

June 24, 2019

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### Reference: Traffic Analysis for Hesperian Boulevard/A Street Intersection

Dear Liliana,

This brief technical memorandum summarizes the traffic analysis conducted by Advanced Mobility Group (AMG) per the City's request to evaluate the following options at the intersection of Hesperian Boulevard/A Street.

The traffic analysis was conducted for the weekday a.m. (7:00 a.m. – 9:00 a.m.) and p.m. (4:00 p.m. – 6:00 p.m.) peak periods utilizing intersection turning movement counts provided by the City (collected in June 2019). Additionally, traffic signal timings for this intersection were obtained from KITS/Kadence adaptive signal software since the intersection operates under adaptive control. Three options were evaluated as a part of the study for existing conditions scenario:

1. Existing Conditions (2019)
2. Eliminate one westbound (WB) through lane on A Street
3. Eliminate one westbound left-turn lane on A Street



**Figure 1: Study Intersection**

Additionally, proposed conditions options 2 and 3 include new bike lanes along Hesperian Boulevard in both the northbound and southbound directions and relocation of existing bus stop on westbound A Street to the northeast corner of the intersection on Hesperian Boulevard, per the City's request.

AMG developed Synchro models under existing conditions for the three options to evaluate level of service (LOS), delay and 95<sup>th</sup> percentile queue lengths at the intersection. **Tables 1, 2 and 3** summarize the results of the analysis. **Appendix A** contains the traffic counts utilized for this study and **Appendix B** contains the Synchro LOS, delay and 95<sup>th</sup> percentile queue length reports.

The results of the existing conditions analysis show a substantial increase in delay and 95<sup>th</sup> percentile queue lengths during the weekday a.m. peak period for Option 3 – Eliminate one westbound left-turn lane. The p.m. peak period experiences a slight increase in delay for options 2 and 3, however, the

queue lengths for both options are more than doubled. There is a slight increase in the northbound through movement queues under options 2 and 3 because of the relocation of the bus stop. However, this increase is not expected to significantly impact traffic operations for the northbound through movement. **Based on the results of the analysis conducted, Option 2 – Eliminate one westbound through lane is the more feasible alternative.**

**Table 1: Intersection LOS and Delay Comparison**

Intersection	Peak Period	Options	Delay (sec)	LOS
Hesperian Boulevard/A Street	AM	Option 1-Existing conditions	40.8	D
		Option 2-Eliminate one through WB lane	41.0	D
		Option 3-Eliminate one left-turn WB lane	<b>66.1</b>	<b>E</b>
	PM	Option 1-Existing conditions	39.2	D
		Option 2-Eliminate one through WB lane	40.8	D
		Option 3-Eliminate one left-turn WB lane	45.8	D

Note: Highway Capacity Manual (HCM), 2010 Edition LOS Methodology was utilized for analysis.

**Table 2: 95th Percentile Queue Length (ft) Comparison**

Intersection	Peak Period	Options	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBTR	SBL	SBTR
Hesperian Boulevard/A Street	AM	Option 1- Existing conditions	30	53	0	378	99	60	177	182	172	475
		Option 2- Eliminate one through WB lane	30	54	0	378	<b>207</b>	60	179	186	170	472
		Option 3- Eliminate one left-turn WB lane	30	54	0	<b>945</b>	81	49	238	228	172	598
	PM	Option 1- Existing conditions	69	114	0	209	116	108	256	643	215	237
		Option 2- Eliminate one through WB lane	69	115	0	207	<b>243</b>	121	255	652	230	243
		Option 3- Eliminate one left-turn WB lane	69	131	0	<b>473</b>	115	124	255	663	244	251

Note: 95<sup>th</sup> Percentile Queue Length is obtained from Synchro Queues Report.

EBL=Eastbound left-turn; EBT=Eastbound through; EBR=Eastbound right-turn; WBL=Westbound left-turn; WBT=Westbound through; WBR=Westbound right-turn; NBL=Northbound left-turn; NBTR=Northbound shared through and right-turn; SBL=Southbound left-turn; SBTR=Southbound shared through and right-turn.

**Table 3: Synchro Intersection Bicycle LOS and Delay Comparison**

Intersection	Peak Period	Options	Bicycle LOS & Score	EB	WB	NB	SB
Hesperian Boulevard/A Street	AM	Option 1-Existing conditions	Score	1.80	4.08	3.20	4.09
			LOS	A	D	C	D
		Option 2- Eliminate one through WB lane	Score	1.74	5.05	2.23	3.02
			LOS	A	F	B	C
		Option 3- Eliminate one left-turn WB lane	Score	1.72	4.01	2.26	3.24
			LOS	A	D	B	C
	PM	Option 1-Existing conditions	Score	1.95	3.82	3.80	3.71
			LOS	A	D	D	D
		Option 2- Eliminate one through WB lane	Score	1.90	4.54	2.82	2.64
			LOS	A	E	C	B
		Option 3- Eliminate one left-turn WB lane	Score	1.90	3.83	2.85	2.64
			LOS	A	D	C	B

Note: Highway Capacity Manual (HCM), 2010 Edition LOS Methodology was utilized for analysis.

**Collision Analysis**

There were a total of eight collisions within 250 feet of the intersection of Hesperian Boulevard/A Street between January 2016 and April 2019 as provided in **Table 4** below and in **Appendix C**. There were no reported collisions in 2019.

2016	2017	2018
Vehicle/Pedestrian with Pedestrian at Fault	Motorcycle/Scooter, Hit Object with Fatal Injury, Unsafe Speed	Rear End - DUI
Rear End - Unsafe Speed	-	Vehicle/Pedestrian
Broadside - DUI	-	Hit Object - DUI
Broadside - Unsafe Speed	-	-
<b>Total - 4</b>	<b>Total - 1</b>	<b>Total - 3</b>



## Appendix A – Traffic Counts

### Intersection Turning Movement Counts (Average)

#### Traffic Volumes - 6/4/19 - 6/6/19

Peak Hour	DOW	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU
AM	Tuesday	65	481	208	73	255	1261	17	9	25	68	29	0	575	169	202	0
	Wednesday	50	501	203	86	257	1453	15	8	30	63	13	0	703	184	193	0
	Thursday	59	467	224	45	260	1337	25	7	33	58	14	0	685	178	183	0
	<b>Average</b>	<b>58</b>	<b>483</b>	<b>212</b>	<b>68</b>	<b>257</b>	<b>1350</b>	<b>19</b>	<b>8</b>	<b>29</b>	<b>63</b>	<b>19</b>	<b>0</b>	<b>654</b>	<b>177</b>	<b>193</b>	<b>0</b>
PM	Tuesday	120	1484	293	44	277	690	9	12	81	160	34	0	312	174	294	0
	Wednesday	130	1405	342	66	287	632	8	13	62	133	50	0	267	180	239	0
	Thursday	142	1510	294	38	340	978	13	15	95	179	44	0	340	194	242	0
	<b>Average</b>	<b>131</b>	<b>1466</b>	<b>310</b>	<b>49</b>	<b>301</b>	<b>767</b>	<b>10</b>	<b>13</b>	<b>79</b>	<b>157</b>	<b>43</b>	<b>0</b>	<b>306</b>	<b>183</b>	<b>258</b>	<b>0</b>

#### Peak Hour Factors - 6/4/19 - 6/6/19

Peak Hour	DOW	NORTHBOUND		SOUTHBOUND		EASTBOUND		WESTBOUND	
AM	Tuesday	0.81		0.86		0.68		0.93	
	Wednesday	0.81		0.89		0.80		0.87	
	Thursday	0.70		0.86		0.88		0.89	
	<b>Average</b>	<b>0.77</b>		<b>0.87</b>		<b>0.79</b>		<b>0.90</b>	
PM	Tuesday	0.92		0.92		0.79		0.90	
	Wednesday	0.92		0.95		0.84		0.89	
	Thursday	0.91		0.89		0.91		0.91	
	<b>Average</b>	<b>0.91</b>		<b>0.92</b>		<b>0.85</b>		<b>0.90</b>	

Note: Average of the three day intersection turning movement counts as summarized above was utilized for the study and Wednesday, June 5, 2019 Pedestrian and Bicycle Counts which were the highest were used.

# National Data & Surveying Services

## Intersection Turning Movement Count

Location: Hesperian Blvd & W A St  
 City: Hayward  
 Control: Signalized

Project ID: 19-08330-001  
 Date: 6/5/2019

### Bikes

NS/EW Streets:	Hesperian Blvd				Hesperian Blvd				W A St				W A St				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	1	3	0	0	2	3	0	0	2	2	1	0	2	2	1	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	2	0	0	1	1	0	0	0	0	0	0	0	1	0	0	5
7:30 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
8:00 AM	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	3
8:15 AM	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	0	0	0	0	2	0	0	1	0	0	0	0	1	0	0	4
8:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s :</b>	0	4	0	0	1	7	1	0	1	0	1	0	1	3	2	0	21
	0.00%	100.00%	0.00%	0.00%	11.11%	77.78%	11.11%	0.00%	50.00%	0.00%	50.00%	0.00%	16.67%	50.00%	33.33%	0.00%	
<b>PEAK HR :</b>	<b>07:45 AM - 08:45 AM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	0	0	0	0	4	1	0	1	0	1	0	1	2	1	0	11
<b>PEAK HR FACTOR :</b>	0.000	0.000	0.000	0.000	0.000	0.500	0.250	0.000	0.250	0.000	0.250	0.000	0.250	0.500	0.250	0.000	0.688
					0.625				0.500								
PM	1	3	0	0	2	3	0	0	2	2	1	0	2	2	1	0	TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	3	0	0	0	1	0	0	0	1	0	0	0	0	0	0	5
4:30 PM	0	1	0	0	0	2	0	0	0	2	0	0	0	0	0	0	5
4:45 PM	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	3
5:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	1	0	0	0	2	0	0	1	0	0	0	4
<b>TOTAL VOLUMES :</b>	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	<b>TOTAL</b>
<b>APPROACH %'s :</b>	0	7	0	0	1	9	0	0	1	5	0	0	1	1	0	0	25
	0.00%	100.00%	0.00%	0.00%	10.00%	90.00%	0.00%	0.00%	16.67%	83.33%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	
<b>PEAK HR :</b>	<b>04:00 PM - 05:00 PM</b>																<b>TOTAL</b>
<b>PEAK HR VOL :</b>	0	5	0	0	1	3	0	0	1	3	0	0	0	1	0	0	14
<b>PEAK HR FACTOR :</b>	0.00	0.417	0.000	0.000	0.250	0.375	0.000	0.000	0.250	0.375	0.000	0.000	0.000	0.250	0.000	0.000	0.700
					0.417				0.500								

# National Data & Surveying Services

# Intersection Turning Movement Count

Location: Hesperian Blvd & W A St  
City: Hayward

Project ID: 19-08330-001  
Date: 6/5/2019

## Pedestrians (Crosswalks)

NS/EW Streets:	Hesperian Blvd		Hesperian Blvd		W A St		W A St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	
	7:00 AM	1	0	0	0	0	1	1	0
	7:15 AM	1	3	0	0	3	3	0	1
	7:30 AM	0	3	0	0	4	0	0	0
	7:45 AM	0	0	0	0	2	3	0	0
	8:00 AM	1	3	0	0	2	0	0	1
	8:15 AM	5	7	0	0	5	8	5	2
	8:30 AM	2	1	0	0	3	5	1	2
	8:45 AM	0	3	1	1	2	2	2	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	
<b>APPROACH %'s :</b>	10	20	1	1	21	22	9	6	
	33.33%	66.67%	50.00%	50.00%	48.84%	51.16%	60.00%	40.00%	
<b>PEAK HR :</b>	07:45 AM - 08:45 AM								
<b>PEAK HR VOL :</b>	8	11	0	0	12	16	6	5	
<b>PEAK HR FACTOR :</b>	0.400	0.393			0.600	0.500	0.300	0.625	
	0.396				0.538		0.393		
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	
	4:00 PM	4	6	0	0	4	2	2	1
	4:15 PM	4	1	0	0	1	1	0	1
	4:30 PM	2	5	0	0	5	2	0	2
	4:45 PM	9	6	0	0	8	9	3	6
	5:00 PM	5	5	0	0	1	3	1	4
	5:15 PM	1	3	0	1	3	5	1	4
	5:30 PM	2	4	1	0	3	3	5	2
	5:45 PM	3	2	0	0	8	4	3	0
<b>TOTAL VOLUMES :</b>	EB	WB	EB	WB	NB	SB	NB	SB	
<b>APPROACH %'s :</b>	30	32	1	1	33	29	15	20	
	48.39%	51.61%	50.00%	50.00%	53.23%	46.77%	42.86%	57.14%	
<b>PEAK HR :</b>	04:00 PM - 05:00 PM								
<b>PEAK HR VOL :</b>	19	18	0	0	18	14	5	10	
<b>PEAK HR FACTOR :</b>	0.528	0.750			0.563	0.389	0.417	0.417	
	0.617				0.471		0.417		



## Appendix B – Synchro LOS, Delay and 95th Percentile Queue Length Reports

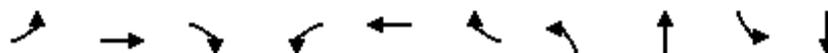
HCM 2010 Signalized Intersection Summary  
 1: Hesperian Blvd & A St

Existing Conditions  
 Timing Plan: A.M. Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	63	19	654	177	193	126	483	212	265	1350	19
Future Volume (veh/h)	29	63	19	654	177	193	126	483	212	265	1350	19
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	37	80	24	727	197	0	164	627	275	305	1552	22
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	2	3	0
Peak Hour Factor	0.79	0.79	0.79	0.90	0.90	0.90	0.77	0.77	0.77	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	239	107	804	925	411	190	1333	571	586	2353	33
Arrive On Green	0.04	0.07	0.07	0.23	0.26	0.00	0.11	0.38	0.38	0.17	0.46	0.46
Sat Flow, veh/h	3442	3539	1583	3442	3539	1571	1774	3466	1485	3442	5165	73
Grp Volume(v), veh/h	37	80	24	727	197	0	164	613	289	305	1019	555
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1571	1774	1695	1562	1721	1695	1848
Q Serve(g_s), s	1.4	2.8	1.9	26.7	5.7	0.0	11.8	17.7	18.2	10.5	30.4	30.4
Cycle Q Clear(g_c), s	1.4	2.8	1.9	26.7	5.7	0.0	11.8	17.7	18.2	10.5	30.4	30.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.95	1.00		0.04
Lane Grp Cap(c), veh/h	137	239	107	804	925	411	190	1304	601	586	1544	842
V/C Ratio(X)	0.27	0.33	0.22	0.90	0.21	0.00	0.86	0.47	0.48	0.52	0.66	0.66
Avail Cap(c_a), veh/h	185	256	114	927	1015	451	246	1304	601	586	1544	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	57.8	57.4	48.4	37.5	0.0	57.1	30.0	30.2	49.1	27.6	27.6
Incr Delay (d2), s/veh	1.1	0.8	1.0	11.1	0.1	0.0	21.2	1.2	2.7	0.8	2.2	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.4	0.8	14.0	2.8	0.0	6.9	8.5	8.2	5.1	14.6	16.4
LnGrp Delay(d),s/veh	61.6	58.6	58.4	59.6	37.7	0.0	78.3	31.3	33.0	49.9	29.8	31.6
LnGrp LOS	E	E	E	E	D		E	C	C	D	C	C
Approach Vol, veh/h		141			924			1066			1879	
Approach Delay, s/veh		59.4			54.9			39.0			33.6	
Approach LOS		E			D			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.9	64.2	9.2	38.7	27.1	55.0	34.4	13.5				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.7	5.0	* 5	4.0	* 4.7				
Max Green Setting (Gmax), s	18.0	50.0	7.0	* 37	18.0	* 50	35.0	* 9.4				
Max Q Clear Time (g_c+I1), s	13.8	32.4	3.4	7.7	12.5	20.2	28.7	4.8				
Green Ext Time (p_c), s	0.2	15.4	0.0	1.3	0.5	15.3	1.7	0.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay				40.8								
HCM 2010 LOS				D								
<b>Notes</b>												

Queues  
1: Hesperian Blvd & A St

Existing Conditions  
Timing Plan: A.M. Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	37	80	24	727	197	214	164	902	305	1574
v/c Ratio	0.20	0.32	0.09	0.90	0.20	0.39	0.76	0.43	0.69	0.73
Control Delay	61.6	61.2	0.7	61.2	35.8	6.7	76.9	25.1	62.2	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	61.2	0.7	61.2	35.8	6.7	76.9	25.1	62.2	34.3
Queue Length 50th (ft)	15	34	0	299	66	0	134	183	127	429
Queue Length 95th (ft)	30	53	0	#378	99	60	177	182	172	475
Internal Link Dist (ft)		543			25			1247		831
Turn Bay Length (ft)	170		310				245		245	
Base Capacity (vph)	184	255	258	862	1021	572	245	2078	443	2155
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.31	0.09	0.84	0.19	0.37	0.67	0.43	0.69	0.73

Intersection Summary

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

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	2	0	4
Total Flow Rate (veh/h)	141	1138	1066	1879
Effct. Green for Bike (s)	9.1	36.7	55.0	57.1
Cross Street Width (ft)	91.9	89.2	69.2	83.9
Through Lanes Number	2	2	3	3
Through Lane Width (ft)	12.0	11.0	12.0	11.0
Bicycle Lane Width (ft)	6.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	140	565	846	878
Bicycle Delay (s/bike)	56.2	33.5	21.6	20.5
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.80	4.08	3.20	4.09
Bicycle LOS	A	D	C	D

HCM 2010 Signalized Intersection Summary  
1: Hesperian Blvd & A St

Existing Conditions  
Timing Plan: P.M. Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	157	43	306	183	258	180	1466	310	314	767	10
Future Volume (veh/h)	79	157	43	306	183	258	180	1466	310	314	767	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	185	51	340	203	0	198	1611	341	341	834	11
Adj No. of Lanes	2	2	1	2	2	1	1	3	0	2	3	0
Peak Hour Factor	0.85	0.85	0.85	0.90	0.90	0.90	0.91	0.91	0.91	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	324	142	398	561	249	447	2311	485	394	2105	28
Arrive On Green	0.05	0.09	0.09	0.12	0.16	0.00	0.25	0.55	0.55	0.11	0.41	0.41
Sat Flow, veh/h	3442	3539	1553	3442	3539	1571	1774	4187	878	3442	5171	68
Grp Volume(v), veh/h	93	185	51	340	203	0	198	1302	650	341	547	298
Grp Sat Flow(s),veh/h/ln	1721	1770	1553	1721	1770	1571	1774	1695	1675	1721	1695	1849
Q Serve(g_s), s	3.7	7.0	2.8	13.6	7.2	0.0	13.2	39.1	39.8	13.6	16.0	16.0
Cycle Q Clear(g_c), s	3.7	7.0	2.8	13.6	7.2	0.0	13.2	39.1	39.8	13.6	16.0	16.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.52	1.00		0.04
Lane Grp Cap(c), veh/h	167	324	142	398	561	249	447	1871	924	394	1380	753
V/C Ratio(X)	0.56	0.57	0.36	0.85	0.36	0.00	0.44	0.70	0.70	0.86	0.40	0.40
Avail Cap(c_a), veh/h	172	490	215	516	842	374	447	1871	924	467	1380	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.1	61.0	24.9	60.8	52.6	0.0	44.1	22.8	23.0	60.9	29.3	29.3
Incr Delay (d2), s/veh	3.7	1.6	1.5	10.7	0.4	0.0	0.7	2.2	4.5	13.7	0.9	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	3.5	1.8	7.1	3.6	0.0	6.5	18.8	19.6	7.2	7.6	8.5
LnGrp Delay(d),s/veh	68.8	62.5	26.5	71.4	53.0	0.0	44.8	25.0	27.5	74.7	30.2	30.9
LnGrp LOS	E	E	C	E	D		D	C	C	E	C	C
Approach Vol, veh/h		329			543			2150			1186	
Approach Delay, s/veh		58.7			64.5			27.5			43.2	
Approach LOS		E			E			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	40.3	62.0	10.8	26.9	20.0	82.3	20.2	17.5				
Change Period (Y+Rc), s	5.0	* 5	4.0	* 4.7	4.0	5.0	4.0	* 4.7				
Max Green Setting (Gmax), s	25.0	* 57	7.0	* 33	19.0	63.0	21.0	* 19				
Max Q Clear Time (g_c+I1), s	15.2	18.0	5.7	9.2	15.6	41.8	15.6	9.0				
Green Ext Time (p_c), s	0.4	15.9	0.0	1.3	0.4	19.9	0.6	0.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			39.2									
HCM 2010 LOS			D									
<b>Notes</b>												

Queues  
1: Hesperian Blvd & A St

Existing Conditions  
Timing Plan: P.M. Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	93	185	51	340	203	287	198	1952	341	845
v/c Ratio	0.54	0.41	0.16	0.79	0.28	0.58	0.63	0.82	0.82	0.40
Control Delay	77.2	58.5	1.0	71.8	46.2	12.3	63.0	35.3	75.4	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.2	58.5	1.0	71.8	46.2	12.3	63.0	35.3	75.4	28.6
Queue Length 50th (ft)	43	81	0	155	79	20	169	571	156	198
Queue Length 95th (ft)	69	114	0	209	116	108	256	643	#215	237
Internal Link Dist (ft)		543			25			1247		831
Turn Bay Length (ft)	170		310				245		245	
Base Capacity (vph)	171	508	343	480	813	525	316	2375	438	2120
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.36	0.15	0.71	0.25	0.55	0.63	0.82	0.78	0.40

Intersection Summary

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

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	3	1	5	3
Total Flow Rate (veh/h)	329	830	2150	1186
Effct. Green for Bike (s)	17.9	29.8	67.2	60.5
Cross Street Width (ft)	91.9	89.2	69.2	83.9
Through Lanes Number	2	2	3	3
Through Lane Width (ft)	12.0	11.0	12.0	11.0
Bicycle Lane Width (ft)	6.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	256	426	960	864
Bicycle Delay (s/bike)	53.3	43.4	19.0	22.6
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.95	3.82	3.80	3.71
Bicycle LOS	A	D	D	D

HCM 2010 Signalized Intersection Summary  
1: Hesperian Blvd & A St

Proposed Conditions-Remove 1 WB Thru Ln  
Timing Plan: A.M. Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	63	19	654	177	193	126	483	212	265	1350	19
Future Volume (veh/h)	29	63	19	654	177	193	126	483	212	265	1350	19
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	37	80	24	727	197	0	164	627	275	305	1552	22
Adj No. of Lanes	2	2	1	2	1	1	1	3	0	2	3	0
Peak Hour Factor	0.79	0.79	0.79	0.90	0.90	0.90	0.77	0.77	0.77	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	239	107	804	487	414	190	1317	564	602	2353	33
Arrive On Green	0.04	0.07	0.07	0.23	0.26	0.00	0.11	0.38	0.38	0.17	0.46	0.46
Sat Flow, veh/h	3442	3539	1583	3442	1863	1583	1774	3466	1485	3442	5165	73
Grp Volume(v), veh/h	37	80	24	727	197	0	164	613	289	305	1019	555
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1863	1583	1774	1695	1561	1721	1695	1848
Q Serve(g_s), s	1.4	2.8	1.9	26.7	11.4	0.0	11.8	17.8	18.3	10.4	30.4	30.4
Cycle Q Clear(g_c), s	1.4	2.8	1.9	26.7	11.4	0.0	11.8	17.8	18.3	10.4	30.4	30.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.95	1.00		0.04
Lane Grp Cap(c), veh/h	137	239	107	804	487	414	190	1288	593	602	1544	842
V/C Ratio(X)	0.27	0.33	0.22	0.90	0.40	0.00	0.86	0.48	0.49	0.51	0.66	0.66
Avail Cap(c_a), veh/h	185	245	110	927	529	449	246	1288	593	602	1544	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	57.8	57.4	48.4	39.6	0.0	57.1	30.5	30.7	48.5	27.6	27.6
Incr Delay (d2), s/veh	1.1	0.8	1.0	11.1	0.5	0.0	21.2	1.3	2.8	0.7	2.2	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.4	0.8	14.0	5.9	0.0	6.9	8.6	8.3	5.0	14.6	16.4
LnGrp Delay(d),s/veh	61.6	58.6	58.4	59.6	40.2	0.0	78.3	31.8	33.5	49.2	29.8	31.6
LnGrp LOS	E	E	E	E	D		E	C	C	D	C	C
Approach Vol, veh/h		141			924			1066			1879	
Approach Delay, s/veh		59.4			55.4			39.4			33.5	
Approach LOS		E			E			D			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.9	64.2	9.2	38.7	27.7	54.4	34.4	13.5				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.7	5.0	* 5	4.0	* 4.7				
Max Green Setting (Gmax), s	18.0	50.4	7.0	* 37	19.0	* 49	35.0	* 9				
Max Q Clear Time (g_c+I1), s	13.8	32.4	3.4	13.4	12.4	20.3	28.7	4.8				
Green Ext Time (p_c), s	0.2	15.7	0.0	1.1	0.6	15.1	1.7	0.1				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			41.0									
HCM 2010 LOS			D									
<b>Notes</b>												

Queues  
1: Hesperian Blvd & A St

Proposed Conditions-Remove 1 WB Thru Ln  
Timing Plan: A.M. Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	37	80	24	727	197	214	164	902	305	1574
v/c Ratio	0.20	0.33	0.09	0.90	0.39	0.39	0.79	0.46	0.65	0.73
Control Delay	61.6	61.5	0.7	61.2	40.1	6.7	81.0	26.0	59.7	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	61.5	0.7	61.2	40.1	6.7	81.0	26.0	59.7	34.5
Queue Length 50th (ft)	15	34	0	299	134	0	134	187	126	433
Queue Length 95th (ft)	30	54	0	#378	207	60	179	186	170	472
Internal Link Dist (ft)		543			932			1247		831
Turn Bay Length (ft)	170		310	520			245		245	
Base Capacity (vph)	184	245	253	862	533	572	228	1975	468	2143
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.33	0.09	0.84	0.37	0.37	0.72	0.46	0.65	0.73

Intersection Summary

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

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	2	0	4
Total Flow Rate (veh/h)	141	1138	1066	1879
Effct. Green for Bike (s)	9.0	36.6	54.1	56.8
Cross Street Width (ft)	88.5	91.2	61.3	83.9
Through Lanes Number	2	1	3	3
Through Lane Width (ft)	12.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	6.0	0.0	5.0	5.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	138	563	832	874
Bicycle Delay (s/bike)	56.3	33.6	22.2	20.6
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.74	5.05	2.23	3.02
Bicycle LOS	A	F	B	C

HCM 2010 Signalized Intersection Summary  
1: Hesperian Blvd & A St

Proposed Conditions- Remove 1 WB Thru Ln  
Timing Plan: P.M. Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	157	43	306	183	258	180	1466	310	314	767	10
Future Volume (veh/h)	79	157	43	306	183	258	180	1466	310	314	767	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	185	51	340	203	0	198	1611	341	341	834	11
Adj No. of Lanes	2	2	1	2	1	1	1	3	0	2	3	0
Peak Hour Factor	0.85	0.85	0.85	0.90	0.90	0.90	0.91	0.91	0.91	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	402	177	399	337	287	433	2219	465	392	2031	27
Arrive On Green	0.05	0.11	0.11	0.12	0.18	0.00	0.24	0.53	0.53	0.11	0.39	0.39
Sat Flow, veh/h	3442	3539	1555	3442	1863	1583	1774	4186	878	3442	5171	68
Grp Volume(v), veh/h	93	185	51	340	203	0	198	1302	650	341	547	298
Grp Sat Flow(s),veh/h/ln	1721	1770	1555	1721	1863	1583	1774	1695	1674	1721	1695	1849
Q Serve(g_s), s	3.7	6.8	2.7	13.6	14.0	0.0	13.3	41.0	41.8	13.6	16.3	16.4
Cycle Q Clear(g_c), s	3.7	6.8	2.7	13.6	14.0	0.0	13.3	41.0	41.8	13.6	16.3	16.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.52	1.00		0.04
Lane Grp Cap(c), veh/h	167	402	177	399	337	287	433	1797	887	392	1332	726
V/C Ratio(X)	0.56	0.46	0.29	0.85	0.60	0.00	0.46	0.72	0.73	0.87	0.41	0.41
Avail Cap(c_a), veh/h	172	465	204	541	443	377	433	1797	887	442	1332	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.1	58.0	23.8	60.7	52.7	0.0	45.0	25.1	25.3	61.0	30.8	30.8
Incr Delay (d2), s/veh	3.7	0.8	0.9	9.4	1.7	0.0	0.8	2.6	5.3	15.6	0.9	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	3.4	1.8	7.0	7.4	0.0	6.6	19.8	20.5	7.3	7.8	8.7
LnGrp Delay(d),s/veh	68.8	58.8	24.7	70.1	54.4	0.0	45.8	27.7	30.6	76.6	31.7	32.5
LnGrp LOS	E	E	C	E	D		D	C	C	E	C	C
Approach Vol, veh/h		329			543			2150			1186	
Approach Delay, s/veh		56.4			64.3			30.2			44.8	
Approach LOS		E			E			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	39.1	60.0	10.8	30.0	19.9	79.2	20.2	20.6				
Change Period (Y+Rc), s	5.0	* 5	4.0	* 4.7	4.0	5.0	4.0	* 4.7				
Max Green Setting (Gmax), s	27.0	* 55	7.0	* 33	18.0	64.0	22.0	* 18				
Max Q Clear Time (g_c+I1), s	15.3	18.4	5.7	16.0	15.6	43.8	15.6	8.8				
Green Ext Time (p_c), s	0.4	15.5	0.0	1.0	0.3	19.0	0.7	0.9				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			40.8									
HCM 2010 LOS			D									
<b>Notes</b>												

Queues  
1: Hesperian Blvd & A St

Proposed Conditions- Remove 1 WB Thru Ln  
Timing Plan: P.M. Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	93	185	51	340	203	287	198	1952	341	845
v/c Ratio	0.54	0.42	0.16	0.77	0.53	0.59	0.62	0.85	0.84	0.41
Control Delay	77.2	59.1	1.1	70.0	53.4	13.9	61.5	36.2	78.4	30.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.2	59.1	1.1	70.0	53.4	13.9	61.5	36.2	78.4	30.1
Queue Length 50th (ft)	43	81	0	155	161	30	167	578	158	204
Queue Length 95th (ft)	69	115	0	207	243	121	255	652	#230	243
Internal Link Dist (ft)		543			1017			1247		831
Turn Bay Length (ft)	170		310	520			245		245	
Base Capacity (vph)	171	493	337	503	428	518	318	2308	417	2050
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.38	0.15	0.68	0.47	0.55	0.62	0.85	0.82	0.41

Intersection Summary

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

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	3	1	5	3
Total Flow Rate (veh/h)	329	830	2150	1186
Effct. Green for Bike (s)	17.5	29.8	67.8	58.5
Cross Street Width (ft)	88.5	91.2	60.9	83.9
Through Lanes Number	2	1	3	3
Through Lane Width (ft)	12.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	6.0	0.0	5.0	5.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	250	426	969	836
Bicycle Delay (s/bike)	53.7	43.4	18.7	23.8
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.90	4.54	2.82	2.64
Bicycle LOS	A	E	C	B

HCM 2010 Signalized Intersection Summary  
1: Hesperian Blvd & A St

Proposed Conditions-Remove 1 WB LT Ln  
Timing Plan: A.M. Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	63	19	654	177	193	126	483	212	265	1350	19
Future Volume (veh/h)	29	63	19	654	177	193	126	483	212	265	1350	19
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1788	1863	1900
Adj Flow Rate, veh/h	37	80	24	727	197	0	164	627	275	305	1552	22
Adj No. of Lanes	2	2	1	1	2	1	1	3	0	2	3	0
Peak Hour Factor	0.79	0.79	0.79	0.90	0.90	0.90	0.77	0.77	0.77	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	239	107	696	1487	665	164	915	391	435	1609	23
Arrive On Green	0.04	0.07	0.07	0.39	0.42	0.00	0.09	0.26	0.26	0.13	0.31	0.31
Sat Flow, veh/h	3442	3539	1583	1774	3539	1583	1774	3456	1479	3304	5165	73
Grp Volume(v), veh/h	37	80	24	727	197	0	164	615	287	305	1019	555
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1774	1770	1583	1774	1695	1545	1652	1695	1848
Q Serve(g_s), s	1.4	2.8	1.9	51.0	4.4	0.0	12.0	21.2	21.8	11.5	38.4	38.4
Cycle Q Clear(g_c), s	1.4	2.8	1.9	51.0	4.4	0.0	12.0	21.2	21.8	11.5	38.4	38.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.96	1.00		0.04
Lane Grp Cap(c), veh/h	137	239	107	696	1487	665	164	897	409	435	1056	576
V/C Ratio(X)	0.27	0.33	0.22	1.04	0.13	0.00	1.00	0.69	0.70	0.70	0.96	0.96
Avail Cap(c_a), veh/h	185	245	110	696	1487	665	164	897	409	457	1056	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.6	57.8	57.4	39.5	23.1	0.0	59.0	42.9	43.2	54.0	44.0	44.0
Incr Delay (d2), s/veh	1.1	0.8	1.0	46.3	0.0	0.0	70.7	4.2	9.7	4.5	20.3	29.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.4	0.8	33.9	2.2	0.0	9.1	10.4	10.4	5.5	21.0	24.3
LnGrp Delay(d),s/veh	61.6	58.6	58.4	85.8	23.2	0.0	129.7	47.2	52.9	58.5	64.4	73.7
LnGrp LOS	E	E	E	F	C		F	D	D	E	E	E
Approach Vol, veh/h		141			924			1066			1879	
Approach Delay, s/veh		59.4			72.5			61.4			66.2	
Approach LOS		E			E			E			E	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	45.5	9.2	59.3	22.1	39.4	55.0	13.5				
Change Period (Y+Rc), s	4.0	5.0	4.0	* 4.7	5.0	* 5	4.0	* 4.7				
Max Green Setting (Gmax), s	12.0	40.4	7.0	* 53	18.0	* 34	51.0	* 9				
Max Q Clear Time (g_c+I1), s	14.0	40.4	3.4	6.4	13.5	23.8	53.0	4.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.4	7.2	0.0	0.1				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			66.1									
HCM 2010 LOS			E									
<b>Notes</b>												

Queues  
1: Hesperian Blvd & A St

Proposed Conditions-Remove 1 WB LT Ln  
Timing Plan: A.M. Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	37	80	24	727	197	214	164	902	305	1574
v/c Ratio	0.20	0.33	0.09	1.12	0.14	0.30	0.93	0.66	0.71	1.05
Control Delay	61.6	61.5	0.7	111.0	23.8	4.2	108.0	40.3	63.8	80.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	61.5	0.7	111.0	23.8	4.2	108.0	40.3	63.8	80.7
Queue Length 50th (ft)	15	34	0	~705	54	0	~154	230	128	~537
Queue Length 95th (ft)	30	54	0	#945	81	49	#238	228	172	#598
Internal Link Dist (ft)		543			25			1247		831
Turn Bay Length (ft)	170		310				245		245	
Base Capacity (vph)	184	245	253	648	1450	727	177	1374	427	1498
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.33	0.09	1.12	0.14	0.29	0.93	0.66	0.71	1.05

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	2	0	4
Total Flow Rate (veh/h)	141	1138	1066	1879
Effct. Green for Bike (s)	9.0	54.6	37.1	41.1
Cross Street Width (ft)	86.9	84.7	63.2	84.4
Through Lanes Number	2	2	3	3
Through Lane Width (ft)	12.0	11.0	11.0	10.0
Bicycle Lane Width (ft)	6.0	0.0	5.0	5.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	138	840	571	632
Bicycle Delay (s/bike)	56.3	21.9	33.2	30.5
Bicycle Compliance	Poor	Fair	Poor	Poor
Bicycle LOS Score	1.72	4.01	2.26	3.24
Bicycle LOS	A	D	B	C

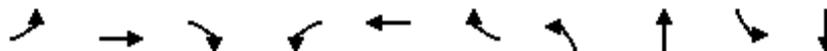
HCM 2010 Signalized Intersection Summary  
1: Hesperian Blvd & A St

Proposed Conditions-Remove 1 WB LT Ln  
Timing Plan: P.M. Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	157	43	306	183	258	180	1466	310	314	767	10
Future Volume (veh/h)	79	157	43	306	183	258	180	1466	310	314	767	10
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	185	51	340	203	0	198	1611	341	341	834	11
Adj No. of Lanes	2	2	1	1	2	1	1	3	0	2	3	0
Peak Hour Factor	0.85	0.85	0.85	0.90	0.90	0.90	0.91	0.91	0.91	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	234	102	365	791	354	385	2044	428	389	1950	26
Arrive On Green	0.05	0.07	0.07	0.21	0.22	0.00	0.22	0.49	0.49	0.11	0.38	0.38
Sat Flow, veh/h	3442	3539	1548	1774	3539	1583	1774	4185	877	3442	5171	68
Grp Volume(v), veh/h	93	185	51	340	203	0	198	1302	650	341	547	298
Grp Sat Flow(s),veh/h/ln	1721	1770	1548	1774	1770	1583	1774	1695	1672	1721	1695	1849
Q Serve(g_s), s	3.7	7.2	3.1	26.4	6.6	0.0	13.8	44.7	45.5	13.7	16.8	16.8
Cycle Q Clear(g_c), s	3.7	7.2	3.1	26.4	6.6	0.0	13.8	44.7	45.5	13.7	16.8	16.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.52	1.00		0.04
Lane Grp Cap(c), veh/h	167	234	102	365	791	354	385	1656	817	389	1279	697
V/C Ratio(X)	0.56	0.79	0.50	0.93	0.26	0.00	0.51	0.79	0.80	0.88	0.43	0.43
Avail Cap(c_a), veh/h	197	243	106	418	872	390	385	1656	817	418	1279	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.1	64.4	30.3	54.6	44.8	0.0	48.3	29.8	30.0	61.1	32.4	32.4
Incr Delay (d2), s/veh	2.9	15.6	3.7	25.6	0.2	0.0	1.2	3.9	7.9	17.6	1.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	4.0	1.9	15.5	3.3	0.0	6.9	21.7	22.7	7.4	8.0	8.9
LnGrp Delay(d),s/veh	68.0	80.0	34.0	80.2	44.9	0.0	49.5	33.6	37.9	78.8	33.4	34.3
LnGrp LOS	E	F	C	F	D		D	C	D	E	C	C
Approach Vol, veh/h		329			543			2150			1186	
Approach Delay, s/veh		69.5			67.0			36.4			46.7	
Approach LOS		E			E			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	35.4	57.8	10.8	36.0	19.8	73.4	32.8	14.0				
Change Period (Y+Rc), s	5.0	* 5	4.0	* 4.7	4.0	5.0	4.0	* 4.7				
Max Green Setting (Gmax), s	27.0	* 53	8.0	* 35	17.0	62.8	33.0	* 9.6				
Max Q Clear Time (g_c+I1), s	15.8	18.8	5.7	8.6	15.7	47.5	28.4	9.2				
Green Ext Time (p_c), s	0.4	14.9	0.0	1.3	0.2	14.5	0.5	0.1				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			45.8									
HCM 2010 LOS			D									
<b>Notes</b>												

Queues  
1: Hesperian Blvd & A St

Proposed Conditions-Remove 1 WB LT Ln  
Timing Plan: P.M. Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	93	185	51	340	203	287	198	1952	341	845
v/c Ratio	0.49	0.75	0.21	0.92	0.25	0.56	0.62	0.89	0.89	0.44
Control Delay	73.0	82.2	2.0	83.5	43.8	13.4	61.5	40.2	85.3	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	82.2	2.0	83.5	43.8	13.4	61.5	40.2	85.3	32.9
Queue Length 50th (ft)	43	88	0	300	78	33	167	588	159	210
Queue Length 95th (ft)	69	#131	0	#473	115	124	255	663	#244	251
Internal Link Dist (ft)		543			25			1247		831
Turn Bay Length (ft)	170		310				245		245	
Base Capacity (vph)	196	249	243	389	843	524	318	2197	389	1900
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.74	0.21	0.87	0.24	0.55	0.62	0.89	0.88	0.44

Intersection Summary

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

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	3	1	5	3
Total Flow Rate (veh/h)	329	830	2150	1186
Effct. Green for Bike (s)	9.8	33.3	64.4	54.2
Cross Street Width (ft)	88.8	89.7	63.1	83.9
Through Lanes Number	2	2	3	3
Through Lane Width (ft)	12.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	6.0	0.0	5.0	5.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	140	476	920	774
Bicycle Delay (s/bike)	60.6	40.7	20.5	26.3
Bicycle Compliance	Poor	Poor	Fair	Fair
Bicycle LOS Score	1.90	3.83	2.85	2.64
Bicycle LOS	A	D	C	B



## Appendix C – Collision Reports

# Collision Details for: Case ID 7185118

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	01/16/2016 23:03		
Location (Intersection)	Hesperian Bl & W A St		
Dist. & Dir. from Intersection	316.00 ft South		
State Highway	No		
Latitude & Longitude	37.66477605, -122.11763103		
Type of Collision	D - Broadside		
Motor Vehicle Involved With	I - Fixed Object		
Collision Severity	4 - Injury (Complaint of Pain)		
PCF Violation Category	03 - Unsafe Speed		
Weather	B - Cloudy		
Alcohol Involved	No		
Pedestrian Accident	No	Bicycle Accident	No
Motorcycle Accident	No	Truck Accident	No

## Map View



## Street View



## Parties: 1

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	South	B - Proceeding Straight

## Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	M - Male	19	7 - Possible Injury

# Collision Details for: Case ID 8024579

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	04/10/2016 00:40		
Location (Intersection)	West A St & Hesperian Bl		
Dist. & Dir. from Intersection	469.00 ft East		
State Highway	No		
Latitude & Longitude	37.66574801, -122.11650787		
Type of Collision	G - Vehicle/Pedestrian		
Motor Vehicle Involved With	B - Pedestrian		
Collision Severity	3 - Injury (Other Visible)		
PCF Violation Category	11 - Pedestrian Violation		
Weather	C - Raining		
Alcohol Involved	Yes		
Pedestrian Accident	Yes	Bicycle Accident	No
Motorcycle Accident	No	Truck Accident	No

## Map View



## Street View



## Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	2 - Pedestrian	N - Pedestrian	Yes	-	L - Entering Traffic
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	West	B - Proceeding Straight

## Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	3 - Pedestrian	M - Male	39	6 - Suspected Minor Injury

# Collision Details for: Case ID 8087221

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	06/24/2016 12:57		
Location (Intersection)	Hesperian Bl & W A St		
Dist. & Dir. from Intersection	150.00 ft South		
State Highway	No		
Latitude & Longitude	37.66518787, -122.11787739		
Type of Collision	C - Rear End		
Motor Vehicle Involved With	C - Other Motor Vehicle		
Collision Severity	4 - Injury (Complaint of Pain)		
PCF Violation Category	03 - Unsafe Speed		
Weather	A - Clear		
Alcohol Involved	No		
Pedestrian Accident	No	Bicycle Accident	No
Motorcycle Accident	No	Truck Accident	No

## Map View



## Street View



## Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	H - Slowing/Stopping
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	A - Stopped

## Victims: 2

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	2 - Passenger	F - Female	1	0 - No Injury
2	1 - Driver	M - Male	37	7 - Possible Injury

# Collision Details for: Case ID 8193229

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	10/15/2016 22:34		
Location (Intersection)	Hesperian Bl S & A St		
Dist. & Dir. from Intersection	243.00 ft South		
State Highway	No		
Latitude & Longitude	37.66495715, -122.11773937		
Type of Collision	D - Broadside		
Motor Vehicle Involved With	C - Other Motor Vehicle		
Collision Severity	3 - Injury (Other Visible)		
PCF Violation Category	01 - Driving or Bicycling Under the Influence of Alcohol or Drug		
Weather	C - Raining		
Alcohol Involved	Yes		
Pedestrian Accident	No	Bicycle Accident	No
Motorcycle Accident	No	Truck Accident	No

## Map View



## Street View



## Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	South	B - Proceeding Straight
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	South	B - Proceeding Straight

## Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	M - Male	5	6 - Suspected Minor Injury

# Collision Details for: Case ID 7200179

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	02/25/2017 16:35		
Location (Intersection)	W A St & Hesperian Bl		
Dist. & Dir. from Intersection	164.00 ft East		
State Highway	No		
Latitude & Longitude	37.66567185, -122.11755646		
Type of Collision	E - Hit Object		
Motor Vehicle Involved With	I - Fixed Object		
Collision Severity	1 - Fatal		
PCF Violation Category	03 - Unsafe Speed		
Weather	B - Cloudy		
Alcohol Involved	No		
Pedestrian Accident	No	Bicycle Accident	No
Motorcycle Accident	Yes	Truck Accident	No

## Map View



## Street View



## Parties: 1

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	C - Motorcycle/Scooter	Yes	East	B - Proceeding Straight

## Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	M - Male	33	1 - Killed

# Collision Details for: Case ID 8650522

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	07/29/2018 18:04		
Location (Intersection)	Hesperian Bl & A St		
Dist. & Dir. from Intersection	52.00 ft West		
State Highway	No		
Latitude & Longitude	37.66568977, -122.11817513		
Type of Collision	C - Rear End		
Motor Vehicle Involved With	C - Other Motor Vehicle		
Collision Severity	3 - Injury (Other Visible)		
PCF Violation Category	01 - Driving or Bicycling Under the Influence of Alcohol or Drug		
Weather	A - Clear		
Alcohol Involved	Yes		
Pedestrian Accident	No	Bicycle Accident	No
Motorcycle Accident	Yes	Truck Accident	No

## Map View



## Street View



## Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	West	B - Proceeding Straight
2	1 - Driver (including Hit and Run)	C - Motorcycle/Scooter	No	West	B - Proceeding Straight

## Victims: 1

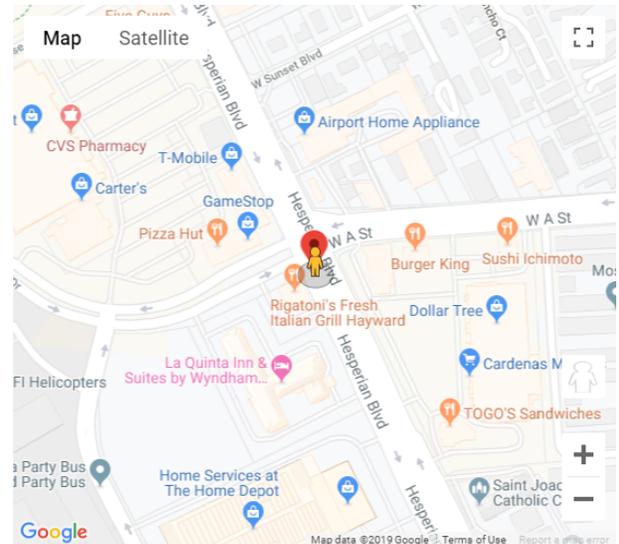
Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	M - Male	62	6 - Suspected Minor Injury

# Collision Details for: Case ID 8699604

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	08/16/2018 02:18		
Location (Intersection)	Hesperian Bl & W A St		
Dist. & Dir. from Intersection	81.00 ft South		
State Highway	No		
Latitude & Longitude	37.66535905, -122.11797979		
Type of Collision	E - Hit Object		
Motor Vehicle Involved With	I - Fixed Object		
Collision Severity	2 - Injury (Severe)		
PCF Violation Category	01 - Driving or Bicycling Under the Influence of Alcohol or Drug		
Weather	A - Clear		
Alcohol Involved	Yes		
Pedestrian Accident	No	Bicycle Accident	No
Motorcycle Accident	No	Truck Accident	No

## Map View



## Street View



## Parties: 1

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	B - Proceeding Straight

## Victims: 1

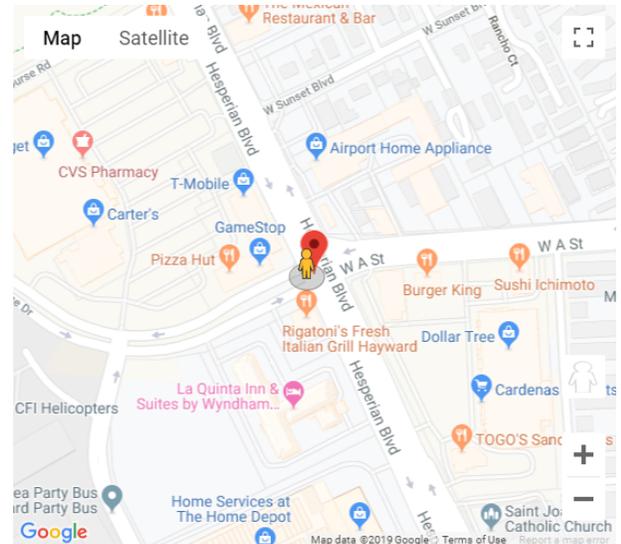
Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	M - Male	26	5 - Suspected Serious Injury

# Collision Details for: Case ID 8751579

## Collision Information

County	Alameda		
City	Hayward		
Date & Time (M/D/Y HH:MM)	10/29/2018 13:52		
Location (Intersection)	N Hesperian Bl & W A St		
Dist. & Dir. from Intersection	0.00 ft East		
State Highway	No		
Latitude & Longitude	37.66555999, -122.11809993		
Type of Collision	G - Vehicle/Pedestrian		
Motor Vehicle Involved With	B - Pedestrian		
Collision Severity	3 - Injury (Other Visible)		
PCF Violation Category	11 - Pedestrian Violation		
Weather	A - Clear		
Alcohol Involved	No		
Pedestrian Accident	Yes	Bicycle Accident	No
Motorcycle Accident	No	Truck Accident	No

## Map View



## Street View



## Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	D - Pickup or Panel Truck	Yes	East	D - Making Right Turn
2	2 - Pedestrian	N - Pedestrian	No	-	B - Proceeding Straight

## Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
2	3 - Pedestrian	M - Male	54	6 - Suspected Minor Injury