

Memo

To: David Hanson / Branson School
From: David Parisi and Maclean Grosel / Parisi Transportation Consulting
Date: July 16, 2021
Subject: **Level of Service and Delay at Sir Francis Drake Boulevard Intersections
in the Town of Ross for Branson School Enrollment Numbers**

This memorandum compares intersection level of service and average vehicular delays for existing conditions (pre-Covid) to levels of vehicular traffic from the proposed 100-student Branson School enrollment increase. Three signalized intersections were studied along Sir Francis Drake Boulevard: Bolinas Avenue, Laurel Grove Avenue, and Lagunitas Road.

Branson School's proposed 100-student increase, from 320 to 420 students, was tested under two scenarios: 1) no additional vehicle trips, as expected upon implementation of the school's proposed Transportation Demand Management Plan (TDMP), and 2) some additional vehicle trips, if the TDMP were not implemented and trip-making followed the status quo trip rates.

Level of Service Definitions

Level of service is used to analyze an intersection's quality of traffic flow and is based upon performance measures. Table 1 summarizes signalized intersection level of service definitions in relationship to average motorist delays.

Table 1: Level of Service Description and Delay Criteria for Signalized Intersections

Level of Service (LOS)	Description	Average Vehicle Delay (s)
A	Highest driver comfort; free flowing	≤ 10
B	High degree of driver comfort; little delay	10 – 20
C	Acceptable level of driver comfort; some delay	20 – 35
D	Some driver frustration; moderate delay	35 – 55
E	High level of driver frustration; high levels of delay	55 – 80
F	Highest level of driver frustration; excessive delays	> 80

According to the Town of Ross' General Plan, Level of Service "D" is the established standard for Sir Francis Drake Boulevard intersections.

Scenario Comparison

Existing conditions were represented by the most recent non-Covid traffic conditions data from 2018. School day traffic counts were balanced for weekday AM and PM commute peak hour conditions at each of the intersections.

Under successful implementation of the TDMP, the 100 additional students would result in no increase in school-related traffic through the study intersections in the Town of Ross. As shown in Tables 2 and 3, each of the study intersections would continue to operate similar to existing conditions, with no changes in service levels or average vehicular delays. Each intersection would continue to operate at level of service "C" or better conditions.

Table 2: Weekday AM Peak Hour Comparison of Results

Intersection	Existing: 320 Students		Proposed w/TDMP: 420 Students		No TDMP: 420 Students	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Bolinas Avenue*	29.4	C	29.4	C	32.6	C
Laurel Grove Ave.	13.7	B	13.7	B	14.1	B
Lagunitas Road	14.7	B	14.7	B	14.1**	B

* Note: Overall delay calculated based on considering Sir Francis Drake Blvd./Bolinas Ave. and San Anselmo Ave./Bolinas Ave. as one intersection.

** Delay slightly decreases due to additional vehicles added to major through traffic movements experiencing the least amount of delay, therefore decreasing overall average delay.

Table 3: Weekday PM Peak Hour Comparison of Results

Intersection	Existing: 320 Students		Proposed w/TDMP: 420 Students		No TDMP: 420 Students	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Bolinas Avenue*	25.3	C	25.3	C	26.5	C
Laurel Grove Ave.	9.6	A	9.6	A	9.8	A
Lagunitas Road	21.0	C	21.0	C	21.2	C

* Note: Overall delay calculated based on considering Sir Francis Drake Blvd./Bolinas Ave. and San Anselmo Ave./Bolinas Ave. as one intersection.

To assess a hypothetical "worst-case" condition for each of the study intersections, a scenario was tested assuming the 100-student increase, but without implementation of the proposed TDMP. Based on Branson School's current trip generation rates, under this scenario the student increase would theoretically result in 77 additional AM peak hour vehicle trips (55 inbound and 22 outbound) and 32 additional PM peak hour vehicle trips (14 inbound and 18 outbound).

Under this hypothetical condition, each intersection would continue to function at its current acceptable service level. Overall delays would slightly increase at each study intersection, with the largest increase of 3.2 seconds at the Sir Francis Drake Boulevard/Bolinas Avenue intersection during the weekday AM peak hour.

HCM Signalized Intersection Capacity Analysis

1: Sir Francis Drake & Bolinas Ave

07/09/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	120	110	195	450	765	135
Future Volume (vph)	120	110	195	450	765	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	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)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	120	212	489	832	147
RTOR Reduction (vph)	0	90	0	0	0	0
Lane Group Flow (vph)	130	30	212	489	832	147
Turn Type	Prot	Perm	Prot	NA	NA	Prot
Protected Phases	7 8		1	6	2	2
Permitted Phases		7 8				
Actuated Green, G (s)	32.9	32.9	20.2	76.5	52.3	52.3
Effective Green, g (s)	29.9	29.9	20.2	76.5	52.3	52.3
Actuated g/C Ratio	0.25	0.25	0.17	0.64	0.44	0.44
Clearance Time (s)			4.0	3.6	3.6	3.6
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	441	394	297	2256	1542	689
v/s Ratio Prot	c0.07		c0.12	0.14	c0.24	0.09
v/s Ratio Perm		0.02				
v/c Ratio	0.29	0.08	0.71	0.22	0.54	0.21
Uniform Delay, d1	36.5	34.5	47.2	9.1	25.0	21.1
Progression Factor	0.01	0.00	1.20	0.81	1.00	1.00
Incremental Delay, d2	0.3	0.1	7.3	0.2	1.4	0.7
Delay (s)	0.8	0.1	63.8	7.6	26.3	21.8
Level of Service	A	A	E	A	C	C
Approach Delay (s)	0.5			24.6	25.6	
Approach LOS	A			C	C	

Intersection Summary

HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Sir Francis Drake & Laurel Grove Avenue

07/09/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	36	610	37	29	844
Future Volume (vph)	88	36	610	37	29	844
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	4.3		4.3	4.3
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1848		1770	1863
Flt Permitted	0.95	1.00	1.00		0.36	1.00
Satd. Flow (perm)	1770	1583	1848		665	1863
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	92	38	635	39	30	879
RTOR Reduction (vph)	0	34	2	0	0	0
Lane Group Flow (vph)	92	4	672	0	30	879
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	7		2 1 8			6 8 5
Permitted Phases		7			6 8 5	
Actuated Green, G (s)	12.0	12.0	100.2		100.2	100.2
Effective Green, g (s)	12.0	12.0	93.2		93.2	93.2
Actuated g/C Ratio	0.10	0.10	0.78		0.78	0.78
Clearance Time (s)	3.5	3.5				
Vehicle Extension (s)	1.5	1.5				
Lane Grp Cap (vph)	177	158	1435		516	1446
v/s Ratio Prot	c0.05		0.36			c0.47
v/s Ratio Perm		0.00			0.05	
v/c Ratio	0.52	0.02	0.47		0.06	0.61
Uniform Delay, d1	51.3	48.7	4.7		3.1	5.7
Progression Factor	1.00	1.00	0.91		0.21	2.65
Incremental Delay, d2	1.1	0.0	0.2		0.0	0.6
Delay (s)	52.3	48.7	4.5		0.7	15.7
Level of Service	D	D	A		A	B
Approach Delay (s)	51.3		4.5			15.2
Approach LOS	D		A			B

Intersection Summary




















HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Sir Francis Drake & Lagunitas

07/09/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	20	85	0	0	0	110	650	30	25	750	200
Future Volume (vph)	0	20	85	0	0	0	110	650	30	25	750	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5				3.5	4.3		3.5	4.3	4.3
Lane Util. Factor		1.00	1.00				1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85				1.00	0.99		1.00	1.00	0.85
Flt Protected		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1863	1583				1770	1850		1770	1863	1583
Flt Permitted		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1863	1583				1770	1850		1770	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	22	92	0	0	0	120	707	33	27	815	217
RTOR Reduction (vph)	0	0	78	0	0	0	0	1	0	0	0	31
Lane Group Flow (vph)	0	22	14	0	0	0	120	739	0	27	815	186
Turn Type		NA	Perm				Prot	NA		Prot	NA	Perm
Protected Phases		8					5	2 7		1	6 7	
Permitted Phases	8		8									6 7
Actuated Green, G (s)		18.0	18.0				14.4	81.7		9.8	77.1	77.1
Effective Green, g (s)		18.0	18.0				14.4	81.7		9.8	77.1	77.1
Actuated g/C Ratio		0.15	0.15				0.12	0.68		0.08	0.64	0.64
Clearance Time (s)		3.5	3.5				3.5			3.5		
Vehicle Extension (s)		3.0	3.0				3.0			3.0		
Lane Grp Cap (vph)		279	237				212	1259		144	1196	1017
v/s Ratio Prot		c0.01					c0.07	0.40		0.02	c0.44	
v/s Ratio Perm			0.01									0.12
v/c Ratio		0.08	0.06				0.57	0.59		0.19	0.68	0.18
Uniform Delay, d1		43.9	43.7				49.9	10.2		51.4	13.6	8.7
Progression Factor		1.00	1.00				1.00	1.00		1.22	0.64	0.44
Incremental Delay, d2		0.1	0.1				3.4	0.5		0.5	1.1	0.0
Delay (s)		44.0	43.8				53.3	10.6		63.4	9.8	3.8
Level of Service		D	D				D	B		E	A	A
Approach Delay (s)		43.9			0.0			16.6			10.0	
Approach LOS		D			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			14.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			14.8		
Intersection Capacity Utilization			63.9%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

11: Bolinas Ave & San Anselmo Ave

07/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔					↖	↗	
Traffic Volume (vph)	17	180	5	0	330	0	0	0	0	53	10	0
Future Volume (vph)	17	180	5	0	330	0	0	0	0	53	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		4.0					7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00					1.00	1.00	
Frt		1.00	0.85		1.00					1.00	1.00	
Flt Protected		1.00	1.00		1.00					0.95	1.00	
Satd. Flow (prot)		1855	1583		1863					1770	1863	
Flt Permitted		0.95	1.00		1.00					0.95	1.00	
Satd. Flow (perm)		1775	1583		1863					1770	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)	18	196	5	0	359	0	0	0	0	58	11	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	214	1	0	359	0	0	0	0	58	11	0
Turn Type	Perm	NA	Perm		NA					Split	NA	
Protected Phases		8			1 2					7	7	
Permitted Phases	8		8	1 2								
Actuated Green, G (s)		20.4	20.4		76.5					9.5	9.5	
Effective Green, g (s)		20.4	20.4		76.5					9.5	9.5	
Actuated g/C Ratio		0.17	0.17		0.64					0.08	0.08	
Clearance Time (s)		3.0	3.0							7.0	7.0	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		301	269		1187					140	147	
v/s Ratio Prot					c0.19					c0.03	0.01	
v/s Ratio Perm		c0.12	0.00									
v/c Ratio		0.71	0.00		0.30					0.41	0.07	
Uniform Delay, d1		47.0	41.4		9.8					52.6	51.2	
Progression Factor		1.00	1.00		0.04					1.00	1.00	
Incremental Delay, d2		7.7	0.0		0.1					2.0	0.2	
Delay (s)		54.7	41.4		0.5					54.6	51.4	
Level of Service		D	D		A					D	D	
Approach Delay (s)		54.4			0.5			0.0			54.1	
Approach LOS		D			A			A			D	

Intersection Summary

HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Sir Francis Drake & Bolinas Ave

07/09/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	120	135	95	915	560	85
Future Volume (vph)	120	135	95	915	560	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	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)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	147	103	995	609	92
RTOR Reduction (vph)	0	104	0	0	0	0
Lane Group Flow (vph)	130	43	103	995	609	92
Turn Type	Prot	Perm	Prot	NA	NA	Prot
Protected Phases	7 8		1	6	2	2
Permitted Phases		7 8				
Actuated Green, G (s)	38.2	38.2	12.3	71.2	54.9	54.9
Effective Green, g (s)	35.2	35.2	12.3	71.2	54.9	54.9
Actuated g/C Ratio	0.29	0.29	0.10	0.59	0.46	0.46
Clearance Time (s)			4.0	3.6	3.6	3.6
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	519	464	181	2099	1619	724
v/s Ratio Prot	c0.07		c0.06	c0.28	0.17	0.06
v/s Ratio Perm		0.03				
v/c Ratio	0.25	0.09	0.57	0.47	0.38	0.13
Uniform Delay, d1	32.3	30.8	51.3	13.8	21.3	18.7
Progression Factor	0.01	0.00	1.00	1.01	1.00	1.00
Incremental Delay, d2	0.2	0.1	3.1	0.6	0.7	0.4
Delay (s)	0.7	0.1	54.5	14.5	22.0	19.1
Level of Service	A	A	D	B	C	B
Approach Delay (s)	0.4			18.3	21.6	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Sir Francis Drake & Laurel Grove Avenue

07/09/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	19	36	979	34	32	637
Future Volume (vph)	19	36	979	34	32	637
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	4.3		4.3	4.3
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1854		1770	1863
Flt Permitted	0.95	1.00	1.00		0.18	1.00
Satd. Flow (perm)	1770	1583	1854		335	1863
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	20	38	1020	35	33	664
RTOR Reduction (vph)	0	34	1	0	0	0
Lane Group Flow (vph)	20	4	1054	0	33	664
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	7		2 1 8			6 8 5
Permitted Phases		7			6 8 5	
Actuated Green, G (s)	12.5	12.5	99.7		99.7	99.7
Effective Green, g (s)	12.5	12.5	92.7		92.7	92.7
Actuated g/C Ratio	0.10	0.10	0.77		0.77	0.77
Clearance Time (s)	3.5	3.5				
Vehicle Extension (s)	1.5	1.5				
Lane Grp Cap (vph)	184	164	1432		258	1439
v/s Ratio Prot	c0.01		c0.57			0.36
v/s Ratio Perm		0.00			0.10	
v/c Ratio	0.11	0.02	0.74		0.13	0.46
Uniform Delay, d1	48.7	48.3	7.2		3.4	4.8
Progression Factor	1.00	1.00	1.10		0.34	1.60
Incremental Delay, d2	0.1	0.0	0.8		0.2	0.2
Delay (s)	48.8	48.3	8.7		1.4	7.9
Level of Service	D	D	A		A	A
Approach Delay (s)	48.5		8.7			7.6
Approach LOS	D		A			A

Intersection Summary

HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Sir Francis Drake & Lagunitas

07/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗				↖	↗		↖	↗	↖
Traffic Volume (vph)	0	5	90	0	0	0	65	1010	30	30	620	55
Future Volume (vph)	0	5	90	0	0	0	65	1010	30	30	620	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5				3.5	4.3		3.5	4.3	4.3
Lane Util. Factor		1.00	1.00				1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85				1.00	1.00		1.00	1.00	0.85
Flt Protected		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1863	1583				1770	1855		1770	1863	1583
Flt Permitted		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1863	1583				1770	1855		1770	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	5	98	0	0	0	71	1098	33	33	674	60
RTOR Reduction (vph)	0	0	84	0	0	0	0	1	0	0	0	20
Lane Group Flow (vph)	0	5	14	0	0	0	71	1130	0	33	674	40
Turn Type		NA	Perm				Prot	NA		Prot	NA	Perm
Protected Phases		8					5	2 7		1	6 7	
Permitted Phases	8		8									6 7
Actuated Green, G (s)		17.5	17.5				12.1	81.5		10.5	79.9	79.9
Effective Green, g (s)		17.5	17.5				12.1	81.5		10.5	79.9	79.9
Actuated g/C Ratio		0.15	0.15				0.10	0.68		0.09	0.67	0.67
Clearance Time (s)		3.5	3.5				3.5			3.5		
Vehicle Extension (s)		3.0	3.0				3.0			3.0		
Lane Grp Cap (vph)		271	230				178	1259		154	1240	1054
v/s Ratio Prot		0.00					c0.04	c0.61		0.02	0.36	
v/s Ratio Perm			c0.01									0.03
v/c Ratio		0.02	0.06				0.40	0.90		0.21	0.54	0.04
Uniform Delay, d1		43.9	44.2				50.5	15.8		50.9	10.5	6.9
Progression Factor		1.00	1.00				1.00	1.00		1.32	0.75	0.34
Incremental Delay, d2		0.0	0.1				1.5	8.5		0.7	0.2	0.0
Delay (s)		43.9	44.3				52.0	24.3		68.0	8.1	2.4
Level of Service		D	D				D	C		E	A	A
Approach Delay (s)		44.3			0.0			25.9			10.2	
Approach LOS		D			A			C			B	
Intersection Summary												
HCM 2000 Control Delay			21.0				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			14.8		
Intersection Capacity Utilization			69.4%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

11: Bolinas Ave & San Anselmo Ave

07/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔					↖	↗	
Traffic Volume (vph)	55	185	5	0	180	0	0	0	0	70	10	0
Future Volume (vph)	55	185	5	0	180	0	0	0	0	70	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		4.0					7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00					1.00	1.00	
Frt		1.00	0.85		1.00					1.00	1.00	
Flt Protected		0.99	1.00		1.00					0.95	1.00	
Satd. Flow (prot)		1842	1583		1863					1770	1863	
Flt Permitted		0.88	1.00		1.00					0.95	1.00	
Satd. Flow (perm)		1644	1583		1863					1770	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)	60	201	5	0	196	0	0	0	0	76	11	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	261	1	0	196	0	0	0	0	76	11	0
Turn Type	Perm	NA	Perm		NA					Split	NA	
Protected Phases		8			1 2					7	7	
Permitted Phases	8		8	1 2								
Actuated Green, G (s)		24.8	24.8		71.2					10.4	10.4	
Effective Green, g (s)		24.8	24.8		71.2					10.4	10.4	
Actuated g/C Ratio		0.21	0.21		0.59					0.09	0.09	
Clearance Time (s)		3.0	3.0							7.0	7.0	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		339	327		1105					153	161	
v/s Ratio Prot					c0.11					c0.04	0.01	
v/s Ratio Perm		c0.16	0.00									
v/c Ratio		0.77	0.00		0.18					0.50	0.07	
Uniform Delay, d1		44.9	37.8		11.1					52.3	50.3	
Progression Factor		1.00	1.00		0.05					1.00	1.00	
Incremental Delay, d2		10.1	0.0		0.1					2.5	0.2	
Delay (s)		55.0	37.8		0.6					54.8	50.5	
Level of Service		E	D		A					D	D	
Approach Delay (s)		54.7			0.6			0.0			54.3	
Approach LOS		D			A			A			D	
Intersection Summary												
HCM 2000 Control Delay			35.3		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)					17.6		
Intersection Capacity Utilization			38.9%		ICU Level of Service					A		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Sir Francis Drake & Bolinas Ave

07/09/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	134	122	227	450	765	158
Future Volume (vph)	134	122	227	450	765	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	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)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	133	247	489	832	172
RTOR Reduction (vph)	0	97	0	0	0	0
Lane Group Flow (vph)	146	36	247	489	832	172
Turn Type	Prot	Perm	Prot	NA	NA	Prot
Protected Phases	7 8		1	6	2	2
Permitted Phases		7 8				
Actuated Green, G (s)	35.2	35.2	22.0	74.2	48.2	48.2
Effective Green, g (s)	32.2	32.2	22.0	74.2	48.2	48.2
Actuated g/C Ratio	0.27	0.27	0.18	0.62	0.40	0.40
Clearance Time (s)			4.0	3.6	3.6	3.6
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	474	424	324	2188	1421	635
v/s Ratio Prot	c0.08		c0.14	0.14	c0.24	0.11
v/s Ratio Perm		0.02				
v/c Ratio	0.31	0.08	0.76	0.22	0.59	0.27
Uniform Delay, d1	35.0	32.9	46.5	10.1	28.1	24.1
Progression Factor	0.02	0.00	1.26	0.83	1.00	1.00
Incremental Delay, d2	0.3	0.1	9.4	0.2	1.8	1.0
Delay (s)	0.9	0.1	67.9	8.6	29.9	25.2
Level of Service	A	A	E	A	C	C
Approach Delay (s)	0.5			28.5	29.1	
Approach LOS	A			C	C	

Intersection Summary

HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Sir Francis Drake & Laurel Grove Avenue

07/09/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	36	642	37	29	854
Future Volume (vph)	88	36	642	37	29	854
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	4.3		4.3	4.3
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1849		1770	1863
Flt Permitted	0.95	1.00	1.00		0.34	1.00
Satd. Flow (perm)	1770	1583	1849		634	1863
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	92	38	669	39	30	890
RTOR Reduction (vph)	0	34	2	0	0	0
Lane Group Flow (vph)	92	4	706	0	30	890
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	7		2 1 8			6 8 5
Permitted Phases		7			6 8 5	
Actuated Green, G (s)	12.0	12.0	100.2		100.2	100.2
Effective Green, g (s)	12.0	12.0	93.2		93.2	93.2
Actuated g/C Ratio	0.10	0.10	0.78		0.78	0.78
Clearance Time (s)	3.5	3.5				
Vehicle Extension (s)	1.5	1.5				
Lane Grp Cap (vph)	177	158	1436		492	1446
v/s Ratio Prot	c0.05		0.38			c0.48
v/s Ratio Perm		0.00			0.05	
v/c Ratio	0.52	0.02	0.49		0.06	0.62
Uniform Delay, d1	51.3	48.7	4.8		3.1	5.7
Progression Factor	1.00	1.00	0.90		0.22	2.78
Incremental Delay, d2	1.1	0.0	0.2		0.0	0.7
Delay (s)	52.3	48.7	4.6		0.7	16.6
Level of Service	D	D	A		A	B
Approach Delay (s)	51.3		4.6			16.1
Approach LOS	D		A			B

Intersection Summary

HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Sir Francis Drake & Lagunitas

07/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗				↖	↗		↖	↗	↖
Traffic Volume (vph)	0	20	85	0	0	0	110	682	30	25	760	200
Future Volume (vph)	0	20	85	0	0	0	110	682	30	25	760	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5				3.5	4.3		3.5	4.3	4.3
Lane Util. Factor		1.00	1.00				1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85				1.00	0.99		1.00	1.00	0.85
Flt Protected		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1863	1583				1770	1851		1770	1863	1583
Flt Permitted		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1863	1583				1770	1851		1770	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	22	92	0	0	0	120	741	33	27	826	217
RTOR Reduction (vph)	0	0	78	0	0	0	0	1	0	0	0	30
Lane Group Flow (vph)	0	22	14	0	0	0	120	773	0	27	826	187
Turn Type		NA	Perm				Prot	NA		Prot	NA	Perm
Protected Phases		8					5	2 7		1	6 7	
Permitted Phases	8		8									6 7
Actuated Green, G (s)		18.0	18.0				14.4	81.6		9.9	77.1	77.1
Effective Green, g (s)		18.0	18.0				14.4	81.6		9.9	77.1	77.1
Actuated g/C Ratio		0.15	0.15				0.12	0.68		0.08	0.64	0.64
Clearance Time (s)		3.5	3.5				3.5			3.5		
Vehicle Extension (s)		3.0	3.0				3.0			3.0		
Lane Grp Cap (vph)		279	237				212	1258		146	1196	1017
v/s Ratio Prot		c0.01					c0.07	0.42		0.02	c0.44	
v/s Ratio Perm			0.01									0.12
v/c Ratio		0.08	0.06				0.57	0.61		0.18	0.69	0.18
Uniform Delay, d1		43.9	43.7				49.9	10.6		51.3	13.8	8.7
Progression Factor		1.00	1.00				1.00	1.00		1.17	0.52	0.38
Incremental Delay, d2		0.1	0.1				3.4	0.6		0.5	1.2	0.0
Delay (s)		44.0	43.8				53.3	11.2		60.8	8.4	3.3
Level of Service		D	D				D	B		E	A	A
Approach Delay (s)		43.9			0.0			16.8			8.7	
Approach LOS		D			A			B			A	

Intersection Summary		
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.60	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	64.4%	14.8
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

11: Bolinas Ave & San Anselmo Ave

07/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔					↖	↗	
Traffic Volume (vph)	20	199	5	0	385	0	0	0	0	57	10	0
Future Volume (vph)	20	199	5	0	385	0	0	0	0	57	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		4.0					7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00					1.00	1.00	
Frt		1.00	0.85		1.00					1.00	1.00	
Flt Protected		1.00	1.00		1.00					0.95	1.00	
Satd. Flow (prot)		1854	1583		1863					1770	1863	
Flt Permitted		0.94	1.00		1.00					0.95	1.00	
Satd. Flow (perm)		1751	1583		1863					1770	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)	22	216	5	0	418	0	0	0	0	62	11	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	238	1	0	418	0	0	0	0	62	11	0
Turn Type	Perm	NA	Perm		NA					Split	NA	
Protected Phases		8			1 2					7	7	
Permitted Phases	8		8	1 2								
Actuated Green, G (s)		22.5	22.5		74.2					9.7	9.7	
Effective Green, g (s)		22.5	22.5		74.2					9.7	9.7	
Actuated g/C Ratio		0.19	0.19		0.62					0.08	0.08	
Clearance Time (s)		3.0	3.0							7.0	7.0	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		328	296		1151					143	150	
v/s Ratio Prot					c0.22					c0.04	0.01	
v/s Ratio Perm		c0.14	0.00									
v/c Ratio		0.73	0.00		0.36					0.43	0.07	
Uniform Delay, d1		45.8	39.6		11.3					52.5	51.0	
Progression Factor		1.00	1.00		0.04					1.00	1.00	
Incremental Delay, d2		7.8	0.0		0.2					2.1	0.2	
Delay (s)		53.6	39.6		0.6					54.6	51.2	
Level of Service		D	D		A					D	D	
Approach Delay (s)		53.3			0.6			0.0			54.1	
Approach LOS		D			A			A			D	

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Sir Francis Drake & Bolinas Ave

07/09/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	135	140	102	915	560	92
Future Volume (vph)	135	140	102	915	560	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	3.6	3.6	3.6
Lane Util. Factor	1.00	1.00	1.00	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)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	152	111	995	609	100
RTOR Reduction (vph)	0	106	0	0	0	0
Lane Group Flow (vph)	147	46	111	995	609	100
Turn Type	Prot	Perm	Prot	NA	NA	Prot
Protected Phases	7 8		1	6	2	2
Permitted Phases		7 8				
Actuated Green, G (s)	39.4	39.4	12.7	70.0	53.3	53.3
Effective Green, g (s)	36.4	36.4	12.7	70.0	53.3	53.3
Actuated g/C Ratio	0.30	0.30	0.11	0.58	0.44	0.44
Clearance Time (s)			4.0	3.6	3.6	3.6
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	536	480	187	2064	1571	703
v/s Ratio Prot	c0.08		c0.06	c0.28	0.17	0.06
v/s Ratio Perm		0.03				
v/c Ratio	0.27	0.10	0.59	0.48	0.39	0.14
Uniform Delay, d1	31.8	30.0	51.2	14.5	22.4	19.8
Progression Factor	0.02	0.00	1.01	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	3.8	0.6	0.7	0.4
Delay (s)	0.9	0.1	55.6	15.1	23.1	20.2
Level of Service	A	A	E	B	C	C
Approach Delay (s)	0.5			19.2	22.7	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Sir Francis Drake & Laurel Grove Avenue

07/09/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	19	36	986	34	32	646
Future Volume (vph)	19	36	986	34	32	646
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5	4.3		4.3	4.3
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	1854		1770	1863
Flt Permitted	0.95	1.00	1.00		0.18	1.00
Satd. Flow (perm)	1770	1583	1854		329	1863
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	20	38	1027	35	33	673
RTOR Reduction (vph)	0	34	1	0	0	0
Lane Group Flow (vph)	20	4	1061	0	33	673
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	7		2 1 8			6 8 5
Permitted Phases		7			6 8 5	
Actuated Green, G (s)	12.5	12.5	99.7		99.7	99.7
Effective Green, g (s)	12.5	12.5	92.7		92.7	92.7
Actuated g/C Ratio	0.10	0.10	0.77		0.77	0.77
Clearance Time (s)	3.5	3.5				
Vehicle Extension (s)	1.5	1.5				
Lane Grp Cap (vph)	184	164	1432		254	1439
v/s Ratio Prot	c0.01		c0.57			0.36
v/s Ratio Perm		0.00			0.10	
v/c Ratio	0.11	0.02	0.74		0.13	0.47
Uniform Delay, d1	48.7	48.3	7.3		3.5	4.9
Progression Factor	1.00	1.00	1.12		0.36	1.66
Incremental Delay, d2	0.1	0.0	0.8		0.2	0.2
Delay (s)	48.8	48.3	9.0		1.5	8.3
Level of Service	D	D	A		A	A
Approach Delay (s)	48.5		9.0			8.0
Approach LOS	D		A			A

Intersection Summary

HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Sir Francis Drake & Lagunitas

07/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗				↖	↗		↖	↗	↖
Traffic Volume (vph)	0	5	90	0	0	0	65	1017	30	30	629	55
Future Volume (vph)	0	5	90	0	0	0	65	1017	30	30	629	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5				3.5	4.3		3.5	4.3	4.3
Lane Util. Factor		1.00	1.00				1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85				1.00	1.00		1.00	1.00	0.85
Flt Protected		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1863	1583				1770	1855		1770	1863	1583
Flt Permitted		1.00	1.00				0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1863	1583				1770	1855		1770	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	5	98	0	0	0	71	1105	33	33	684	60
RTOR Reduction (vph)	0	0	84	0	0	0	0	1	0	0	0	20
Lane Group Flow (vph)	0	5	14	0	0	0	71	1137	0	33	684	40
Turn Type		NA	Perm				Prot	NA		Prot	NA	Perm
Protected Phases		8					5	2 7		1	6 7	
Permitted Phases	8		8									6 7
Actuated Green, G (s)		17.5	17.5				12.3	81.5		10.5	79.7	79.7
Effective Green, g (s)		17.5	17.5				12.3	81.5		10.5	79.7	79.7
Actuated g/C Ratio		0.15	0.15				0.10	0.68		0.09	0.66	0.66
Clearance Time (s)		3.5	3.5				3.5			3.5		
Vehicle Extension (s)		3.0	3.0				3.0			3.0		
Lane Grp Cap (vph)		271	230				181	1259		154	1237	1051
v/s Ratio Prot		0.00					c0.04	c0.61		0.02	0.37	
v/s Ratio Perm			c0.01									0.03
v/c Ratio		0.02	0.06				0.39	0.90		0.21	0.55	0.04
Uniform Delay, d1		43.9	44.2				50.4	16.0		50.9	10.7	6.9
Progression Factor		1.00	1.00				1.00	1.00		1.32	0.69	0.32
Incremental Delay, d2		0.0	0.1				1.4	9.1		0.7	0.3	0.0
Delay (s)		43.9	44.3				51.8	25.0		67.8	7.7	2.2
Level of Service		D	D				D	C		E	A	A
Approach Delay (s)		44.3			0.0			26.6			9.8	
Approach LOS		D			A			C			A	

Intersection Summary		
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.75	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 14.8
Intersection Capacity Utilization	69.8%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

11: Bolinas Ave & San Anselmo Ave

07/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔					↖	↗	
Traffic Volume (vph)	55	203	5	0	194	0	0	0	0	70	10	0
Future Volume (vph)	55	203	5	0	194	0	0	0	0	70	10	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0		4.0					7.0	7.0	
Lane Util. Factor		1.00	1.00		1.00					1.00	1.00	
Frt		1.00	0.85		1.00					1.00	1.00	
Flt Protected		0.99	1.00		1.00					0.95	1.00	
Satd. Flow (prot)		1843	1583		1863					1770	1863	
Flt Permitted		0.89	1.00		1.00					0.95	1.00	
Satd. Flow (perm)		1652	1583		1863					1770	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)	60	221	5	0	211	0	0	0	0	76	11	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	281	1	0	211	0	0	0	0	76	11	0
Turn Type	Perm	NA	Perm		NA					Split	NA	
Protected Phases		8			1 2					7	7	
Permitted Phases	8		8	1 2								
Actuated Green, G (s)		25.8	25.8		70.0					10.6	10.6	
Effective Green, g (s)		25.8	25.8		70.0					10.6	10.6	
Actuated g/C Ratio		0.22	0.22		0.58					0.09	0.09	
Clearance Time (s)		3.0	3.0							7.0	7.0	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		355	340		1086					156	164	
v/s Ratio Prot					c0.11					c0.04	0.01	
v/s Ratio Perm		c0.17	0.00									
v/c Ratio		0.79	0.00		0.19					0.49	0.07	
Uniform Delay, d1		44.6	37.0		11.7					52.1	50.2	
Progression Factor		1.00	1.00		0.04					1.00	1.00	
Incremental Delay, d2		11.4	0.0		0.1					2.4	0.2	
Delay (s)		56.0	37.0		0.6					54.5	50.3	
Level of Service		E	D		A					D	D	
Approach Delay (s)		55.7			0.6			0.0			54.0	
Approach LOS		E			A			A			D	

Intersection Summary

HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group