

November 19, 2018

Ryan Mott
Regional Manager, Melcor USA
6930 E. Chauncey Lane, Suite 135
Phoenix, AZ 85054

OV1801921

OV #1901060

PERMIT #2402455

ENGINEERING HAS NO
ADDITIONAL
COMMENTS

SUBJECT: Traffic Impact Statement for **Rivers Edge Development**
Located at the northwest corner of Shore Cliff Dr/Lambert Ln, Oro Valley, AZ
Rick Engineering Job No. P4824A

Dear Mr. Mott:

This Traffic Impact Statement is developed to present assessments of the site access/driveway visibility; to quantify the anticipated traffic generation; and to evaluate the traffic operational impact on the major intersections in the project vicinity due to the proposed Rivers Edge development located at the northwest corner of Shore Cliff Dr & Lambert Ln in Oro Valley, Arizona. **Figure 1** shows the vicinity map.

Project Site



Figure 1: Vicinity Map

BACKGROUND

The proposed site consists of 21 single-family detached dwelling units. **Attachment-A** contains the conceptual site plan. The proposed site access is off of Shore Cliff Dr. which

is a 35-foot wide local road with 25 mph posted speed limit (**Figure 2**) and provides access to the residential area located south of the proposed site. There is a 4-foot wide sidewalk for pedestrian access along the south side of Shore Cliff Dr. An intersection sight triangle field test was performed following the American Association of State Highway and Transportation Officials

(AASHTO) published guidelines described in "A Policy on Geometric Design of Highways and Streets - 2011". It is found that more than 450 feet (**Figure 3**) intersection stopping sight distance is available at the project site access (greater than required 335 feet, for <3% grade).

Lambert Ln is a 3-lane road (2-lane both-ways with a two-way-left-turn center lane) with 45 mph posted speed limit. It connects to Pusch View Ln on the south-west, and 1st Ave to the north-east and provides access to the residential areas in the vicinity.

There are multi-use path/sidewalks along both sides of it to provide access to non-motorized travel modes (**Figure 4**).

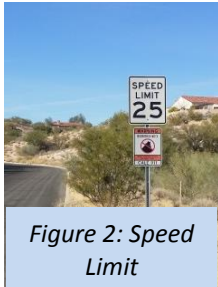


Figure 2: Speed Limit



Figure 3: AASHTO Intersection Stopping Sight Distance



Figure 4: Multiuse path and sidewalks along Lambert Ln



The Lambert Ln/Shore Cliff Dr intersection is STOP-controlled and Lambert Ln has dedicated left-turn lanes for both northbound and southbound left-turning vehicles. Based on 24-hour traffic on March 2017, Lambert Ln carries about 4,700 ADT (**Attachment-B**).

ESTIMATION OF PROJECT TRAFFIC GENERATION

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th edition was utilized to estimate the development related to new trips. A total of 199 new daily trips are anticipated to generate from the development which would add 16 new trips (4-inbound/12-outbound) in the AM peak-hour, and 21 new trips (13-inbound/8-outbound) in the PM peak-hour (**Table 1**).

Table 1: Estimates of New Trip Generation

LAND USE, CODE & UNIT	SIZE	DAILY RATE (TRIP/UNIT)	ADT	AM PEAK					PM PEAK				
				RATE (TRIP/UNIT)	IN/OUT (%)	VOLUME			RATE (TRIP/UNIT)	IN/OUT (%)	VOLUME		
						IN	OUT	TOTAL			IN	OUT	TOTAL
Single - Family Detached Housing Land Use Code -210 Units - Dwelling Units	21	9.44	199	0.74	25/75	4	12	16	0.99	63/37	13	8	21

TRAFFIC OPERATIONAL IMPACT ASSESSMENT

Traffic turning movement counts (TMC) for both AM and PM peak-hours are conducted on March 27 for both Shore Cliff Dr/Lambert Ln, and Lambert Ln/Pusch View Ln intersections (**Attachment-C**). TMC at Lambert Ln/1st Ave intersection was obtained from the Pima Association of Governments (PAG) Transportation Data Management System (TDMS) (<http://pag.ms2soft.com/tcds/tsearch.asp?loc=Pag&mod=>) which was conducted in 2016 (**Attachment-D**). A 5% annual growth was estimated from the PAG TDMS data for the study vicinity and applied to this TMC to estimate 2018 TMC. The Town suggested a 90 second cycle length and a permissive-protected left-turn to use for the Lambert Ln/1st Ave signal timing plan and synchro optimization.

No vehicle queuing or excessive delay at any intersections was observed during the field visit. Level-of-Service (LOS) and delay are also analyzed using Synchro v9 (**Attachment-E**) for both existing and with project traffic conditions (**Table 2**). All approaches (and movements, as appropriate) of all intersections are expected to be operated at LOS D or better for both existing and with project traffic conditions.

Table 2: Delay and Level-of-Service Analysis Summary for both Existing and with Project Generated New Traffic

Intersection (signalized/unsignalized)	Approach/ Movement	Existing				With Project Traffic			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Site Access/Shore Cliff Dr (unsignalized)	Left-turn from the site	-	-	-	-	8.6	A	8.7	A
Lambert Ln/Shore Cliff Dr (unsignalized)	EBL/EBR	11.3	B	10.5	B	11.7	B	10.9	B
	WBL/WBR	12.0	B	11.8	B	12.2	B	12.0	B
	NBL	7.7	A	7.7	A	7.7	A	7.8	A
	SBL	7.7	A	7.6	A	7.7	A	7.6	A
Lambert Ln/ Pusch View Ln (unsignalized)	EBL	8.5	A	9.2	A	8.5	A	9.2	A
	SBL	33.7	D	24.8	C	34.4	D	25.3	D
	SBR	10.3	B	12.5	B	10.4	B	12.6	B
Lambert Ln/1st Ave (signalized)	NB	5.6	A	13.4	B	5.6	A	13.5	B
	EB	23.4	C	20.9	C	23.3	C	21.0	C
	WB	16.9	B	9.7	A	16.9	B	9.7	A

CONCLUSIONS/RECOMMENDATIONS

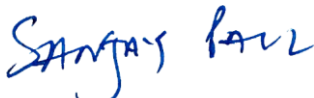
The following conclusions and recommendations are identified from the analysis conducted with respect to the proposed Rivers Edge development:

- The proposed development site consists of 21 single-family detached dwelling units. Only one access to the site is proposed off to Shore Cliff Dr. The available site visibility is more than 450 feet (greater than AASHTO required 335 feet).
- While construction, the contractor should make sure that no vegetation or structures create any obstacles on the line of sight of the drivers exiting the development site driveway. Also, the site's approach driveway onto Shore Cliff Dr should be STOP-controlled.
- The site is anticipated to generate 199 new daily trips, 16 new AM peak-hour trips (4-inbound/12-outbound), and 21 new PM peak-hour trips (13-inbound/8-outbound).
- No vehicle queuing or excessive delay at any intersections was observed during the field visit. Also all intersections in the study vicinity are operating at Level of Service D or better at existing condition. The intersections are also anticipated to operate at LOS D or better with project traffic condition.
- A connection between the sidewalk to the project site and the nearest sidewalk or the multiuse path is recommended to provide access to the pedestrians from/to the site. The pedestrian crossings should be in compliance with the Americans with Disabilities Act (ADA) ensuring full accessibility to all types of pedestrians.

Should you have any questions, please do not hesitate to contact me at spaul@rickengineering.com or 602.957.3350 (office) or 480.559.2623 (cell).

Very truly yours,

RICK ENGINEERING COMPANY



Sanjay Paul, PhD, PE, PTOE, PTP
Principal Traffic Engineer



Attachments

Attachment-A
Conceptual Site Plan



Conceptual Proposed Site Plan

**Attachment-B
24-hour Traffic Data on Lambert Ln
(Next to proposed development site)**

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Tuesday, March 27, 2018

City: Oro Valley

Project #: 18-1156-003

Location: Lambert Ln. btwn. Lambert Ln. / Pusch View Ln. & Shore Cliff Dr.

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00			1	1	12:00			38	43
00:15			0	2	12:15			36	43
00:30			0	0	12:30			45	45
00:45			0	1	12:45			40	159
01:00			1	0	13:00			39	58
01:15			0	1	13:15			27	57
01:30			0	1	13:30			29	51
01:45			0	1	13:45			46	141
02:00			0	1	14:00			44	41
02:15			0	0	14:15			34	36
02:30			0	1	14:30			44	57
02:45			1	1	14:45			39	161
03:00			0	0	15:00			46	59
03:15			1	0	15:15			46	58
03:30			0	0	15:30			47	55
03:45			2	3	15:45			45	184
04:00			0	3	16:00			42	69
04:15			1	0	16:15			43	51
04:30			2	1	16:30			52	49
04:45			6	9	16:45			42	179
05:00			1	3	17:00			39	46
05:15			5	6	17:15			26	65
05:30			1	9	17:30			32	52
05:45			12	19	17:45			32	129
06:00			6	7	18:00			37	33
06:15			13	18	18:15			22	31
06:30			7	12	18:30			26	27
06:45			21	47	18:45			20	105
07:00			22	35	19:00			26	32
07:15			54	38	19:15			16	29
07:30			52	65	19:30			22	18
07:45			61	189	19:45			24	88
08:00			41	56	20:00			16	15
08:15			34	42	20:15			15	12
08:30			44	27	20:30			8	17
08:45			36	155	20:45			13	52
09:00			39	37	21:00			12	10
09:15			41	29	21:15			12	8
09:30			45	28	21:30			4	7
09:45			50	175	21:45			6	34
10:00			54	30	22:00			6	8
10:15			41	33	22:15			0	6
10:30			42	39	22:30			4	5
10:45			44	181	22:45			2	12
11:00			52	44	23:00			1	4
11:15			48	33	23:15			1	4
11:30			51	32	23:30			1	2
11:45			41	192	23:45			1	4

Total Vol. 973 884 **1857** 1248 1588 **2836**

GPS Coordinates: 32.400486, -110.968228

Daily Totals

NB	SB	EB	WB	Combined
		2221	2472	4693

AM

Split %	52.4%	47.6%	39.6%
Peak Hour	07:15	07:30	07:15
Volume	208	224	428
P.H.F.	0.85	0.86	0.88

PM

44.0%	56.0%	60.4%
15:00	15:15	15:15
184	260	440
0.98	0.83	0.89

Attachment-C
Intersection Traffic Movement Counts
(At Shore Cliff Dr/Lambert Ln; and Lambert Ln/Pusch View Ln)

Project #: 18-1156-001

TMC SUMMARY OF Shore Cliff Dr. & Lambert Ln.

Shore Cliff Dr.

Lambert Ln.

APPROACH LANES			
	AM	MD	PM
TOTAL	2	7	9
	0	0	0
	7	4	11

CONTROL
2-Way Stio
NB-SB

	AM	MD	PM
TOTAL	13	0	5
	0	0	0
	2	1	1

APPROACH LANES

N

Lambert Ln.

	TOTAL	AM	MD	PM
	6	1		5
	383	205		178
	9	6		3

APPROACH LANES

	AM	MD	PM	TOTAL
	2		3	5
	213		222	435
	1		4	5

APPROACH LANES

LOCATION #: 18-1156-001

TURNING MOVEMENT COUNT

Shore Cliff Dr. & Lambert Ln.
(Intersection Name)

TUESDAY 03/27/18
Day Date

COUNT PERIODS

AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR _____

PM PEAK HOUR 400 PM

Project #: 18-1156-002

TMC SUMMARY OF Lambert Ln. & Lambert Ln/Pusch View Ln

Lambert Ln.

Lambert Ln/Pusch View Ln

APPROACH LANES			
	AM	MD	PM
TOTAL	161	0	68
	200	0	35
	361	0	103

N

Lambert Ln/Pusch View Ln

TOTAL	AM	MD	PM
283	180		103
913	573		340
0	0		0

CONTROL

AM	MD	PM	TOTAL
36		59	95
267		492	759
0		0	0

Lambert Ln.

APPROACH LANES

	AM	MD	PM
TOTAL	0	0	0
	0	0	0
	0	0	0

APPROACH LANES

LOCATION #: 18-1156-002

TURNING MOVEMENT COUNT

Lambert Ln. & Lambert Ln/Pusch View
(Intersection Name)

TUESDAY 03/27/18
Day Date

COUNT PERIODS

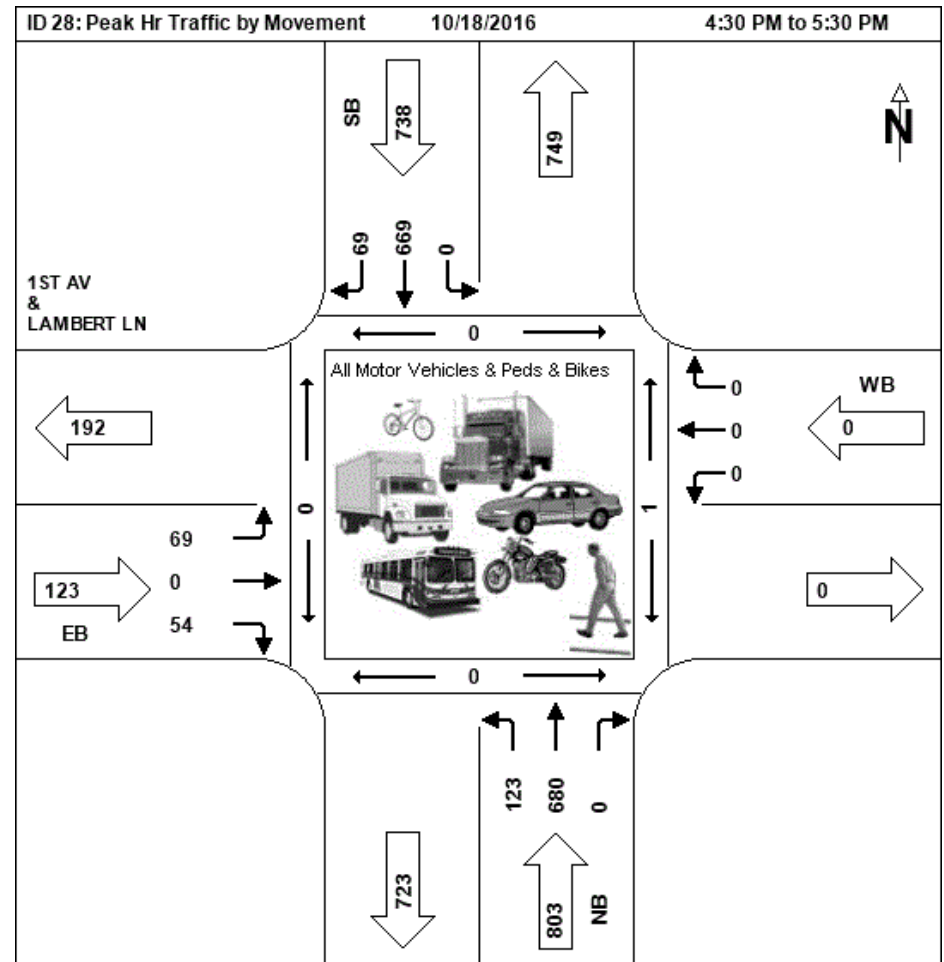
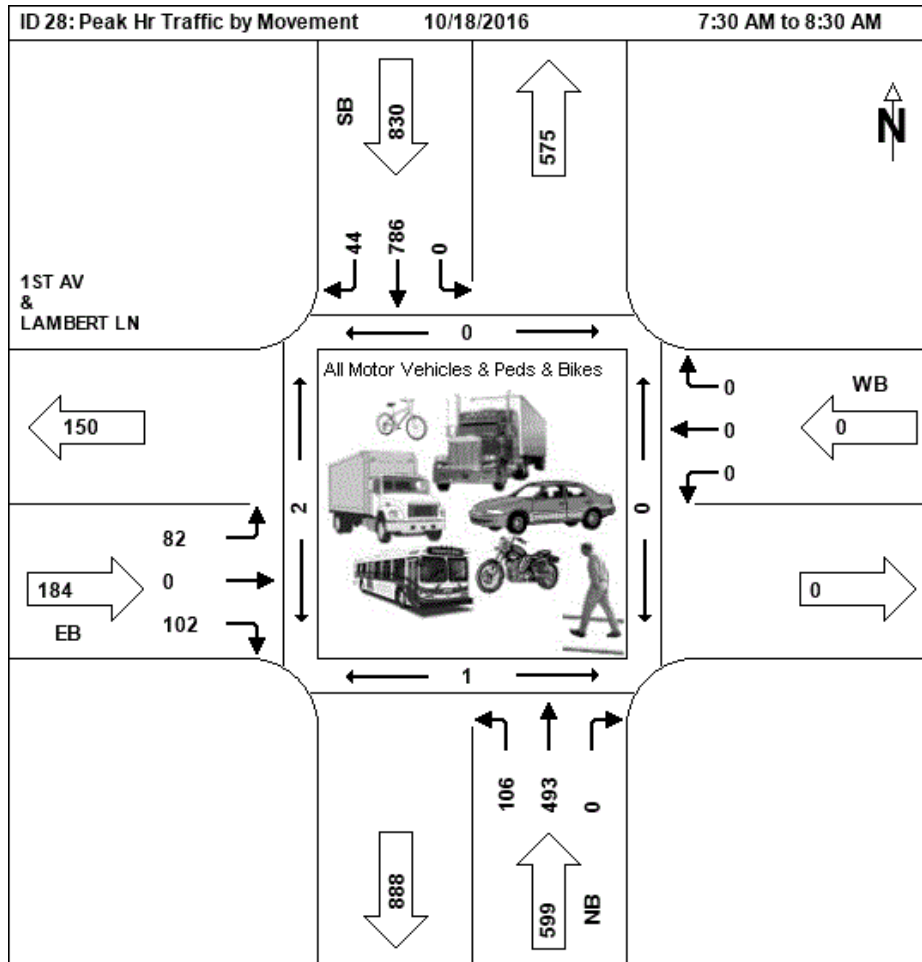
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR _____

PM PEAK HOUR 430 PM

Attachment-D
Lambert Ln/1st Ave Traffic Movement Count
(Source: PAG TDMS - <http://pag.ms2soft.com/tcds/tsearch.asp?loc=Pag&mod=>)



Lambert Ln/1st Ave Traffic Movement Count.

Source: <http://pag.ms2soft.com/tcds/tsearch.asp?loc=Pag&mod=>

Attachment- E Synchro Outputs

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↵	↑↑	↵	↵
Traffic Volume (vph)	205	49	117	544	90	112
Future Volume (vph)	205	49	117	544	90	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	250
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.971					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3437	0	1770	3539	1770	1583
Flt Permitted			0.403		0.950	
Satd. Flow (perm)	3437	0	751	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	33					122
Link Speed (mph)	30			30	30	
Link Distance (ft)	540			638	2580	
Travel Time (s)	12.3			14.5	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	53	127	591	98	122
Shared Lane Traffic (%)						
Lane Group Flow (vph)	276	0	127	591	98	122
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	31.0		23.0	54.0	36.0	36.0
Total Split (%)	34.4%		25.6%	60.0%	40.0%	40.0%
Maximum Green (s)	27.0		19.0	50.0	32.0	32.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	10.6		20.6	20.6	32.3	32.3
Actuated g/C Ratio	0.17		0.34	0.34	0.53	0.53
v/c Ratio	0.44		0.32	0.49	0.10	0.14
Control Delay	23.4		15.9	17.1	9.3	2.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.4		15.9	17.1	9.3	2.7
LOS	C		B	B	A	A
Approach Delay	23.4			16.9	5.6	
Approach LOS	C			B	A	
Queue Length 50th (ft)	44		32	88	17	0
Queue Length 95th (ft)	80		64	127	45	24
Internal Link Dist (ft)	460			558	2500	
Turn Bay Length (ft)			250			250
Base Capacity (vph)	1553		598	2926	936	895
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.18		0.21	0.20	0.10	0.14

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 61

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 16.3

Intersection LOS: B

Intersection Capacity Utilization 28.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Lambert Ln & 1st Ave

↙ Ø2	↖ Ø3	→ Ø4
36 s	23 s	31 s
	↙ Ø8	
	54 s	

HCM Unsignalized Intersection Capacity Analysis

1: Lambert Ln & Pusch View Ln

04/05/2018

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	180	573	267	36	68	161	
Future Volume (Veh/h)	180	573	267	36	68	161	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	196	623	290	39	74	175	
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	329				1013	164	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	329				1013	164	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	84				63	79	
cM capacity (veh/h)	1227				198	851	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	196	312	312	193	136	74	175
Volume Left	196	0	0	0	0	74	0
Volume Right	0	0	0	0	39	0	175
cSH	1227	1700	1700	1700	1700	198	851
Volume to Capacity	0.16	0.18	0.18	0.11	0.08	0.37	0.21
Queue Length 95th (ft)	14	0	0	0	0	41	19
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	33.7	10.3
Lane LOS	A					D	B
Approach Delay (s)	2.0			0.0		17.3	
Approach LOS						C	
Intersection Summary							
Average Delay			4.3				
Intersection Capacity Utilization			32.3%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

3: Lambert Ln & Shore Cliff Dr

04/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	2	13	0	2	1	205	6	1	213	2
Future Volume (Veh/h)	7	0	2	13	0	2	1	205	6	1	213	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)	8	0	2	14	0	2	1	223	7	1	232	2
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	462	467	233	464	464	226	234				230	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	462	467	233	464	464	226	234				230	
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 %	98	100	100	97	100	100	100				100	
cM capacity (veh/h)	508	493	806	506	494	813	1333				1338	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	16	1	230	1	234						
Volume Left	8	14	1	0	1	0						
Volume Right	2	2	0	7	0	2						
cSH	549	531	1333	1700	1338	1700						
Volume to Capacity	0.02	0.03	0.00	0.14	0.00	0.14						
Queue Length 95th (ft)	1	2	0	0	0	0						
Control Delay (s)	11.7	12.0	7.7	0.0	7.7	0.0						
Lane LOS	B	B	A	A								
Approach Delay (s)	11.7	12.0	0.0	0.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay	0.7											
Intersection Capacity Utilization	21.3%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

6: Shore Cliff Dr & Site Access

04/05/2018

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
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	0	0	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	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↓	↑↑	↓	↑
Traffic Volume (vph)	738	76	136	750	76	60
Future Volume (vph)	738	76	136	750	76	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	250
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.986					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3490	0	1770	3539	1770	1583
Flt Permitted			0.152		0.950	
Satd. Flow (perm)	3490	0	283	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	16					65
Link Speed (mph)	30			30	30	
Link Distance (ft)	540			638	2580	
Travel Time (s)	12.3			14.5	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	802	83	148	815	83	65
Shared Lane Traffic (%)						
Lane Group Flow (vph)	885	0	148	815	83	65
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	46.0		18.0	64.0	26.0	26.0
Total Split (%)	51.1%		20.0%	71.1%	28.9%	28.9%
Maximum Green (s)	42.0		14.0	60.0	22.0	22.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	24.0		36.3	36.3	22.2	22.2
Actuated g/C Ratio	0.36		0.55	0.55	0.33	0.33
v/c Ratio	0.70		0.44	0.42	0.14	0.11
Control Delay	20.9		11.3	9.4	18.9	6.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	20.9		11.3	9.4	18.9	6.4
LOS	C		B	A	B	A
Approach Delay	20.9			9.7	13.4	
Approach LOS	C			A	B	
Queue Length 50th (ft)	153		27	92	23	0
Queue Length 95th (ft)	220		50	126	64	27
Internal Link Dist (ft)	460			558	2500	
Turn Bay Length (ft)			250			250
Base Capacity (vph)	2231		470	3188	591	572
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.40		0.31	0.26	0.14	0.11

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 66.6

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 15.0

Intersection LOS: B

Intersection Capacity Utilization 44.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Lambert Ln & 1st Ave

↙ Ø2	↘ Ø3	→ Ø4
26 s	18 s	46 s
	↖ Ø8	
	64 s	

HCM Unsignalized Intersection Capacity Analysis

1: Lambert Ln & Pusch View Ln

04/05/2018

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	103	340	492	59	35	200	
Future Volume (Veh/h)	103	340	492	59	35	200	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	112	370	535	64	38	217	
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	599				976	300	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	599				976	300	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	89				83	69	
cM capacity (veh/h)	974				220	697	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	112	185	185	357	242	38	217
Volume Left	112	0	0	0	0	38	0
Volume Right	0	0	0	0	64	0	217
cSH	974	1700	1700	1700	1700	220	697
Volume to Capacity	0.11	0.11	0.11	0.21	0.14	0.17	0.31
Queue Length 95th (ft)	10	0	0	0	0	15	33
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	24.8	12.5
Lane LOS	A					C	B
Approach Delay (s)	2.1			0.0		14.3	
Approach LOS						B	
Intersection Summary							
Average Delay			3.5				
Intersection Capacity Utilization			34.5%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

3: Lambert Ln & Shore Cliff Dr

04/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	7	5	0	1	5	178	3	4	222	3
Future Volume (Veh/h)	4	0	7	5	0	1	5	178	3	4	222	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)	4	0	8	5	0	1	5	193	3	4	241	3
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	454	456	242	462	456	194	244				196	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	454	456	242	462	456	194	244				196	
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	99	99	100	100	100				100	
cM capacity (veh/h)	513	497	796	503	497	847	1322				1377	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	6	5	196	4	244						
Volume Left	4	5	5	0	4	0						
Volume Right	8	1	0	3	0	3						
cSH	672	539	1322	1700	1377	1700						
Volume to Capacity	0.02	0.01	0.00	0.12	0.00	0.14						
Queue Length 95th (ft)	1	1	0	0	0	0						
Control Delay (s)	10.5	11.8	7.7	0.0	7.6	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	10.5	11.8	0.2		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay				0.6								
Intersection Capacity Utilization				21.9%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Shore Cliff Dr & Site Access

04/05/2018

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	0	0
Sign Control		Free	Free		Stop	
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	0	0	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	0				0	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				0	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1623				1023	1085
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	0	0	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			0.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↘	↗
Traffic Volume (vph)	205	50	118	544	93	115
Future Volume (vph)	205	50	118	544	93	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	250
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.971					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3437	0	1770	3539	1770	1583
Flt Permitted			0.401		0.950	
Satd. Flow (perm)	3437	0	747	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	34					125
Link Speed (mph)	30			30	30	
Link Distance (ft)	540			638	2580	
Travel Time (s)	12.3			14.5	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	223	54	128	591	101	125
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	128	591	101	125
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	31.0		23.0	54.0	36.0	36.0
Total Split (%)	34.4%		25.6%	60.0%	40.0%	40.0%
Maximum Green (s)	27.0		19.0	50.0	32.0	32.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	10.6		20.7	20.7	32.3	32.3
Actuated g/C Ratio	0.17		0.34	0.34	0.53	0.53
v/c Ratio	0.45		0.32	0.49	0.11	0.14
Control Delay	23.3		15.9	17.1	9.3	2.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.3		15.9	17.1	9.3	2.7
LOS	C		B	B	A	A
Approach Delay	23.3			16.9	5.6	
Approach LOS	C			B	A	
Queue Length 50th (ft)	44		33	88	18	0
Queue Length 95th (ft)	80		65	127	46	24
Internal Link Dist (ft)	460			558	2500	
Turn Bay Length (ft)			250			250
Base Capacity (vph)	1552		598	2924	936	896
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.18		0.21	0.20	0.11	0.14

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 61.1

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 16.3

Intersection LOS: B

Intersection Capacity Utilization 29.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Lambert Ln & 1st Ave

↙ Ø2	↖ Ø3	→ Ø4
36 s	23 s	31 s
	↙ Ø8	
	54 s	

HCM Unsignalized Intersection Capacity Analysis

1: Lambert Ln & Pusch View Ln

04/05/2018

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	181	573	267	37	70	165	
Future Volume (Veh/h)	181	573	267	37	70	165	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	197	623	290	40	76	179	
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	330				1016	165	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	330				1016	165	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	84				61	79	
cM capacity (veh/h)	1226				197	850	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	197	312	312	193	137	76	179
Volume Left	197	0	0	0	0	76	0
Volume Right	0	0	0	0	40	0	179
cSH	1226	1700	1700	1700	1700	197	850
Volume to Capacity	0.16	0.18	0.18	0.11	0.08	0.39	0.21
Queue Length 95th (ft)	14	0	0	0	0	42	20
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	34.4	10.4
Lane LOS	A					D	B
Approach Delay (s)	2.0			0.0		17.5	
Approach LOS						C	
Intersection Summary							
Average Delay			4.4				
Intersection Capacity Utilization			32.5%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

3: Lambert Ln & Shore Cliff Dr

04/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	0	8	13	0	2	3	205	6	1	213	4
Future Volume (Veh/h)	13	0	8	13	0	2	3	205	6	1	213	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)	14	0	9	14	0	2	3	223	7	1	232	4
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	467	472	234	476	470	226	236	230				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467	472	234	476	470	226	236	230				
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 %	97	100	99	97	100	100	100	100				
cM capacity (veh/h)	504	489	805	493	490	813	1331	1338				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	23	16	3	230	1	236						
Volume Left	14	14	3	0	1	0						
Volume Right	9	2	0	7	0	4						
cSH	590	518	1331	1700	1338	1700						
Volume to Capacity	0.04	0.03	0.00	0.14	0.00	0.14						
Queue Length 95th (ft)	3	2	0	0	0	0						
Control Delay (s)	11.3	12.2	7.7	0.0	7.7	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	11.3	12.2	0.1		0.0							
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			21.5%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: Shore Cliff Dr & Site Access

04/05/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	9	3	4	12	0
Future Volume (Veh/h)	0	9	3	4	12	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	3	4	13	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	7				15	5
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	7				15	5
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1614				1004	1078
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	10	7	13			
Volume Left	0	0	13			
Volume Right	0	4	0			
cSH	1614	1700	1004			
Volume to Capacity	0.00	0.00	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.0	8.6			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	 			 		
Traffic Volume (vph)	738	79	140	750	78	62
Future Volume (vph)	738	79	140	750	78	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	250		0	250
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.985					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3486	0	1770	3539	1770	1583
Flt Permitted			0.151		0.950	
Satd. Flow (perm)	3486	0	281	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	17					67
Link Speed (mph)	30			30	30	
Link Distance (ft)	540			638	2580	
Travel Time (s)	12.3			14.5	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	802	86	152	815	85	67
Shared Lane Traffic (%)						
Lane Group Flow (vph)	888	0	152	815	85	67
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings

2: Lambert Ln & 1st Ave

04/05/2018

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	46.0		18.0	64.0	26.0	26.0
Total Split (%)	51.1%		20.0%	71.1%	28.9%	28.9%
Maximum Green (s)	42.0		14.0	60.0	22.0	22.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	24.1		36.5	36.5	22.2	22.2
Actuated g/C Ratio	0.36		0.55	0.55	0.33	0.33
v/c Ratio	0.70		0.45	0.42	0.14	0.12
Control Delay	21.0		11.5	9.4	19.0	6.4
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	21.0		11.5	9.4	19.0	6.4
LOS	C		B	A	B	A
Approach Delay	21.0			9.7	13.5	
Approach LOS	C			A	B	
Queue Length 50th (ft)	154		28	92	23	0
Queue Length 95th (ft)	221		51	125	65	27
Internal Link Dist (ft)	460			558	2500	
Turn Bay Length (ft)			250			250
Base Capacity (vph)	2222		468	3182	589	571
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.40		0.32	0.26	0.14	0.12

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 66.8

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 15.0

Intersection LOS: B

Intersection Capacity Utilization 45.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Lambert Ln & 1st Ave

↖ Ø2	↘ Ø3	→ Ø4
26 s	18 s	46 s
	↙ Ø8	
	64 s	

HCM Unsignalized Intersection Capacity Analysis

1: Lambert Ln & Pusch View Ln

04/05/2018

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	107	340	492	61	36	203	
Future Volume (Veh/h)	107	340	492	61	36	203	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	116	370	535	66	39	221	
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	601				985	300	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	601				985	300	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	88				82	68	
cM capacity (veh/h)	972				216	696	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	116	185	185	357	244	39	221
Volume Left	116	0	0	0	0	39	0
Volume Right	0	0	0	0	66	0	221
cSH	972	1700	1700	1700	1700	216	696
Volume to Capacity	0.12	0.11	0.11	0.21	0.14	0.18	0.32
Queue Length 95th (ft)	10	0	0	0	0	16	34
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	25.3	12.6
Lane LOS	A					D	B
Approach Delay (s)	2.2			0.0		14.5	
Approach LOS						B	
Intersection Summary							
Average Delay			3.6				
Intersection Capacity Utilization			34.8%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis

3: Lambert Ln & Shore Cliff Dr

04/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	0	11	5	0	1	11	178	3	4	222	10
Future Volume (Veh/h)	8	0	11	5	0	1	11	178	3	4	222	10
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)	9	0	12	5	0	1	12	193	3	4	241	11
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	472	474	246	480	478	194	252				196	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	472	474	246	480	478	194	252				196	
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 %	98	100	98	99	100	100	99				100	
cM capacity (veh/h)	497	483	792	485	480	847	1313				1377	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	21	6	12	196	4	252						
Volume Left	9	5	12	0	4	0						
Volume Right	12	1	0	3	0	11						
cSH	631	522	1313	1700	1377	1700						
Volume to Capacity	0.03	0.01	0.01	0.12	0.00	0.15						
Queue Length 95th (ft)	3	1	1	0	0	0						
Control Delay (s)	10.9	12.0	7.8	0.0	7.6	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	10.9	12.0	0.4		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay				0.9								
Intersection Capacity Utilization				22.3%	ICU Level of Service					A		
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

6: Shore Cliff Dr & Site Access

04/05/2018

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	9	13	8	0
Future Volume (Veh/h)	0	11	9	13	8	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	10	14	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	24				29	17
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24				29	17
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1591				986	1062
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	12	24	9			
Volume Left	0	0	9			
Volume Right	0	14	0			
cSH	1591	1700	986			
Volume to Capacity	0.00	0.01	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.0	8.7			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			13.3%	ICU Level of Service		A
Analysis Period (min)			15			