



September 24, 2021

Sameh "Sam" Ibrahim
Logos Investment Group
3343 Deputy Evans
Norco, CA 92860

C.C. Kevin Tsang
Riverside County Department of Public Works

**Re: Addendum to Traffic Impact Study for Commercial Developments
21419 & 21425 Cajalco Road, Perris, County of Riverside**

Hi Sam,

In accordance with the direction provided by Riverside County Department of Public Works for the proposed commercial development at 21419 & 21425 Cajalco Road, we have conducted new traffic counts for the intersection of Cajalco Road and Alexander Street. These updated traffic data are used to verify existing conditions as well as future conditions upon project completion. This letter presents our methodology, finding, and recommendation in regards to the sufficiency of on-site parking.

NEW TRAFFIC DATA

New turning movement counts at the intersection of Cajalco Road and Alexander Street for the AM and PM peak hours were collected on Wednesday, September 24, 2021. Traffic data are shown in **Exhibit 1**. This subject intersection currently operates at LOS C for the AM and PM peak hour. **Table 1** shows the level of services and intersection delays at the subject intersection. The level of service analysis worksheets can be found in **Exhibit 2**.

Table 1. Existing LOS

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (Seconds)	LOS	Delay (Seconds)
Cajalco Road at Alexander Street	C	24.1	C	22.3

PROJECT COMPLETION (EXISTING + AMBIENT + PROJECT)

For project opening year 2022, the annual growth rate of two percent (2%) has applied. This factor covers background traffic increases resulting from traffic growth of regional developments. The subject intersection is anticipated to maintain LOS C for both AM and

PM peak hours. **Table 4** shows the level of services and intersection delays at the subject intersection. The level of service analysis worksheets can be found in **Exhibit 3**.

Table 2. Project Completion LOS

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (Seconds)	LOS	Delay (Seconds)
Cajalco Road at Alexander Street	C	25.2	C	23.4

CUMULATIVE (EXISTING + AMBIENT + PROJECT + OTHER DEVELOPMENTS)

The subject intersection is anticipated to maintain LOS C for both AM and PM peak hour in the cumulative conditions. **Table 3** shows the level of services and intersection delays at the subject intersection. The level of service analysis worksheets can be found in **Exhibit 4**.

Table 3. Cumulative LOS


Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay (Seconds)	LOS	Delay (Seconds)
Cajalco Road at Alexander Street	C	27.3	C	25.8

SUMMARY

New traffic count data have confirmed that the intersection of Cajalco Road and Alexander Street is anticipated to maintain LOS C for all study scenarios, exceeding the target LOS D set forth in Riverside County’s General Plan. The project has no or less than significant traffic impact for the subject intersection and no mitigation measure or improvement is required.

Regards,

K2 Traffic Engineering, Inc.


 Jende Kay Hsu, T.E.
 California Licensed TR2285



K2 Traffic Engineering, Inc.

EXHIBIT 1

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: FCE TRAFFIC

DATE: 9/22/21 WEDNESDAY	LOCATION: NORTH & SOUTH: EAST & WEST:	PERRIS ALEXANDER ST CAJALCO RD	PROJECT #: LOCATION #: 1 CONTROL: SIGNAL
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NOTES:	AM		▲	
	PM		N	
	MD	◀ W		E ▶
	OTHER		S	
	OTHER		▼	

LANES:	NORTHBOUND ALEXANDER ST			SOUTHBOUND ALEXANDER ST			EASTBOUND CAJALCO RD			WESTBOUND CAJALCO RD			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	1	0	1	1	0	1	1	0	

AM													
7:00 AM	18	18	5	3	11	13	7	87	2	1	213	2	380
7:15 AM	23	30	5	3	6	26	11	165	2	1	216	4	492
7:30 AM	17	20	4	1	9	24	31	137	3	2	169	8	425
7:45 AM	18	26	4	4	8	30	11	123	1	5	161	9	400
8:00 AM	15	24	4	6	13	21	7	108	2	4	177	6	387
8:15 AM	13	14	2	9	15	12	2	107	4	3	189	19	389
8:30 AM	5	11	3	1	4	10	2	93	0	5	163	2	299
8:45 AM	3	8	4	6	8	6	0	76	3	2	177	2	295
VOLUMES	112	151	31	33	74	142	71	896	17	23	1,465	52	3,067
APPROACH %	38%	51%	11%	13%	30%	57%	7%	91%	2%	1%	95%	3%	
APP/DEPART	294	/	274	249	/	114	984	/	960	1,540	/	1,719	0
BEGIN PEAK HR	7:15 AM												
VOLUMES	73	100	17	14	36	101	60	533	8	12	723	27	1,704
APPROACH %	38%	53%	9%	9%	24%	67%	10%	89%	1%	2%	95%	4%	
PEAK HR FACTOR	0.819			0.899			0.844			0.862			0.866
APP/DEPART	190	/	187	151	/	56	601	/	564	762	/	897	0
PM													
4:00 PM	10	16	3	18	64	8	20	164	12	12	172	12	511
4:15 PM	9	27	10	12	47	9	19	160	2	9	164	6	474
4:30 PM	12	12	3	9	32	8	17	178	4	4	139	11	429
4:45 PM	9	13	1	4	32	7	16	182	6	5	149	8	432
5:00 PM	13	10	5	4	26	9	19	181	6	4	122	9	408
5:15 PM	4	15	3	0	28	6	10	221	4	4	168	11	474
5:30 PM	8	13	2	5	22	8	22	177	8	7	123	10	405
5:45 PM	9	18	3	5	21	5	15	203	10	7	152	8	456
VOLUMES	74	124	30	57	272	60	138	1,466	52	52	1,189	75	3,589
APPROACH %	32%	54%	13%	15%	70%	15%	8%	89%	3%	4%	90%	6%	
APP/DEPART	228	/	337	389	/	376	1,656	/	1,553	1,316	/	1,323	0
BEGIN PEAK HR	4:00 PM												
VOLUMES	40	68	17	43	175	32	72	684	24	30	624	37	1,846
APPROACH %	32%	54%	14%	17%	70%	13%	9%	88%	3%	4%	90%	5%	
PEAK HR FACTOR	0.679			0.694			0.956			0.881			0.903
APP/DEPART	125	/	177	250	/	229	780	/	744	691	/	696	0

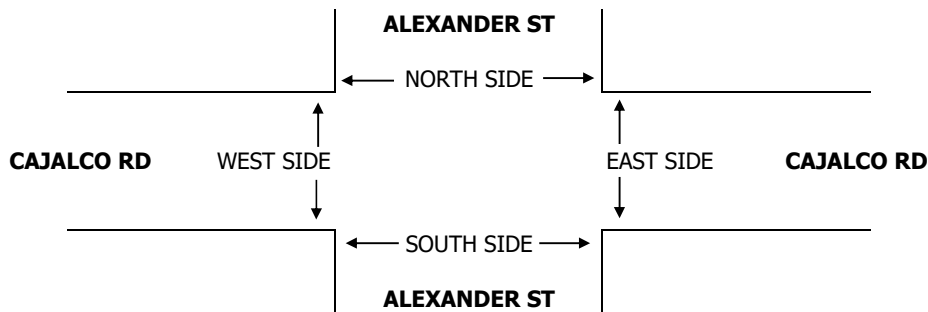




















EXHIBIT 2. EXISTING LOS ANALYSIS

HCM 2010 Signalized Intersection Summary 1: Alexander St & Cajalco Rd

09/23/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	533	8	12	723	27	73	100	17	14	36	101
Future Volume (veh/h)	60	533	8	12	723	27	73	100	17	14	36	101
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		1.00	1.00		1.00
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	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	65	579	9	13	786	29	79	109	18	15	39	110
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	83	819	13	427	1146	42	137	147	22	57	77	184
Arrive On Green	0.05	0.45	0.45	0.24	0.64	0.64	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1774	1829	28	1774	1785	66	504	912	136	81	480	1143
Grp Volume(v), veh/h	65	0	588	13	0	815	206	0	0	164	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1858	1774	0	1851	1551	0	0	1704	0	0
Q Serve(g_s), s	3.3	0.0	23.0	0.5	0.0	25.4	3.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	23.0	0.5	0.0	25.4	11.5	0.0	0.0	8.1	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.04	0.38		0.09	0.09		0.67
Lane Grp Cap(c), veh/h	83	0	832	427	0	1188	305	0	0	318	0	0
V/C Ratio(X)	0.78	0.00	0.71	0.03	0.00	0.69	0.67	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	104	0	832	427	0	1188	589	0	0	614	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	42.4	0.0	20.1	26.1	0.0	10.3	36.4	0.0	0.0	35.1	0.0	0.0
Incr Delay (d2), s/veh	25.0	0.0	5.0	0.0	0.0	3.2	2.6	0.0	0.0	1.3	0.0	0.0
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	2.2	0.0	12.9	0.2	0.0	13.7	5.1	0.0	0.0	3.9	0.0	0.0
LnGrp Delay(d),s/veh	67.4	0.0	25.1	26.1	0.0	13.6	39.0	0.0	0.0	36.4	0.0	0.0
LnGrp LOS	E		C	C		B	D			D		
Approach Vol, veh/h		653			828			206			164	
Approach Delay, s/veh		29.3			13.8			39.0			36.4	
Approach LOS		C			B			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	26.2	44.8		19.0	8.7	62.3				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		31.1	5.1	40.3		31.1	5.3	40.1				
Max Q Clear Time (g_c+I1), s		13.5	2.5	25.0		10.1	5.3	27.4				
Green Ext Time (p_c), s		1.0	0.0	3.1		0.8	0.0	4.4				
Intersection Summary												
HCM 2010 Ctrl Delay			24.1									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary
 1: Alexander St & Cajalco Rd

09/23/2021



















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	684	24	30	624	37	40	68	17	43	175	32
Future Volume (veh/h)	72	684	24	30	624	37	40	68	17	43	175	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		1.00	1.00		1.00
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	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	78	743	26	33	678	40	43	74	18	47	190	35
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	968	34	193	1034	61	120	183	37	92	237	41
Arrive On Green	0.06	0.54	0.54	0.11	0.59	0.59	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1774	1789	63	1774	1742	103	333	1009	206	215	1308	225
Grp Volume(v), veh/h	78	0	769	33	0	718	135	0	0	272	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1852	1774	0	1845	1548	0	0	1748	0	0
Q Serve(g_s), s	3.5	0.0	26.1	1.4	0.0	20.7	0.0	0.0	0.0	6.3	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	26.1	1.4	0.0	20.7	5.6	0.0	0.0	12.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.06	0.32		0.13	0.17		0.13
Lane Grp Cap(c), veh/h	100	0	1002	193	0	1095	340	0	0	370	0	0
V/C Ratio(X)	0.78	0.00	0.77	0.17	0.00	0.66	0.40	0.00	0.00	0.74	0.00	0.00
Avail Cap(c_a), veh/h	140	0	1002	193	0	1095	409	0	0	446	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	37.3	0.0	14.4	32.4	0.0	10.8	29.0	0.0	0.0	31.6	0.0	0.0
Incr Delay (d2), s/veh	16.7	0.0	5.6	0.4	0.0	3.1	0.8	0.0	0.0	5.0	0.0	0.0
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	2.2	0.0	14.8	0.7	0.0	11.3	2.7	0.0	0.0	6.3	0.0	0.0
LnGrp Delay(d),s/veh	54.0	0.0	20.0	32.8	0.0	13.9	29.7	0.0	0.0	36.7	0.0	0.0
LnGrp LOS	D		C	C		B	C			D		
Approach Vol, veh/h		847			751			135			272	
Approach Delay, s/veh		23.1			14.7			29.7			36.7	
Approach LOS		C			B			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	13.2	47.8		19.0	9.0	52.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.1	5.1	43.3		18.1	6.3	42.1				
Max Q Clear Time (g_c+I1), s		7.6	3.4	28.1		14.0	5.5	22.7				
Green Ext Time (p_c), s		0.4	0.0	4.4		0.5	0.0	4.5				
Intersection Summary												
HCM 2010 Ctrl Delay			22.3									
HCM 2010 LOS			C									

EXHIBIT 3. PROJECT COMPLETION LOS ANALYSIS

HCM 2010 Signalized Intersection Summary
 1: Alexander St & Cajalco Rd

09/23/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	562	8	16	755	32	74	102	22	19	37	103
Future Volume (veh/h)	61	562	8	16	755	32	74	102	22	19	37	103
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		1.00	1.00		1.00
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	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	66	611	9	17	821	35	80	111	24	21	40	112
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	820	12	416	1126	48	136	149	29	65	80	184
Arrive On Green	0.05	0.45	0.45	0.23	0.63	0.63	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1774	1831	27	1774	1774	76	486	888	173	118	479	1097
Grp Volume(v), veh/h	66	0	620	17	0	856	215	0	0	173	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1858	1774	0	1849	1547	0	0	1695	0	0
Q Serve(g_s), s	3.3	0.0	24.9	0.7	0.0	28.3	3.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	24.9	0.7	0.0	28.3	12.1	0.0	0.0	8.5	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.04	0.37		0.11	0.12		0.65
Lane Grp Cap(c), veh/h	85	0	832	416	0	1174	314	0	0	329	0	0
V/C Ratio(X)	0.78	0.00	0.75	0.04	0.00	0.73	0.68	0.00	0.00	0.53	0.00	0.00
Avail Cap(c_a), veh/h	104	0	832	416	0	1174	588	0	0	611	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	42.4	0.0	20.6	26.6	0.0	11.2	36.1	0.0	0.0	34.8	0.0	0.0
Incr Delay (d2), s/veh	25.4	0.0	6.0	0.0	0.0	4.0	2.6	0.0	0.0	1.3	0.0	0.0
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	2.2	0.0	14.1	0.3	0.0	15.6	5.4	0.0	0.0	4.1	0.0	0.0
LnGrp Delay(d),s/veh	67.8	0.0	26.6	26.7	0.0	15.2	38.7	0.0	0.0	36.1	0.0	0.0
LnGrp LOS	E		C	C		B	D			D		
Approach Vol, veh/h		686			873			215			173	
Approach Delay, s/veh		30.6			15.4			38.7			36.1	
Approach LOS		C			B			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.6	25.6	44.8		19.6	8.8	61.6				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		31.1	5.1	40.3		31.1	5.3	40.1				
Max Q Clear Time (g_c+I1), s		14.1	2.7	26.9		10.5	5.3	30.3				
Green Ext Time (p_c), s		1.0	0.0	3.1		0.9	0.0	4.0				
Intersection Summary												
HCM 2010 Ctrl Delay			25.2									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary
 1: Alexander St & Cajalco Rd

09/23/2021





































												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	717	24	35	654	42	41	69	21	48	179	33
Future Volume (veh/h)	73	717	24	35	654	42	41	69	21	48	179	33
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		1.00	1.00		1.00
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	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	79	779	26	38	711	46	45	75	23	52	195	36
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	101	970	32	182	1016	66	120	180	46	97	241	42
Arrive On Green	0.06	0.54	0.54	0.10	0.59	0.59	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1774	1792	60	1774	1731	112	326	960	246	235	1289	222
Grp Volume(v), veh/h	79	0	805	38	0	757	143	0	0	283	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1852	1774	0	1843	1532	0	0	1746	0	0
Q Serve(g_s), s	3.5	0.0	28.2	1.6	0.0	23.0	0.0	0.0	0.0	6.4	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	28.2	1.6	0.0	23.0	6.1	0.0	0.0	12.5	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.06	0.31		0.16	0.18		0.13
Lane Grp Cap(c), veh/h	101	0	1002	182	0	1082	346	0	0	380	0	0
V/C Ratio(X)	0.78	0.00	0.80	0.21	0.00	0.70	0.41	0.00	0.00	0.74	0.00	0.00
Avail Cap(c_a), veh/h	140	0	1002	182	0	1082	405	0	0	446	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	37.2	0.0	14.9	32.9	0.0	11.6	28.7	0.0	0.0	31.4	0.0	0.0
Incr Delay (d2), s/veh	17.1	0.0	6.8	0.6	0.0	3.8	0.8	0.0	0.0	5.6	0.0	0.0
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	2.2	0.0	16.2	0.8	0.0	12.7	2.9	0.0	0.0	6.6	0.0	0.0
LnGrp Delay(d),s/veh	54.3	0.0	21.7	33.5	0.0	15.4	29.5	0.0	0.0	37.0	0.0	0.0
LnGrp LOS	D		C	C		B	C			D		
Approach Vol, veh/h		884			795			143			283	
Approach Delay, s/veh		24.6			16.2			29.5			37.0	
Approach LOS		C			B			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.5	12.7	47.8		19.5	9.1	51.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.1	5.1	43.3		18.1	6.3	42.1				
Max Q Clear Time (g_c+I1), s		8.1	3.6	30.2		14.5	5.5	25.0				
Green Ext Time (p_c), s		0.5	0.0	4.4		0.5	0.0	4.6				
Intersection Summary												
HCM 2010 Ctrl Delay			23.4									
HCM 2010 LOS			C									

EXHIBIT 4. CUMULATIVE LOS ANALYSIS



















HCM 2010 Signalized Intersection Summary 1: Alexander St & Cajalco Rd

09/24/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	631	8	16	778	36	74	102	22	30	37	103
Future Volume (veh/h)	61	631	8	16	778	36	74	102	22	30	37	103
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		1.00	1.00		1.00
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	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	66	686	9	17	846	39	80	111	24	33	40	112
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	821	11	412	1117	51	136	149	29	80	78	171
Arrive On Green	0.05	0.45	0.45	0.23	0.63	0.63	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1774	1834	24	1774	1767	81	476	878	170	194	459	1002
Grp Volume(v), veh/h	66	0	695	17	0	885	215	0	0	185	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1858	1774	0	1848	1525	0	0	1656	0	0
Q Serve(g_s), s	3.3	0.0	29.7	0.7	0.0	30.4	3.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	29.7	0.7	0.0	30.4	12.3	0.0	0.0	9.2	0.0	0.0
Prop In Lane	1.00		0.01	1.00		0.04	0.37		0.11	0.18		0.61
Lane Grp Cap(c), veh/h	85	0	832	412	0	1169	314	0	0	329	0	0
V/C Ratio(X)	0.78	0.00	0.84	0.04	0.00	0.76	0.68	0.00	0.00	0.56	0.00	0.00
Avail Cap(c_a), veh/h	104	0	832	412	0	1169	584	0	0	602	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	42.4	0.0	21.9	26.8	0.0	11.7	36.0	0.0	0.0	34.8	0.0	0.0
Incr Delay (d2), s/veh	25.4	0.0	9.7	0.0	0.0	4.6	2.6	0.0	0.0	1.5	0.0	0.0
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	2.2	0.0	17.3	0.3	0.0	16.7	5.4	0.0	0.0	4.4	0.0	0.0
LnGrp Delay(d),s/veh	67.8	0.0	31.6	26.8	0.0	16.3	38.6	0.0	0.0	36.3	0.0	0.0
LnGrp LOS	E		C	C		B	D			D		
Approach Vol, veh/h		761			902			215			185	
Approach Delay, s/veh		34.7			16.5			38.6			36.3	
Approach LOS		C			B			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.8	25.4	44.8		19.8	8.8	61.4				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		31.1	5.1	40.3		31.1	5.3	40.1				
Max Q Clear Time (g_c+I1), s		14.3	2.7	31.7		11.2	5.3	32.4				
Green Ext Time (p_c), s		1.0	0.0	2.8		0.9	0.0	3.5				
Intersection Summary												
HCM 2010 Ctrl Delay			27.3									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary
 1: Alexander St & Cajalco Rd

09/24/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	762	24	35	731	55	41	69	21	56	179	33
Future Volume (veh/h)	73	762	24	35	731	55	41	69	21	56	179	33
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		1.00	1.00		1.00
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	1900	1863	1863	1900	1900	1863	1900	1900	1863	1900
Adj Flow Rate, veh/h	79	828	26	38	795	60	45	75	23	61	195	36
Adj No. of Lanes	1	1	0	1	1	0	0	1	0	0	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	101	972	31	172	995	75	122	183	47	108	240	41
Arrive On Green	0.06	0.54	0.54	0.10	0.58	0.58	0.19	0.19	0.19	0.19	0.19	0.19
Sat Flow, veh/h	1774	1796	56	1774	1711	129	326	950	245	277	1243	214
Grp Volume(v), veh/h	79	0	854	38	0	855	143	0	0	292	0	0
Grp Sat Flow(s),veh/h/ln	1774	0	1853	1774	0	1840	1520	0	0	1734	0	0
Q Serve(g_s), s	3.5	0.0	31.4	1.6	0.0	29.1	0.0	0.0	0.0	6.9	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	31.4	1.6	0.0	29.1	6.0	0.0	0.0	13.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.07	0.31		0.16	0.21		0.12
Lane Grp Cap(c), veh/h	101	0	1003	172	0	1070	352	0	0	389	0	0
V/C Ratio(X)	0.78	0.00	0.85	0.22	0.00	0.80	0.41	0.00	0.00	0.75	0.00	0.00
Avail Cap(c_a), veh/h	140	0	1003	172	0	1070	403	0	0	445	0	0
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	37.2	0.0	15.6	33.3	0.0	13.1	28.3	0.0	0.0	31.2	0.0	0.0
Incr Delay (d2), s/veh	17.1	0.0	9.1	0.6	0.0	6.3	0.8	0.0	0.0	6.1	0.0	0.0
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	2.2	0.0	18.4	0.8	0.0	16.4	2.9	0.0	0.0	6.9	0.0	0.0
LnGrp Delay(d),s/veh	54.3	0.0	24.7	34.0	0.0	19.4	29.1	0.0	0.0	37.3	0.0	0.0
LnGrp LOS	D		C	C		B	C			D		
Approach Vol, veh/h		933			893			143			292	
Approach Delay, s/veh		27.2			20.0			29.1			37.3	
Approach LOS		C			B			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.9	12.3	47.8		19.9	9.1	51.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		18.1	5.1	43.3		18.1	6.3	42.1				
Max Q Clear Time (g_c+I1), s		8.0	3.6	33.4		15.0	5.5	31.1				
Green Ext Time (p_c), s		0.5	0.0	4.0		0.5	0.0	4.3				
Intersection Summary												
HCM 2010 Ctrl Delay			25.8									
HCM 2010 LOS			C									