1,235	1,238	999	899	1,781	1,786	1,237	1,247	1,000	990	1,295	702	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak 5-min Results:																		
Residual Queue Length (veh) [7]	22	23	25	25	16	17	13	12	24	24	16	17	13	13	17	9	0	0
Residual Queue Length (ft)	558	565	615	614	412	413	333	300	594	595	412	416	333	330	432	234	0	0
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

RAMP METERING/QUEUE SPILL-BACK

ALTERNATIVE PHASING ANALYSIS

Ramp Metering / Queue Spill-back Analysis - 2010 Plus Project Alt Phase I				
Description	**Silva Valley I/C**			
	WB On-Ramp		**EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:				
Forecasted Traffic Volumes (vph)	487	379	840	832
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	56	44	97	96
Adjusted Traffic Volumes (vph) [2]	431	335	743	736
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	511	397	881	872
Average Arrival Rate (pcps)	0.14	0.11	0.24	0.24
Peak 15-min Arrival Rate (pc)	128	99	220	218
Peak 5-min Arrival Rate (pc)	43	33	73	73
Assumptions/Given:				
Average Car Length (ft)	25	25	25	25
Approx. Storage Length (ft per lane) [4]	500	500	580	580
Number of On-Ramp Lanes	1	1	1	1
Approx Total Storage Capacity (ft)	500	500	580	580
Discharge Rate:				
Maximum Capacity or Discharge Rate (pcph) [5]	430	320	790	780
Average Discharge Rate (pcps)	0.12	0.09	0.22	0.22
Peak 15-min Discharge Rate (pc)	108	80	198	195
Peak 5-min Discharge Rate (pc)	36	27	66	65
Resultant Ramp Flow Rate without HOV (vph) [6]	363	270	667	658
Resultant Ramp Flow Rate with HOV (vph)	419	314	763	754
Peak 15-min Results:				
Residual Queue Length (veh) [7]	20	19	23	23
Residual Queue Length (ft)	504	484	567	577
Resultant Queue Spillback (ft) [8]	4	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0
Peak 5-min Results:				
Residual Queue Length (veh) [7]	7	6	8	8
Residual Queue Length (ft)	168	161	189	192
Resultant Queue Spillback (ft) [8]	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project Alt Phase I (Min Storage)				
Description	**Silva Valley I/C**			
	WB On-Ramp		**EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:				
Forecasted Traffic Volumes (vph)	899	694	1,203	1,657
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	103	80	138	191
Adjusted Traffic Volumes (vph) [2]	796	614	1,065	1,466
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	943	728	1,261	1,737
Average Arrival Rate (pcps)	0.26	0.20	0.35	0.48
Peak 15-min Arrival Rate (pc)	236	182	315	434
Peak 5-min Arrival Rate (pc)	79	61	105	145
Assumptions/Given:				
Average Car Length (ft)	25	25	25	25
Approx. Storage Length (ft per lane) [4]	500	500	580	580
Number of On-Ramp Lanes	1	1	1	1
Approx Total Storage Capacity (ft)	500	500	580	580
Discharge Rate:				
Maximum Capacity or Discharge Rate (pcph) [5]	865	650	1,065	1,065
Average Discharge Rate (pcps)	0.24	0.18	0.30	0.30
Peak 15-min Discharge Rate (pc)	216	163	266	266
Peak 5-min Discharge Rate (pc)	72	54	89	89
Resultant Ramp Flow Rate without HOV (vph) [6]	730	549	899	899
Resultant Ramp Flow Rate with HOV (vph)	833	628	1037	1089
Peak 15-min Results:				
Residual Queue Length (veh) [7]	19	19	49	168
Residual Queue Length (ft)	485	486	1,227	4,203
Resultant Queue Spillback (ft) [8]	0	0	**647**	**3,623**
Resultant Queue Spillback (veh)	0	0	**26**	**145**
Peak 5-min Results:				
Residual Queue Length (veh) [7]	6	6	16	56
Residual Queue Length (ft)	162	162	409	1,401
Resultant Queue Spillback (ft) [8]	0	0	0	**821**
Resultant Queue Spillback (veh)	0	0	0	**33**

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[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project Alt Phase II (Min Storage)								
Description	**Silva Valley I/C**							
	NB to WB On-Ramp		**SB to WB On-Ramp**		**NB to EB On-Ramp**		**SB to EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:								
Forecasted Traffic Volumes (vph)	361	337	538	357	594	774	609	883
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	42	39	62	41	68	89	70	102
Adjusted Traffic Volumes (vph) [2]	319	298	476	316	526	685	539	781
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	379	353	564	374	623	812	639	926
Average Arrival Rate (pcps)	0.11	0.10	0.16	0.10	0.17	0.23	0.18	0.26
Peak 15-min Arrival Rate (pc)	95	88	141	94	156	203	160	231
Peak 5-min Arrival Rate (pc)	32	29	47	31	52	68	53	77
Assumptions/Given:								
Average Car Length (ft)	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	500	500	500	500	700	700	580	580
Number of On-Ramp Lanes	1	1	1	1	2	2	1	1
Approx Total Storage Capacity (ft)	500	500	500	500	1,400	1,400	580	580
Discharge Rate:								
Maximum Capacity or Discharge Rate (pcph) [5]	300	285	485	295	400	590	545	835
Average Discharge Rate (pcps)	0.08	0.08	0.13	0.08	0.11	0.16	0.15	0.23
Peak 15-min Discharge Rate (pc)	75	71	121	74	100	148	136	209
Peak 5-min Discharge Rate (pc)	25	24	40	25	33	49	45	70
Resultant Ramp Flow Rate without HOV (vph) [6]	253	241	409	249	338	498	460	705
Resultant Ramp Flow Rate with HOV (vph)	295	279	471	290	406	587	530	806
Peak 15-min Results:								
Residual Queue Length (veh) [7]	20	17	20	20	56	55	23	23
Residual Queue Length (ft)	491	427	494	496	1,393	1,385	585	568
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	5	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0
Peak 5-min Results:								
Residual Queue Length (veh) [7]	7	6	7	7	19	18	8	8
Residual Queue Length (ft)	164	142	165	165	464	462	195	189
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2030 Plus Project Alt Phase I (Min Storage)				
Description	**Silva Valley I/C**			
	WB On-Ramp		**EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:				
Forecasted Traffic Volumes (vph)	1,309	1,008	1,562	1,922
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	151	116	180	221
Adjusted Traffic Volumes (vph) [2]	1,158	892	1,382	1,701
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	1,373	1,057	1,638	2,015
Average Arrival Rate (pcps)	0.38	0.29	0.45	0.56
Peak 15-min Arrival Rate (pc)	343	264	409	504
Peak 5-min Arrival Rate (pc)	114	88	136	168
Assumptions/Given:				
Average Car Length (ft)	25	25	25	25
Approx. Storage Length (ft per lane) [4]	500	500	580	580
Number of On-Ramp Lanes	1	1	1	1
Approx Total Storage Capacity (ft)	500	500	580	580
Discharge Rate:				
Maximum Capacity or Discharge Rate (pcph) [5]	1,065	980	1,065	1,065
Average Discharge Rate (pcps)	0.30	0.27	0.30	0.30
Peak 15-min Discharge Rate (pc)	266	245	266	266
Peak 5-min Discharge Rate (pc)	89	82	89	89
Resultant Ramp Flow Rate without HOV (vph) [6]	899	827	899	899
Resultant Ramp Flow Rate with HOV (vph)	1049	943	1079	1120
Peak 15-min Results:				
Residual Queue Length (veh) [7]	77	19	143	238
Residual Queue Length (ft)	1,922	481	3,580	5,939
Resultant Queue Spillback (ft) [8]	**1,422**	0	**3,000**	**5,359**
Resultant Queue Spillback (veh)	**57**	0	**120**	**214**
Peak 5-min Results:				
Residual Queue Length (veh) [7]	26	6	48	79
Residual Queue Length (ft)	641	160	1,193	1,980
Resultant Queue Spillback (ft) [8]	**141**	0	**613**	**1,400**
Resultant Queue Spillback (veh)	**6**	0	**25**	**56**

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2030 Plus Project Alt Phase II (Min Storage)								
Description	**Silva Valley I/C**							
	NB to WB On-Ramp		**SB to WB On-Ramp**		**NB to EB On-Ramp**		**SB to EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:								
Forecasted Traffic Volumes (vph)	570	599	739	409	987	1,274	575	648
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	66	69	85	47	114	147	66	75
Adjusted Traffic Volumes (vph) [2]	504	530	654	362	873	1,127	509	573
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	598	628	775	429	1,035	1,336	603	679
Average Arrival Rate (pcps)	0.17	0.17	0.22	0.12	0.29	0.37	0.17	0.19
Peak 15-min Arrival Rate (pc)	149	157	194	107	259	334	151	170
Peak 5-min Arrival Rate (pc)	50	52	65	36	86	111	50	57
Assumptions/Given:								
Average Car Length (ft)	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	500	500	500	500	700	700	580	580
Number of On-Ramp Lanes	1	1	1	1	2	2	1	1
Approx Total Storage Capacity (ft)	500	500	500	500	1,400	1,400	580	580
Discharge Rate:								
Maximum Capacity or Discharge Rate (pcph) [5]	520	550	695	350	815	1,115	510	590
Average Discharge Rate (pcps)	0.14	0.15	0.19	0.10	0.23	0.31	0.14	0.16
Peak 15-min Discharge Rate (pc)	130	138	174	88	204	279	128	148
Peak 5-min Discharge Rate (pc)	43	46	58	29	68	93	43	49
Resultant Ramp Flow Rate without HOV (vph) [6]	439	464	587	295	688	941	430	498
Resultant Ramp Flow Rate with HOV (vph)	504	533	672	342	801	1,088	497	573
Peak 15-min Results:								
Residual Queue Length (veh) [7]	19	20	20	20	55	55	23	22
Residual Queue Length (ft)	485	488	499	493	1,374	1,380	581	559
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	1	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0
Peak 5-min Results:								
Residual Queue Length (veh) [7]	6	7	7	7	18	18	8	7
Residual Queue Length (ft)	162	163	166	164	458	460	194	186
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project Alt Phase I (Max Storage)				
Description	**Silva Valley I/C**			
	WB On-Ramp		**EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:				
Forecasted Traffic Volumes (vph)	899	694	1,203	1,657
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	103	80	138	191
Adjusted Traffic Volumes (vph) [2]	796	614	1,065	1,466
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	943	728	1,261	1,737
Average Arrival Rate (pcps)	0.26	0.20	0.35	0.48
Peak 15-min Arrival Rate (pc)	236	182	315	434
Peak 5-min Arrival Rate (pc)	79	61	105	145
Assumptions/Given:				
Average Car Length (ft)	25	25	25	25
Approx. Storage Length (ft per lane) [4]	1,000	1,000	1,250	1,250
Number of On-Ramp Lanes	1	1	1	1
Approx Total Storage Capacity (ft)	1,000	1,000	1,250	1,250
Discharge Rate:				
Maximum Capacity or Discharge Rate (pcph) [5]	785	570	1,065	1,065
Average Discharge Rate (pcps)	0.22	0.16	0.30	0.30
Peak 15-min Discharge Rate (pc)	196	143	266	266
Peak 5-min Discharge Rate (pc)	65	48	89	89
Resultant Ramp Flow Rate without HOV (vph) [6]	663	481	899	899
Resultant Ramp Flow Rate with HOV (vph)	766	561	1037	1089
Peak 15-min Results:				
Residual Queue Length (veh) [7]	39	39	49	168
Residual Queue Length (ft)	985	986	1,227	4,203
Resultant Queue Spillback (ft) [8]	0	0	0	**2,953**
Resultant Queue Spillback (veh)	0	0	0	**118**
Peak 5-min Results:				
Residual Queue Length (veh) [7]	13	13	16	56
Residual Queue Length (ft)	328	329	409	1,401
Resultant Queue Spillback (ft) [8]	0	0	0	**151**
Resultant Queue Spillback (veh)	0	0	0	**6**

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project Alt Phase I (Max Storage)		
Description	**Silva Valley I/C**	
	EB On-Ramp	
	AM Peak	**PM Peak**
Arrival Rate:		
Forecasted Traffic Volumes (vph)	1,203	1,657
Percentage of HOV Vehicles [1]	11.5%	11.5%
HOV Vehicles	138	191
Adjusted Traffic Volumes (vph) [2]	1,065	1,466
Peak Hour Factor (PHF)	0.92	0.92
Proportion of Heavy Vehicle	6%	6%
Proportion of RVs	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92
Flow Rate (pcph) [3]	1,261	1,737
Average Arrival Rate (pcps)	0.35	0.48
Peak 15-min Arrival Rate (pc)	315	434
Peak 5-min Arrival Rate (pc)	105	145
Assumptions/Given:		
Average Car Length (ft)	25	25
Approx. Storage Length (ft per lane) [4]	850	850
Number of On-Ramp Lanes	2	2
Approx Total Storage Capacity (ft)	1,700	1,700
Discharge Rate:		
Maximum Capacity or Discharge Rate (pcph) [5]	1,005	1,465
Average Discharge Rate (pcps)	0.28	0.41
Peak 15-min Discharge Rate (pc)	251	366
Peak 5-min Discharge Rate (pc)	84	122
Resultant Ramp Flow Rate without HOV (vph) [6]	848	1,237
Resultant Ramp Flow Rate with HOV (vph)	987	1427
Peak 15-min Results:		
Residual Queue Length (veh) [7]	64	68
Residual Queue Length (ft)	1,602	1,703
Resultant Queue Spillback (ft) [8]	0	3
Resultant Queue Spillback (veh)	0	0
Peak 5-min Results:		
Residual Queue Length (veh) [7]	21	23
Residual Queue Length (ft)	534	568
Resultant Queue Spillback (ft) [8]	0	0
Resultant Queue Spillback (veh)	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project Alt Phase II (Max Storage)								
Description	**Silva Valley I/C**							
	NB to WB On-Ramp		**SB to WB On-Ramp**		**NB to EB On-Ramp**		**SB to EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:								
Forecasted Traffic Volumes (vph)	361	337	538	357	594	774	609	883
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	42	39	62	41	68	89	70	102
Adjusted Traffic Volumes (vph) [2]	319	298	476	316	526	685	539	781
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	379	353	564	374	623	812	639	926
Average Arrival Rate (pcps)	0.11	0.10	0.16	0.10	0.17	0.23	0.18	0.26
Peak 15-min Arrival Rate (pc)	95	88	141	94	156	203	160	231
Peak 5-min Arrival Rate (pc)	32	29	47	31	52	68	53	77
Assumptions/Given:								
Average Car Length (ft)	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	1,250	1,250	1,000	1,000	900	900	1,250	1,250
Number of On-Ramp Lanes	1	1	1	1	2	2	1	1
Approx Total Storage Capacity (ft)	1,250	1,250	1,000	1,000	1,800	1,800	1,250	1,250
Discharge Rate:								
Maximum Capacity or Discharge Rate (pcph) [5]	285	285	405	285	335	525	560	850
Average Discharge Rate (pcps)	0.08	0.08	0.11	0.08	0.09	0.15	0.16	0.24
Peak 15-min Discharge Rate (pc)	71	71	101	71	84	131	140	213
Peak 5-min Discharge Rate (pc)	24	24	34	24	28	44	47	71
Resultant Ramp Flow Rate without HOV (vph) [6]	241	241	342	241	283	443	473	717
Resultant Ramp Flow Rate with HOV (vph)	282	279	404	282	351	532	543	819
Peak 15-min Results:								
Residual Queue Length (veh) [7]	23	17	40	22	72	72	20	19
Residual Queue Length (ft)	585	427	994	558	1,799	1,791	491	474
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0
Peak 5-min Results:								
Residual Queue Length (veh) [7]	8	6	13	7	24	24	7	6
Residual Queue Length (ft)	195	142	331	186	600	597	164	158
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2030 Plus Project Alt Phase I (Max Storage)				
Description	**Silva Valley I/C**			
	WB On-Ramp		**EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:				
Forecasted Traffic Volumes (vph)	1,309	1,008	1,562	1,922
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	151	116	180	221
Adjusted Traffic Volumes (vph) [2]	1,158	892	1,382	1,701
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	1,373	1,057	1,638	2,015
Average Arrival Rate (pcps)	0.38	0.29	0.45	0.56
Peak 15-min Arrival Rate (pc)	343	264	409	504
Peak 5-min Arrival Rate (pc)	114	88	136	168
Assumptions/Given:				
Average Car Length (ft)	25	25	25	25
Approx. Storage Length (ft per lane) [4]	1,000	1,000	1,250	1,250
Number of On-Ramp Lanes	1	1	1	1
Approx Total Storage Capacity (ft)	1,000	1,000	1,250	1,250
Discharge Rate:				
Maximum Capacity or Discharge Rate (pcph) [5]	1,065	900	1,065	1,065
Average Discharge Rate (pcps)	0.30	0.25	0.30	0.30
Peak 15-min Discharge Rate (pc)	266	225	266	266
Peak 5-min Discharge Rate (pc)	89	75	89	89
Resultant Ramp Flow Rate without HOV (vph) [6]	899	760	899	899
Resultant Ramp Flow Rate with HOV (vph)	1049	876	1079	1120
Peak 15-min Results:				
Residual Queue Length (veh) [7]	77	39	143	238
Residual Queue Length (ft)	1,922	981	3,580	5,939
Resultant Queue Spillback (ft) [8]	**922**	0	**2,330**	**4,689**
Resultant Queue Spillback (veh)	**37**	0	**93**	**188**
Peak 5-min Results:				
Residual Queue Length (veh) [7]	26	13	48	79
Residual Queue Length (ft)	641	327	1,193	1,980
Resultant Queue Spillback (ft) [8]	0	0	0	**730**
Resultant Queue Spillback (veh)	0	0	0	**29**

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2030 Plus Project Alt Phase I (Max Storage)		
Description	**Silva Valley I/C EB On-Ramp**	
	AM Peak	**PM Peak**
Arrival Rate:		
Forecasted Traffic Volumes (vph)	1,562	1,922
Percentage of HOV Vehicles [1]	11.5%	11.5%
HOV Vehicles	180	221
Adjusted Traffic Volumes (vph) [2]	1,382	1,701
Peak Hour Factor (PHF)	0.92	0.92
Proportion of Heavy Vehicle	6%	6%
Proportion of RVs	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92
Flow Rate (pcph) [3]	1,638	2,015
Average Arrival Rate (pcps)	0.45	0.56
Peak 15-min Arrival Rate (pc)	409	504
Peak 5-min Arrival Rate (pc)	136	168
Assumptions/Given:		
Average Car Length (ft)	25	25
Approx. Storage Length (ft per lane) [4]	850	850
Number of On-Ramp Lanes	2	2
Approx Total Storage Capacity (ft)	1,700	1,700
Discharge Rate:		
Maximum Capacity or Discharge Rate (pcph) [5]	1,370	1,745
Average Discharge Rate (pcps)	0.38	0.48
Peak 15-min Discharge Rate (pc)	343	436
Peak 5-min Discharge Rate (pc)	114	145
Resultant Ramp Flow Rate without HOV (vph) [6]	1,156	1,473
Resultant Ramp Flow Rate with HOV (vph)	1336	1694
Peak 15-min Results:		
Residual Queue Length (veh) [7]	67	68
Residual Queue Length (ft)	1,674	1,689
Resultant Queue Spillback (ft) [8]	0	0
Resultant Queue Spillback (veh)	0	0
Peak 5-min Results:		
Residual Queue Length (veh) [7]	22	23
Residual Queue Length (ft)	558	563
Resultant Queue Spillback (ft) [8]	0	0
Resultant Queue Spillback (veh)	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2030 Plus Project Alt Phase II (Max Storage)								
Description	**Silva Valley I/C**							
	NB to WB On-Ramp		**SB to WB On-Ramp**		**NB to EB On-Ramp**		**SB to EB On-Ramp**	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Arrival Rate:								
Forecasted Traffic Volumes (vph)	570	599	739	409	987	1,274	575	648
Percentage of HOV Vehicles [1]	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
HOV Vehicles	66	69	85	47	114	147	66	75
Adjusted Traffic Volumes (vph) [2]	504	530	654	362	873	1,127	509	573
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	598	628	775	429	1,035	1,336	603	679
Average Arrival Rate (pcps)	0.17	0.17	0.22	0.12	0.29	0.37	0.17	0.19
Peak 15-min Arrival Rate (pc)	149	157	194	107	259	334	151	170
Peak 5-min Arrival Rate (pc)	50	52	65	36	86	111	50	57
Assumptions/Given:								
Average Car Length (ft)	25	25	25	25	25	25	25	25
Approx. Storage Length (ft per lane) [4]	1,250	1,250	1,000	1,000	900	900	1,250	1,250
Number of On-Ramp Lanes	1	1	1	1	2	2	1	1
Approx Total Storage Capacity (ft)	1,250	1,250	1,000	1,000	1,800	1,800	1,250	1,250
Discharge Rate:								
Maximum Capacity or Discharge Rate (pcph) [5]	400	430	615	285	750	1,050	405	480
Average Discharge Rate (pcps)	0.11	0.12	0.17	0.08	0.21	0.29	0.11	0.13
Peak 15-min Discharge Rate (pc)	100	108	154	71	188	263	101	120
Peak 5-min Discharge Rate (pc)	33	36	51	24	63	88	34	40
Resultant Ramp Flow Rate without HOV (vph) [6]	338	363	519	241	633	886	342	405
Resultant Ramp Flow Rate with HOV (vph)	403	432	604	288	747	1,033	408	480
Peak 15-min Results:								
Residual Queue Length (veh) [7]	49	50	40	36	71	71	49	50
Residual Queue Length (ft)	1,235	1,238	999	899	1,781	1,786	1,237	1,247
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0
Peak 5-min Results:								
Residual Queue Length (veh) [7]	16	17	13	12	24	24	16	17
Residual Queue Length (ft)	412	413	333	300	594	595	412	416
Resultant Queue Spillback (ft) [8]	0	0	0	0	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgement

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphpl

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project Alt Phase I (Min Storage)

Description	Silva Valley I/C			
	WB On-Ramp		EB On-Ramp	
	AM Peak	PM Peak	AM Peak	PM Peak
Arrival Rate:				
Forecasted Traffic Volumes (vph)	899	694	1,203	1,657
Percentage of HOV Vehicles [1]	11.5%	11.5%	0.0%	0.0%
HOV Vehicles	103	80	0	0
Adjusted Traffic Volumes (vph) [2]	796	614	1,203	1,657
Peak Hour Factor (PHF)	0.92	0.92	0.92	0.92
Proportion of Heavy Vehicle	6%	6%	6%	6%
Proportion of RVs	0%	0%	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92	0.92	0.92
Flow Rate (pcph) [3]	943	728	1,425	1,963
Average Arrival Rate (pcps)	0.26	0.20	0.40	0.55
Peak 15-min Arrival Rate (pc)	236	182	356	491
Peak 5-min Arrival Rate (pc)	79	61	119	164
Assumptions/Given:				
Average Car Length (ft)	25	25	25	25
Approx. Storage Length (ft per lane) [4]	500	500	580	580
Number of On-Ramp Lanes	1	1	2	2
Approx Total Storage Capacity (ft)	500	500	1,160	1,160
Discharge Rate:				
Maximum Capacity or Discharge Rate (pcph) [5]	865	650	1,240	1,780
Average Discharge Rate (pcps)	0.24	0.18	0.34	0.49
Peak 15-min Discharge Rate (pc)	216	163	310	445
Peak 5-min Discharge Rate (pc)	72	54	103	148
Resultant Ramp Flow Rate without HOV (vph) [6]	730	549	1,047	1,502
Resultant Ramp Flow Rate with HOV (vph)	833	628	1,047	1,502
Peak 15-min Results:				
Residual Queue Length (veh) [7]	19	19	46	46
Residual Queue Length (ft)	485	486	1,158	1,145
Resultant Queue Spillback (ft) [8]	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0
Peak 5-min Results:				
Residual Queue Length (veh) [7]	6	6	15	15
Residual Queue Length (ft)	162	162	386	382
Resultant Queue Spillback (ft) [8]	0	0	0	0
Resultant Queue Spillback (veh)	0	0	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgemen

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphp

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

Ramp Metering / Queue Spill-back Analysis - 2020 Plus Project Alt Phase I (Max Storage)

Description	Silva Valley I/C EB On-Ramp	
	AM Peak	PM Peak
Arrival Rate:		
Forecasted Traffic Volumes (vph)	1,203	1,657
Percentage of HOV Vehicles [1]	0.0%	0.0%
HOV Vehicles	0	0
Adjusted Traffic Volumes (vph) [2]	1,203	1,657
Peak Hour Factor (PHF)	0.92	0.92
Proportion of Heavy Vehicle	6%	6%
Proportion of RVs	0%	0%
Factor for Heavy Vehicle and RVs	0.92	0.92
Flow Rate (pcph) [3]	1,425	1,963
Average Arrival Rate (pcps)	0.40	0.55
Peak 15-min Arrival Rate (pc)	356	491
Peak 5-min Arrival Rate (pc)	119	164
Assumptions/Given:		
Average Car Length (ft)	25	25
Approx. Storage Length (ft per lane) [4]	850	850
Number of On-Ramp Lanes	2	2
Approx Total Storage Capacity (ft)	1,700	1,700
Discharge Rate:		
Maximum Capacity or Discharge Rate (pcph) [5]	1,155	1,695
Average Discharge Rate (pcps)	0.32	0.47
Peak 15-min Discharge Rate (pc)	289	424
Peak 5-min Discharge Rate (pc)	96	141
Resultant Ramp Flow Rate without HOV (vph) [6]	975	1,431
Resultant Ramp Flow Rate with HOV (vph)	975	1431
Peak 15-min Results:		
Residual Queue Length (veh) [7]	68	67
Residual Queue Length (ft)	1,689	1,676
Resultant Queue Spillback (ft) [8]	0	0
Resultant Queue Spillback (veh)	0	0
Peak 5-min Results:		
Residual Queue Length (veh) [7]	23	22
Residual Queue Length (ft)	563	559
Resultant Queue Spillback (ft) [8]	0	0
Resultant Queue Spillback (veh)	0	0

[1] - Forecasted volumes were reduced by 11.5% to account for an HOV bypass lane as assumed in PSR for Silva Valley and El Dorado Hills I/C

[2] - Forecasted traffic volumes were not reduced to exclude HOV-lane traffic

[3] - Computed as traffic volumes divided by a PHF and Factor for Heavy Vehicles

[4] - Based on Geometric Designs provided by Mark Thomas (Silva Valley I/C), Quincy (El Dorado Hills I/C) and engineering judgemen

[5] - Adjusted iteratively to avoid queue spillbacks

[6] - Based on Highway Design Manual (HDM), Sixth Edition. Min = 240 vphpl and Max = 900 vphp

[7] - Difference of corresponding arrival rate and departure rate

[8] - Queues in feet exceeding the available storage capacity

Shaded box with bold letter indicates spillbacks

vph = vehicles per hour, vps = vehicles per second, vphpl = vehicles per hour per lane, pcph = passenger cars per hour

APPENDIX G

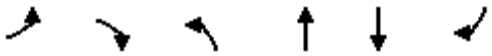
BASS LAKE RAMP COUNTS
APRIL 2010
El Dorado DOT

					AM (7-8)			PM (5-6)		
					3+ Axles	Total	% 3+ Axles	3+ Axles	Total	% 3+ Axles
Bass Lake	EB	Off	Day1	Mon				6	646	0.93%
			Day2	Tue	0	114	0.00%	3	583	0.51%
			Day3	Wed	4	131	3.05%	7	612	1.14%
			Day4	Thu	5	150	3.33%	5	592	0.84%
			Day5	Fri	7	165	4.24%			
				Avg Tue-Thu			2.13%			0.83%
Bass Lake	EB	On	Day1	Mon				0	99	0.00%
			Day2	Tue	1	126	0.79%	0	90	0.00%
			Day3	Wed	0	119	0.00%	0	98	0.00%
			Day4	Thu	2	125	1.60%	1	126	0.79%
			Day5	Fri	0	127	0.00%			
				Avg Tue-Thu			0.80%			0.26%
Bass Lake	WB	Off	Day1	Mon				1	96	1.04%
			Day2	Tue	1	98	1.02%	0	129	0.00%
			Day3	Wed	3	95	3.16%	1	114	0.88%
			Day4	Thu	0	92	0.00%	1	116	0.86%
			Day5	Fri	1	89	1.12%			
				Avg Tue-Thu			1.39%			0.58%
Bass Lake	WB	On	Day1	Mon				3	225	1.33%
			Day2	Tue	5	694	0.72%	1	230	0.43%
			Day3	Wed	1	715	0.14%	1	204	0.49%
			Day4	Thu	3	725	0.41%	2	263	0.76%
			Day5	Fri	4	652	0.61%			
				Avg Tue-Thu			0.42%			0.56%

APPENDIX H
ALTERNATIVE PHASING ANALYSIS

SYNCHRO LOS WORKSHEETS

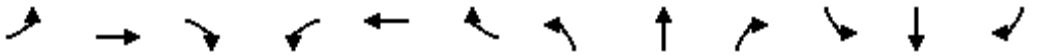
2020 AM/PM
PEAK HOUR
SYNCHRO LOS WORKSHEETS



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	398	115	594	600	1044	609
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	0.95	0.97	0.95	0.95	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)	1767	1447	3433	3406	3406	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1767	1447	3433	3406	3406	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	433	125	646	652	1135	662
RTOR Reduction (vph)	1	83	0	0	0	376
Lane Group Flow (vph)	445	29	646	652	1135	286
Heavy Vehicles (%)	2%	6%	2%	6%	6%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	19.1	19.1	15.9	47.9	28.0	28.0
Effective Green, g (s)	19.1	19.1	15.9	47.9	28.0	28.0
Actuated g/C Ratio	0.25	0.25	0.21	0.64	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	450	369	728	2175	1272	591
v/s Ratio Prot	c0.25		c0.19	0.19	c0.33	
v/s Ratio Perm		0.02				0.18
v/c Ratio	0.99	0.08	0.89	0.30	0.89	0.48
Uniform Delay, d1	27.8	21.3	28.7	6.1	22.1	18.0
Progression Factor	1.00	1.00	1.00	1.00	0.34	0.75
Incremental Delay, d2	38.8	0.1	12.6	0.4	2.7	0.2
Delay (s)	66.7	21.3	41.3	6.4	10.3	13.7
Level of Service	E	C	D	A	B	B
Approach Delay (s)	57.6			23.8	11.5	
Approach LOS	E			C	B	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

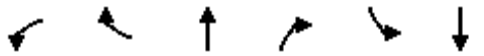
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	546	0	553	361	637	0	0	1107	538
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
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.92	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1494	1504	1770	3539			3539	1583
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1494	1504	1770	3539			3539	1583
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)	0	0	0	593	0	601	392	692	0	0	1203	585
RTOR Reduction (vph)	0	0	0	0	60	190	0	0	0	0	0	382
Lane Group Flow (vph)	0	0	0	415	340	189	392	692	0	0	1203	203
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				20.0	20.0	20.0	17.0	47.0			26.0	26.0
Effective Green, g (s)				20.0	20.0	20.0	17.0	47.0			26.0	26.0
Actuated g/C Ratio				0.27	0.27	0.27	0.23	0.63			0.35	0.35
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				431	398	401	401	2218			1227	549
v/s Ratio Prot				c0.26	0.23		c0.22	0.20			c0.34	
v/s Ratio Perm						0.13						0.13
v/c Ratio				0.96	0.85	0.47	0.98	0.31			0.98	0.37
Uniform Delay, d1				27.1	26.1	23.1	28.8	6.5			24.2	18.4
Progression Factor				1.00	1.00	1.00	0.68	0.58			0.93	1.49
Incremental Delay, d2				33.6	16.1	0.9	34.7	0.3			18.7	1.5
Delay (s)				60.8	42.2	23.9	54.3	4.1			41.2	28.8
Level of Service				E	D	C	D	A			D	C
Approach Delay (s)		0.0			42.9			22.2			37.2	
Approach LOS		A			D			C			D	

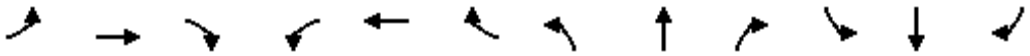
Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	170	164	1022	168	1	1475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3464		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3464		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	178	1111	183	1	1603
RTOR Reduction (vph)	0	138	14	0	0	0
Lane Group Flow (vph)	185	40	1280	0	1	1603
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	12.8	12.8	49.4		0.8	54.2
Effective Green, g (s)	12.8	12.8	49.4		0.8	54.2
Actuated g/C Ratio	0.17	0.17	0.66		0.01	0.72
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	302	270	2282		19	2558
v/s Ratio Prot	c0.10		0.37		0.00	c0.45
v/s Ratio Perm		0.03				
v/c Ratio	0.61	0.15	0.56		0.05	0.63
Uniform Delay, d1	28.8	26.5	6.9		36.7	5.3
Progression Factor	1.00	1.00	0.70		1.00	1.00
Incremental Delay, d2	3.7	0.3	0.9		1.2	1.2
Delay (s)	32.5	26.7	5.7		37.9	6.4
Level of Service	C	C	A		D	A
Approach Delay (s)	29.6		5.7			6.5
Approach LOS	C		A			A

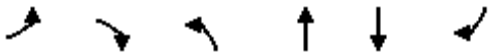
Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	2	2	0	2	6	1190	0	0	1156	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)	2	0	2	2	0	2	7	1293	0	0	1257	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			10			10						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											726	
pX, platoon unblocked	0.68	0.68	0.68	0.68	0.68		0.68					
vC, conflicting volume	1918	2565	630	1936	2566	647	1260			1293		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1415	2362	0	1441	2365	647	451			1293		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	100	97	100	99	99			100		
cM capacity (veh/h)	66	24	740	63	23	414	755			532		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	4	4	7	862	431	0	838	422
Volume Left	2	2	7	0	0	0	0	0
Volume Right	2	2	0	0	0	0	0	3
cSH	132	126	755	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.03	0.01	0.51	0.25	0.00	0.49	0.25
Queue Length 95th (ft)	3	3	1	0	0	0	0	0
Control Delay (s)	35.7	38.9	9.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	E	A					
Approach Delay (s)	35.7	38.9	0.0			0.0		
Approach LOS	E	E						

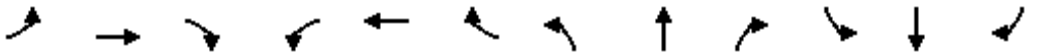
Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	49.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	502	192	774	957	1076	883
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	0.95	0.97	0.95	0.95	1.00
Frt	0.99	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)	1765	1447	3433	3406	3406	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1765	1447	3433	3406	3406	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	546	209	841	1040	1170	960
RTOR Reduction (vph)	1	135	0	0	0	388
Lane Group Flow (vph)	566	53	841	1040	1170	572
Heavy Vehicles (%)	2%	6%	2%	6%	6%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	27.0	27.0	22.0	60.0	34.0	34.0
Effective Green, g (s)	27.0	27.0	22.0	60.0	34.0	34.0
Actuated g/C Ratio	0.28	0.28	0.23	0.63	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	502	411	795	2151	1219	567
v/s Ratio Prot	c0.32		c0.24	0.31	0.34	
v/s Ratio Perm		0.04				c0.36
v/c Ratio	1.13	0.13	1.06	0.48	0.96	1.01
Uniform Delay, d1	34.0	25.3	36.5	9.3	29.8	30.5
Progression Factor	1.00	1.00	1.00	1.00	0.52	1.23
Incremental Delay, d2	79.8	0.1	48.3	0.8	6.0	21.0
Delay (s)	113.8	25.4	84.8	10.1	21.4	58.5
Level of Service	F	C	F	B	C	E
Approach Delay (s)	91.8			43.5	38.1	
Approach LOS	F			D	D	

Intersection Summary			
HCM Average Control Delay	48.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



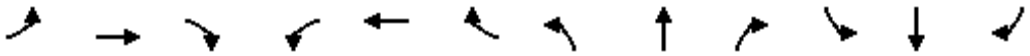
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	944	0	556	337	1122	0	0	1018	357
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.97	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1536	1504	1770	3539			3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1536	1504	1770	3539			3539	1583
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)	0	0	0	1026	0	604	366	1220	0	0	1107	388
RTOR Reduction (vph)	0	0	0	0	8	37	0	0	0	0	0	265
Lane Group Flow (vph)	0	0	0	564	551	470	366	1220	0	0	1107	123
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				34.0	34.0	34.0	19.0	53.0			30.0	30.0
Effective Green, g (s)				34.0	34.0	34.0	19.0	53.0			30.0	30.0
Actuated g/C Ratio				0.36	0.36	0.36	0.20	0.56			0.32	0.32
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				579	550	538	354	1974			1118	500
v/s Ratio Prot				0.35	c0.36		c0.21	0.34			c0.31	
v/s Ratio Perm						0.31						0.08
v/c Ratio				0.97	1.00	0.87	1.03	0.62			0.99	0.25
Uniform Delay, d1				30.1	30.5	28.5	38.0	14.2			32.4	24.1
Progression Factor				1.00	1.00	1.00	0.76	0.62			0.90	1.30
Incremental Delay, d2				30.7	39.0	14.5	48.9	1.0			22.8	1.0
Delay (s)				60.7	69.5	43.0	77.6	9.9			52.0	32.3
Level of Service				E	E	D	E	A			D	C
Approach Delay (s)		0.0			58.2			25.5			46.8	
Approach LOS		A			E			C			D	

Intersection Summary			
HCM Average Control Delay	43.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	33	214	1404	274	1	1342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3452		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3452		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	233	1526	298	1	1459
RTOR Reduction (vph)	0	94	13	0	0	0
Lane Group Flow (vph)	36	139	1811	0	1	1459
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	12.7	12.7	69.5		0.8	74.3
Effective Green, g (s)	12.7	12.7	69.5		0.8	74.3
Actuated g/C Ratio	0.13	0.13	0.73		0.01	0.78
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	237	212	2525		15	2768
v/s Ratio Prot	0.02		c0.52		0.00	c0.41
v/s Ratio Perm		c0.09				
v/c Ratio	0.15	0.65	0.72		0.07	0.53
Uniform Delay, d1	36.4	39.1	7.2		46.7	3.8
Progression Factor	1.00	1.00	0.85		1.00	1.00
Incremental Delay, d2	0.3	7.1	1.2		1.9	0.7
Delay (s)	36.7	46.1	7.4		48.6	4.6
Level of Service	D	D	A		D	A
Approach Delay (s)	44.9		7.4			4.6
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

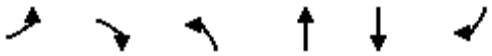


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	2	0	0	0	2	1729	0	0	1269	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	0	2	0	0	0	2	1879	0	0	1379	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			10			10						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											726	
pX, platoon unblocked	0.67	0.67	0.67	0.67	0.67		0.67					
vC, conflicting volume	2324	3264	691	2574	3265	940	1382			1879		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1993	3394	0	2365	3395	940	586			1879		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	100	100	100	100	100	100			100		
cM capacity (veh/h)	24	5	727	12	5	265	660			315		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	4	0	2	1253	626	0	920	462
Volume Left	2	0	2	0	0	0	0	0
Volume Right	2	0	0	0	0	0	0	2
cSH	48	1700	660	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.00	0.00	0.74	0.37	0.00	0.54	0.27
Queue Length 95th (ft)	7	0	0	0	0	0	0	0
Control Delay (s)	89.9	0.0	10.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	A	B					
Approach Delay (s)	89.9	0.0	0.0			0.0		
Approach LOS	F	A						

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			

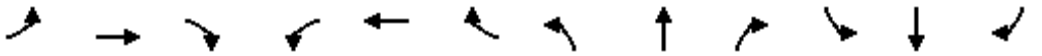
2030 AM/PM
PEAK HOUR
SYNCHRO LOS WORKSHEETS



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	543	180	987	950	1707	575
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	0.95	0.97	0.95	0.95	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)	1766	1447	3433	3406	3406	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1766	1447	3433	3406	3406	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	590	196	1073	1033	1855	625
RTOR Reduction (vph)	1	1	0	0	0	0
Lane Group Flow (vph)	609	175	1073	1033	1855	625
Heavy Vehicles (%)	2%	6%	2%	6%	6%	2%
Turn Type		pm+ov	Prot			Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	38.0	75.0	37.0	104.0	63.0	150.0
Effective Green, g (s)	38.0	75.0	37.0	104.0	63.0	150.0
Actuated g/C Ratio	0.25	0.50	0.25	0.69	0.42	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	447	762	847	2361	1431	1583
v/s Ratio Prot	c0.35	0.06	c0.31	0.30	c0.54	
v/s Ratio Perm		0.06				0.39
v/c Ratio	1.36	0.23	1.27	0.44	1.30	0.39
Uniform Delay, d1	56.0	21.2	56.5	10.1	43.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	0.37	1.00
Incremental Delay, d2	177.3	0.2	129.4	0.6	133.8	0.1
Delay (s)	233.3	21.3	185.9	10.7	149.8	0.1
Level of Service	F	C	F	B	F	A
Approach Delay (s)	185.8			100.0	112.1	
Approach LOS	F			F	F	

Intersection Summary			
HCM Average Control Delay	118.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	119.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



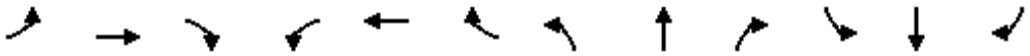
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	856	0	553	570	923	0	0	1426	739
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.97	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1530	1504	1770	3539			3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1530	1504	1770	3539			3539	1583
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)	0	0	0	930	0	601	620	1003	0	0	1550	803
RTOR Reduction (vph)	0	0	0	0	7	112	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	530	513	369	620	1003	0	0	1550	803
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Perm	Prot					Free
Protected Phases				8	8		5	2			6	
Permitted Phases						8						Free
Actuated Green, G (s)				41.0	41.0	41.0	42.0	101.0			55.0	150.0
Effective Green, g (s)				41.0	41.0	41.0	42.0	101.0			55.0	150.0
Actuated g/C Ratio				0.27	0.27	0.27	0.28	0.67			0.37	1.00
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				442	418	411	496	2383			1298	1583
v/s Ratio Prot				0.33	c0.34		c0.35	0.28			c0.44	
v/s Ratio Perm						0.25						0.51
v/c Ratio				1.20	1.23	0.90	1.25	0.42			1.19	0.51
Uniform Delay, d1				54.5	54.5	52.5	54.0	11.2			47.5	0.0
Progression Factor				1.00	1.00	1.00	0.98	0.64			0.95	1.00
Incremental Delay, d2				109.6	121.5	21.6	122.7	0.3			92.2	0.7
Delay (s)				164.1	176.0	74.1	175.8	7.5			137.2	0.7
Level of Service				F	F	E	F	A			F	A
Approach Delay (s)		0.0			139.9			71.8			90.6	
Approach LOS		A			F			E			F	

Intersection Summary			
HCM Average Control Delay	98.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	110.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	340	328	1141	335	1	1825
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3419		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3419		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	357	1240	364	1	1984
RTOR Reduction (vph)	0	87	15	0	0	0
Lane Group Flow (vph)	370	270	1589	0	1	1984
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	36.0	36.0	101.2		0.8	106.0
Effective Green, g (s)	36.0	36.0	101.2		0.8	106.0
Actuated g/C Ratio	0.24	0.24	0.67		0.01	0.71
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	425	380	2307		9	2501
v/s Ratio Prot	c0.21		0.46		0.00	c0.56
v/s Ratio Perm		0.17				
v/c Ratio	0.87	0.71	0.69		0.11	0.79
Uniform Delay, d1	54.8	52.2	14.8		74.2	14.7
Progression Factor	1.00	1.00	0.62		1.00	1.00
Incremental Delay, d2	17.4	6.2	1.3		5.4	2.7
Delay (s)	72.1	58.4	10.5		79.7	17.4
Level of Service	E	E	B		E	B
Approach Delay (s)	65.4		10.5			17.4
Approach LOS	E		B			B

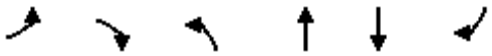
Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	2	2	0	2	8	1933	0	0	1883	4
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)	2	0	2	2	0	2	9	2101	0	0	2047	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			10			10						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											726	
pX, platoon unblocked	0.59	0.59	0.59	0.59	0.59		0.59					
vC, conflicting volume	3117	4167	1026	3143	4170	1051	2051			2101		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3198	4979	0	3242	4983	1051	1391			2101		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	8	100	100	0	100	99	97			100		
cM capacity (veh/h)	2	0	639	2	0	223	288			258		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	4	4	9	1401	700	0	1364	687
Volume Left	2	2	9	0	0	0	0	0
Volume Right	2	2	0	0	0	0	0	4
cSH	5	4	288	1700	1700	1700	1700	1700
Volume to Capacity	0.92	1.00	0.03	0.82	0.41	0.00	0.80	0.40
Queue Length 95th (ft)	31	32	2	0	0	0	0	0
Control Delay (s)	1163.2	1266.4	17.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	C					
Approach Delay (s)	1163.2	1266.4	0.1			0.0		
Approach LOS	F	F						

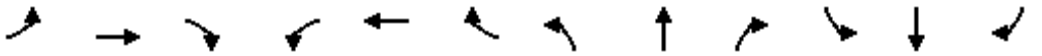
Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	70.1%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	653	209	1274	1513	1750	648
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	0.95	0.97	0.95	0.95	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)	1766	1447	3433	3406	3406	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1766	1447	3433	3406	3406	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	710	227	1385	1645	1902	704
RTOR Reduction (vph)	1	149	0	0	0	199
Lane Group Flow (vph)	732	55	1385	1645	1902	505
Heavy Vehicles (%)	2%	6%	2%	6%	6%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	38.0	38.0	37.0	94.0	53.0	53.0
Effective Green, g (s)	38.0	38.0	37.0	94.0	53.0	53.0
Actuated g/C Ratio	0.27	0.27	0.26	0.67	0.38	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	479	393	907	2287	1289	599
v/s Ratio Prot	c0.41		c0.40	0.48	c0.56	
v/s Ratio Perm		0.04				0.32
v/c Ratio	1.53	0.14	1.53	0.72	1.48	0.84
Uniform Delay, d1	51.0	38.6	51.5	14.6	43.5	39.7
Progression Factor	1.00	1.00	1.00	1.00	0.57	0.48
Incremental Delay, d2	248.3	0.2	242.8	2.0	214.4	1.1
Delay (s)	299.3	38.8	294.3	16.6	239.2	20.1
Level of Service	F	D	F	B	F	C
Approach Delay (s)	242.6			143.5	180.0	
Approach LOS	F			F	F	

Intersection Summary			
HCM Average Control Delay	172.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.51		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	135.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



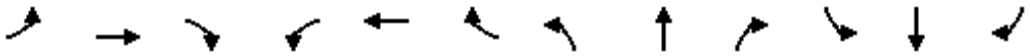
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1051	0	600	599	1567	0	0	1347	409
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.95	0.91	0.95	1.00	0.95			0.95	1.00
Frt				1.00	0.98	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1618	1538	1504	1770	3539			3539	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1618	1538	1504	1770	3539			3539	1583
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)	0	0	0	1142	0	652	651	1703	0	0	1464	445
RTOR Reduction (vph)	0	0	0	0	4	20	0	0	0	0	0	163
Lane Group Flow (vph)	0	0	0	617	612	541	651	1703	0	0	1464	282
Heavy Vehicles (%)	2%	2%	2%	6%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				43.0	43.0	43.0	37.0	89.0			48.0	48.0
Effective Green, g (s)				43.0	43.0	43.0	37.0	89.0			48.0	48.0
Actuated g/C Ratio				0.31	0.31	0.31	0.26	0.64			0.34	0.34
Clearance Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				497	472	462	468	2250			1213	543
v/s Ratio Prot				0.38	c0.40		c0.37	0.48			c0.41	
v/s Ratio Perm						0.36						0.18
v/c Ratio				1.24	1.30	1.17	1.39	0.76			1.21	0.52
Uniform Delay, d1				48.5	48.5	48.5	51.5	17.9			46.0	36.8
Progression Factor				1.00	1.00	1.00	0.88	0.66			0.75	0.41
Incremental Delay, d2				124.9	148.3	97.8	180.0	0.7			98.7	2.4
Delay (s)				173.4	196.8	146.3	225.4	12.5			133.4	17.6
Level of Service				F	F	F	F	B			F	B
Approach Delay (s)		0.0			173.0			71.4			106.4	
Approach LOS		A			F			E			F	

Intersection Summary			
HCM Average Control Delay	112.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	65	426	1621	546	0	1691
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Frt	1.00	0.85	0.96			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3406			3539
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	1770	1583	3406			3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	463	1762	593	0	1838
RTOR Reduction (vph)	0	56	20	0	0	0
Lane Group Flow (vph)	71	407	2335	0	0	1838
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	33.0	33.0	99.0			99.0
Effective Green, g (s)	33.0	33.0	99.0			99.0
Actuated g/C Ratio	0.24	0.24	0.71			0.71
Clearance Time (s)	4.0	4.0	4.0			4.0
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	417	373	2409			2503
v/s Ratio Prot	0.04		c0.69			0.52
v/s Ratio Perm		c0.26				
v/c Ratio	0.17	1.09	0.97			0.73
Uniform Delay, d1	42.6	53.5	19.1			12.5
Progression Factor	1.00	1.00	0.55			1.00
Incremental Delay, d2	0.2	73.5	7.1			2.0
Delay (s)	42.8	127.0	17.7			14.4
Level of Service	D	F	B			B
Approach Delay (s)	115.8		17.7			14.4
Approach LOS	F		B			B

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	0	2	0	0	0	2	2785	0	0	1957	2
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)	2	0	2	0	0	0	2	3027	0	0	2127	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)			10			10						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											726	
pX, platoon unblocked	0.63	0.63	0.63	0.63	0.63		0.63					
vC, conflicting volume	3646	5160	1065	4096	5161	1514	2129			3027		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4023	6418	0	4735	6420	1514	1622			3027		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	100	100	100	99			100		
cM capacity (veh/h)	1	0	685	0	0	109	251			110		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	4	0	2	2018	1009	0	1418	711
Volume Left	2	0	2	0	0	0	0	0
Volume Right	2	0	0	0	0	0	0	2
cSH	1	1700	251	1700	1700	1700	1700	1700
Volume to Capacity	3.85	0.00	0.01	1.19	0.59	0.00	0.83	0.42
Queue Length 95th (ft)	Err	0	1	0	0	0	0	0
Control Delay (s)	Err	0.0	19.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	A	C					
Approach Delay (s)	Err	0.0	0.0			0.0		
Approach LOS	F	A						

Intersection Summary				
Average Delay	8.4			
Intersection Capacity Utilization	87.0%	ICU Level of Service	E	
Analysis Period (min)	15			