LINSCOTT
LAW &
GREENSPAN
engineers

TECHNICAL APPENDICES

BERNARDO SHORES

Imperial Beach, California
September 8, 2014

LLG Ref. 3-13-2203

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APPENDICES

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APPENDIX A

INTERSECTION AND SEGMENT MANUAL COUNT SHEETS

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Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: SR 75 (Palm Avenue) @ Rainbow Drive

Date of Count: *Wednesday, March 06, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0038*

Vehicular Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: SR 75 (Palm Avenue) @ Rainbow Drive

AM Period (7:00 AM - 9:00 AM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	1	0	0	8	358	0	110	0	9	0	41	10	537
7:15 AM	0	0	0	12	344	0	102	0	22	0	48	15	543
7:30 AM	1	0	0	4	333	1	107	0	19	0	31	13	509
7:45 AM	2	0	0	16	195	1	68	0	32	0	54	18	386
8:00 AM	1	0	0	20	214	0	62	0	19	1	54	22	393
8:15 AM	0	0	0	12	173	0	44	0	17	0	52	19	317
8:30 AM	2	0	0	17	149	0	30	1	24	0	75	17	315
8:45 AM	2	1	0	19	114	1	44	0	15	1	52	8	257
Total	9	1	0	108	1,880	3	567	1	157	2	407	122	3,257

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.91**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	4	0	0	40	1,230	2	387	0	82	0	174	56	1,975
PHF	0.50	#####	#####	0.63	0.86	0.50	0.88	#####	0.64	#####	0.81	0.78	0.91
Movement PHF		0.50			0.87			0.93			0.80		0.91

PM Period (4:00 PM - 6:00 PM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	0	0	0	16	65	0	23	0	14	3	300	65	486
4:15 PM	1	0	0	11	81	0	15	0	17	2	322	72	521
4:30 PM	2	1	0	16	60	0	26	0	13	0	261	53	432
4:45 PM	0	0	1	21	77	0	22	0	6	0	289	72	488
5:00 PM	1	1	0	25	83	3	16	0	10	0	275	56	470
5:15 PM	2	0	0	28	38	0	15	0	16	2	191	51	343
5:30 PM	0	0	0	21	52	3	17	1	7	1	180	62	344
5:45 PM	1	0	0	15	52	2	9	0	12	1	164	52	308
Total	7	2	1	153	508	8	143	1	95	9	1,982	483	3,392

PM Intersection Peak Hour : **4:00 AM - 5:00 PM** Intersection PHF : **0.92**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	3	1	1	64	283	0	86	0	50	5	1172	262	1927
PHF	0.38	0.25	0.25	0.762	0.873	#####	0.827	#####	0.735	0.417	0.91	0.91	0.92
Movement PHF		0.42			0.89			0.87			0.91		0.92

Turn Count Summary

Accurate Video Counts Inc
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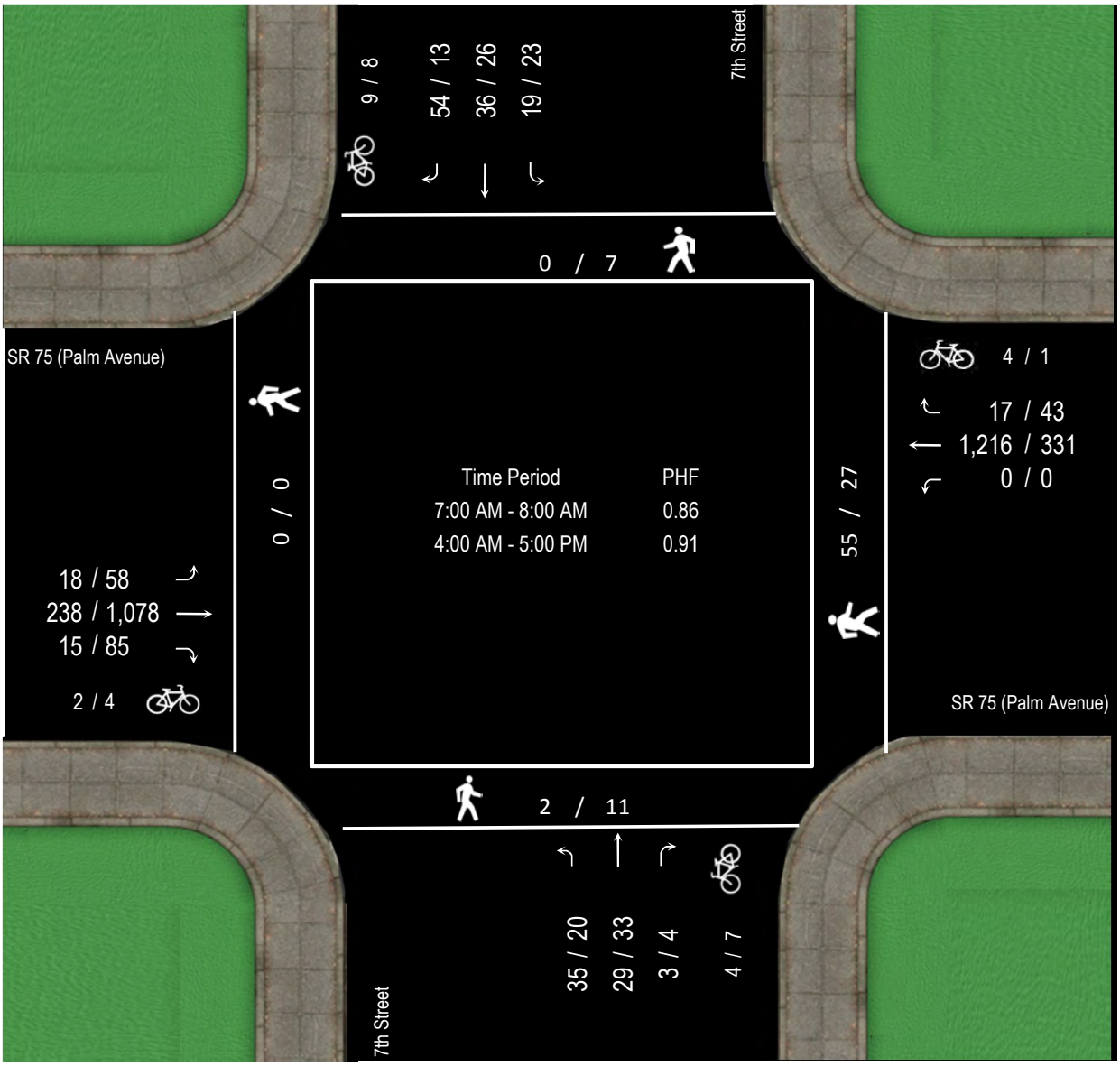
Location: SR 75 (Palm Avenue) @ 7th Street

Date of Count: *Wednesday, March 06, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0038*



Vehicular Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: SR 75 (Palm Avenue) @ 7th Street

AM Period (7:00 AM - 9:00 AM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	3	5	18	0	332	6	7	2	0	5	47	3	428
7:15 AM	7	17	14	0	360	1	10	8	1	4	65	4	491
7:30 AM	5	6	11	0	319	2	12	11	1	4	51	2	424
7:45 AM	4	8	11	0	205	8	6	8	1	5	75	6	337
8:00 AM	4	9	12	0	202	7	9	4	1	3	64	3	318
8:15 AM	3	13	9	0	167	4	5	9	2	3	55	8	278
8:30 AM	2	12	9	0	160	5	8	8	2	8	86	5	305
8:45 AM	6	3	10	0	131	5	3	8	1	5	67	2	241
Total	34	73	94	0	1,876	38	60	58	9	37	510	33	2,822

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.86**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	19	36	54	0	1,216	17	35	29	3	18	238	15	1,680
PHF	0.68	0.53	0.75	#####	0.84	0.53	0.73	0.66	0.75	0.90	0.79	0.63	0.86
Movement PHF		0.72			0.85			0.70			0.79		0.86

PM Period (4:00 PM - 6:00 PM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	5	7	2	0	78	6	1	15	1	10	299	22	446
4:15 PM	7	7	4	0	97	15	11	6	0	20	283	21	471
4:30 PM	5	8	3	0	81	12	4	9	2	15	234	18	391
4:45 PM	6	4	4	0	75	10	4	3	1	13	262	24	406
5:00 PM	3	6	3	0	108	7	2	12	1	13	253	12	420
5:15 PM	10	2	4	0	58	11	2	7	2	14	183	17	310
5:30 PM	7	7	4	0	58	12	2	13	2	17	171	10	303
5:45 PM	6	10	4	0	60	14	5	15	1	18	162	14	309
Total	49	51	28	0	615	87	31	80	10	120	1,847	138	3,056

PM Intersection Peak Hour : **4:00 AM - 5:00 PM** Intersection PHF : **0.91**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	23	26	13	0	331	43	20	33	4	58	1078	85	1714
PHF	0.82	0.813	0.813	#####	0.853	0.717	0.455	0.55	0.5	0.725	0.901	0.885	0.91
Movement PHF		0.86			0.83			0.84			0.92		0.91

Turn Count Summary

Accurate Video Counts Inc
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Location: Palm Avenue @ 7th Street

Date of Count: *Wednesday, March 06, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0038*

Vehicular Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Palm Avenue @ 7th Street

AM Period (7:00 AM - 9:00 AM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	1	1	5	4	83	1	17	6	22	3	72	3	218
7:15 AM	0	7	9	7	98	0	31	13	35	9	113	5	327
7:30 AM	2	2	6	5	55	0	20	10	16	8	71	4	199
7:45 AM	0	4	10	9	58	1	9	10	15	5	69	2	192
8:00 AM	0	4	7	18	95	0	23	11	13	1	67	5	244
8:15 AM	0	16	4	22	70	0	16	10	10	6	73	4	231
8:30 AM	0	11	3	12	63	0	10	12	15	6	65	2	199
8:45 AM	2	4	1	14	98	1	8	7	18	3	79	3	238
Total	5	49	45	91	620	3	134	79	144	41	609	28	1,848

AM Intersection Peak Hour : **7:15 AM - 8:15 AM** Intersection PHF : **0.74**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	2	17	32	39	306	1	83	44	79	23	320	16	962
PHF	0.25	0.61	0.80	0.54	0.78	0.25	0.67	0.85	0.56	0.64	0.71	0.80	0.74
Movement PHF		0.80			0.77			0.65			0.71		0.74

PM Period (4:00 PM - 6:00 PM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	4	17	6	14	81	1	11	5	9	11	95	8	262
4:15 PM	1	20	7	1	57	0	11	5	15	5	91	8	221
4:30 PM	2	13	12	8	78	1	16	6	11	9	97	8	261
4:45 PM	5	23	4	4	87	0	14	7	9	4	76	8	241
5:00 PM	2	12	4	7	103	1	10	5	11	6	93	5	259
5:15 PM	2	12	4	4	82	1	9	3	7	9	88	5	226
5:30 PM	1	13	5	11	93	0	6	6	9	5	80	5	234
5:45 PM	1	11	12	8	99	1	8	7	10	13	71	6	247
Total	18	121	54	57	680	5	85	44	81	62	691	53	1,951

PM Intersection Peak Hour : **4:30 PM - 5:30 PM** Intersection PHF : **0.95**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	11	60	24	23	350	3	49	21	38	28	354	26	987
PHF	0.55	0.652	0.5	0.719	0.85	0.75	0.766	0.75	0.864	0.778	0.912	0.813	0.95
Movement PHF		0.74			0.85			0.82			0.89		0.95

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: SR 75 (Palm Avenue) @ Delaware Street

Date of Count: *Wednesday, March 06, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0038*

Vehicular Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: SR 75 (Palm Avenue) @ Delaware Street

AM Period (7:00 AM - 9:00 AM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	0	0	2	102	345	1	0	0	0	0	50	0	500
7:15 AM	0	0	4	120	362	1	0	0	0	0	73	0	560
7:30 AM	0	0	2	73	315	1	0	0	0	0	57	0	448
7:45 AM	0	0	2	73	217	2	0	0	0	0	80	0	374
8:00 AM	0	0	1	117	209	7	0	0	0	0	69	0	403
8:15 AM	0	0	2	89	162	5	0	0	0	0	60	0	318
8:30 AM	0	0	0	76	169	1	0	0	0	0	90	0	336
8:45 AM	0	0	2	110	140	6	0	0	0	0	74	0	332
Total	0	0	15	760	1,919	24	0	0	0	0	553	0	3,271

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.84**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	0	10	368	1,239	5	0	0	0	0	260	0	1,882
PHF	#####	#####	0.63	0.77	0.86	0.63	#####	#####	#####	#####	0.81	#####	0.84
Movement PHF		0.63			0.83			#DIV/0!			0.81		0.84

PM Period (4:00 PM - 6:00 PM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	0	0	0	98	82	12	0	0	0	0	305	0	497
4:15 PM	0	0	0	62	102	8	0	0	0	0	290	0	462
4:30 PM	0	0	2	85	91	5	0	0	0	0	241	0	424
4:45 PM	0	0	1	96	84	13	0	0	0	0	269	0	463
5:00 PM	0	0	5	112	109	10	0	0	0	0	257	0	493
5:15 PM	0	0	0	91	73	4	0	0	0	0	195	0	363
5:30 PM	0	0	3	102	67	8	0	0	0	0	180	0	360
5:45 PM	0	0	1	110	77	18	0	0	0	0	169	0	375
Total	0	0	12	756	685	78	0	0	0	0	1,906	0	3,437

PM Intersection Peak Hour : **4:00 AM - 5:00 PM** Intersection PHF : **0.93**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	0	0	3	341	359	38	0	0	0	0	1105	0	1846
PHF	#####	#####	0.375	0.87	0.88	0.731	#####	#####	#####	#####	0.906	#####	0.93
Movement PHF		0.38			0.96			#DIV/0!			0.91		0.93

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

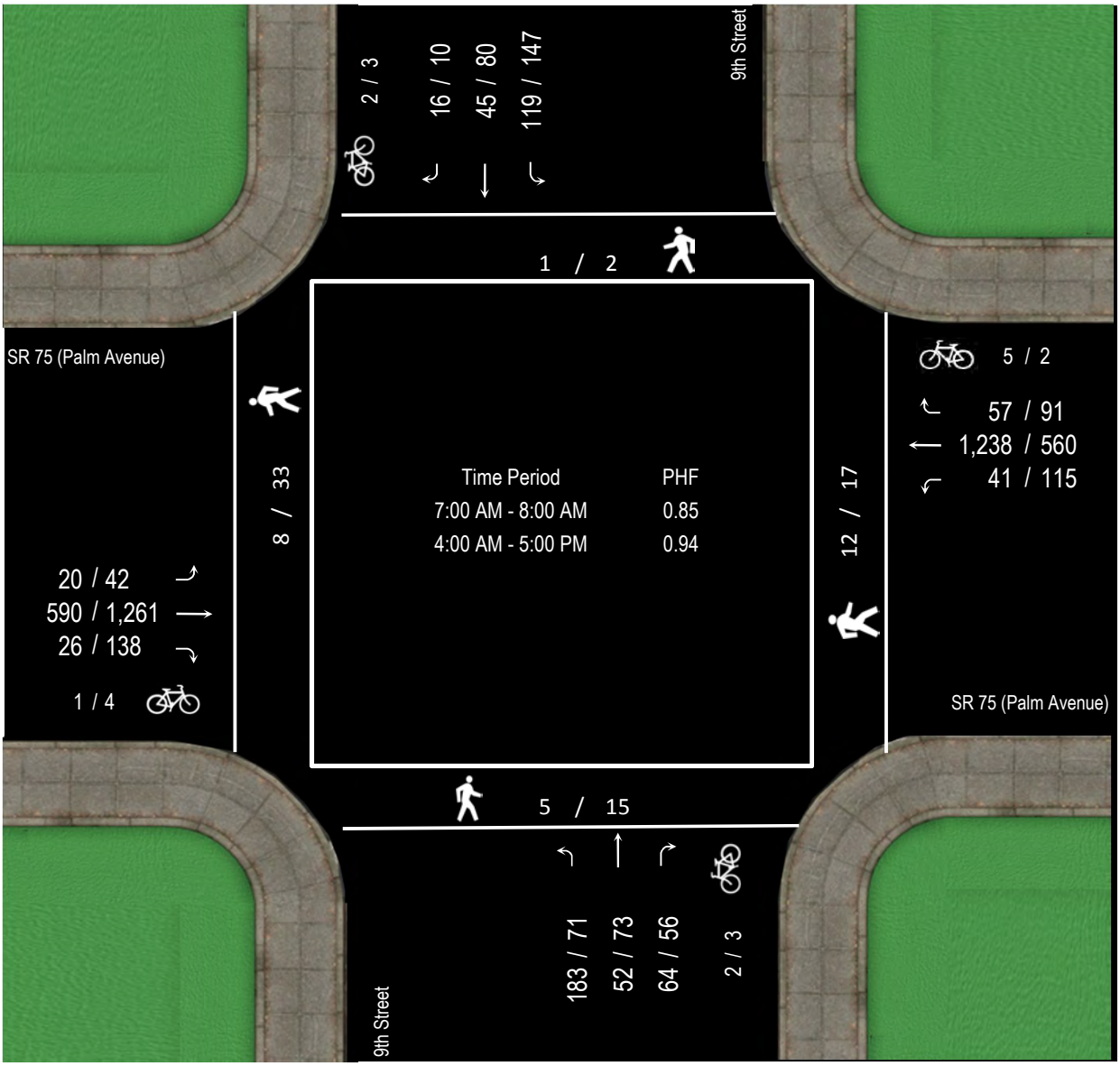
Location: SR 75 (Palm Avenue) @ 9th Street

Date of Count: *Wednesday, March 06, 2013*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *13-0038*



Vehicular Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: SR 75 (Palm Avenue) @ 9th Street

AM Period (7:00 AM - 9:00 AM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
7:00 AM	17	8	6	4	366	9	51	7	14	1	128	4	615
7:15 AM	35	13	3	14	351	18	56	10	21	5	187	7	720
7:30 AM	24	8	2	8	310	13	45	19	17	8	133	6	593
7:45 AM	43	16	5	15	211	17	31	16	12	6	142	9	523
8:00 AM	27	19	1	18	242	11	44	17	21	7	116	11	534
8:15 AM	33	12	4	16	177	16	29	16	21	9	129	12	474
8:30 AM	25	12	2	7	191	15	32	11	19	5	150	5	474
8:45 AM	21	6	3	22	188	25	27	11	16	8	171	6	504
Total	225	94	26	104	2,036	124	315	107	141	49	1,156	60	4,437

AM Intersection Peak Hour : **7:00 AM - 8:00 AM** Intersection PHF : **0.85**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	119	45	16	41	1,238	57	183	52	64	20	590	26	2,451
PHF	0.69	0.70	0.67	0.68	0.85	0.79	0.82	0.68	0.76	0.63	0.79	0.72	0.85
Movement PHF		0.70			0.87			0.86			0.80		0.85

PM Period (4:00 PM - 6:00 PM)													
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	TOTAL
4:00 PM	43	24	2	29	133	22	18	15	15	7	350	47	705
4:15 PM	28	20	1	21	150	29	15	16	14	12	328	27	661
4:30 PM	36	17	3	33	137	19	22	22	14	11	302	32	648
4:45 PM	40	19	4	32	140	21	16	20	13	12	281	32	630
5:00 PM	49	23	1	20	177	32	28	15	7	20	297	26	695
5:15 PM	38	23	5	28	131	18	24	12	23	14	240	26	582
5:30 PM	38	15	7	22	123	30	22	14	21	15	223	22	552
5:45 PM	27	22	3	26	178	27	17	18	21	20	212	25	596
Total	299	163	26	211	1,169	198	162	132	128	111	2,233	237	5,069

PM Intersection Peak Hour : **4:00 AM - 5:00 PM** Intersection PHF : **0.94**

	Southbound			Westbound			Northbound			Eastbound			TOTAL
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Volume	147	80	10	115	560	91	71	73	56	42	1261	138	2644
PHF	0.85	0.833	0.625	0.871	0.933	0.784	0.807	0.83	0.933	0.875	0.901	0.734	0.94
Movement PHF		0.86			0.96			0.86			0.89		0.94

24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: 2. Palm Avenue between Carolina Street and 7th Street

Orientation: *East-West*

Date of Count: *Wednesday, March 06, 2013*

Analysts: *DASH*

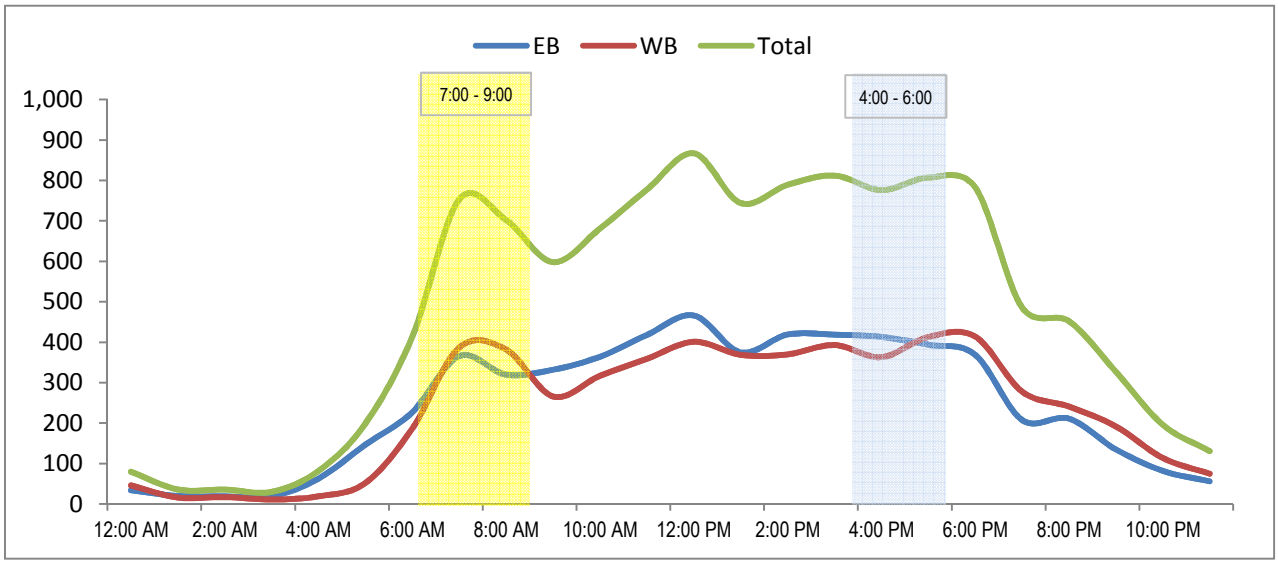
Weather: *Sunny*

AVC Proj. No: *13-0038*

24 Hour Segment Volume ***11,558***

Time	Hourly Volume			Time	Hourly Volume		
	EB	WB	Total		EB	WB	Total
12:00 AM - 1:00 AM	34	46	80	12:00 PM - 1:00 PM	466	401	867
1:00 AM - 2:00 AM	20	16	36	1:00 PM - 2:00 PM	375	369	744
2:00 AM - 3:00 AM	19	17	36	2:00 PM - 3:00 PM	419	370	789
3:00 AM - 4:00 AM	19	11	30	3:00 PM - 4:00 PM	419	393	812
4:00 AM - 5:00 AM	63	19	82	4:00 PM - 5:00 PM	413	363	776
5:00 AM - 6:00 AM	147	52	199	5:00 PM - 6:00 PM	394	413	807
6:00 AM - 7:00 AM	227	187	414	6:00 PM - 7:00 PM	369	414	783
7:00 AM - 8:00 AM	366	387	753	7:00 PM - 8:00 PM	208	278	486
8:00 AM - 9:00 AM	320	382	702	8:00 PM - 9:00 PM	211	241	452
9:00 AM - 10:00 AM	332	266	598	9:00 PM - 10:00 PM	135	192	327
10:00 AM - 11:00 AM	364	317	681	10:00 PM - 11:00 PM	82	114	196
11:00 AM - 12:00 PM	418	359	777	11:00 PM - 12:00 AM	56	75	131
Total	**2,329**	**2,059**	**4,388**	**Total**	**3,547**	**3,623**	**7,170**

24-Hour EB Volume 5,876 ***24-Hour WB Volume 5,682***



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: 1. SR 75 (Palm Avenue) between Rainbow Drive and 7th Street

Orientation: *East-West*

Date of Count: *Wednesday, March 06, 2013*

Analysts: *DASH*

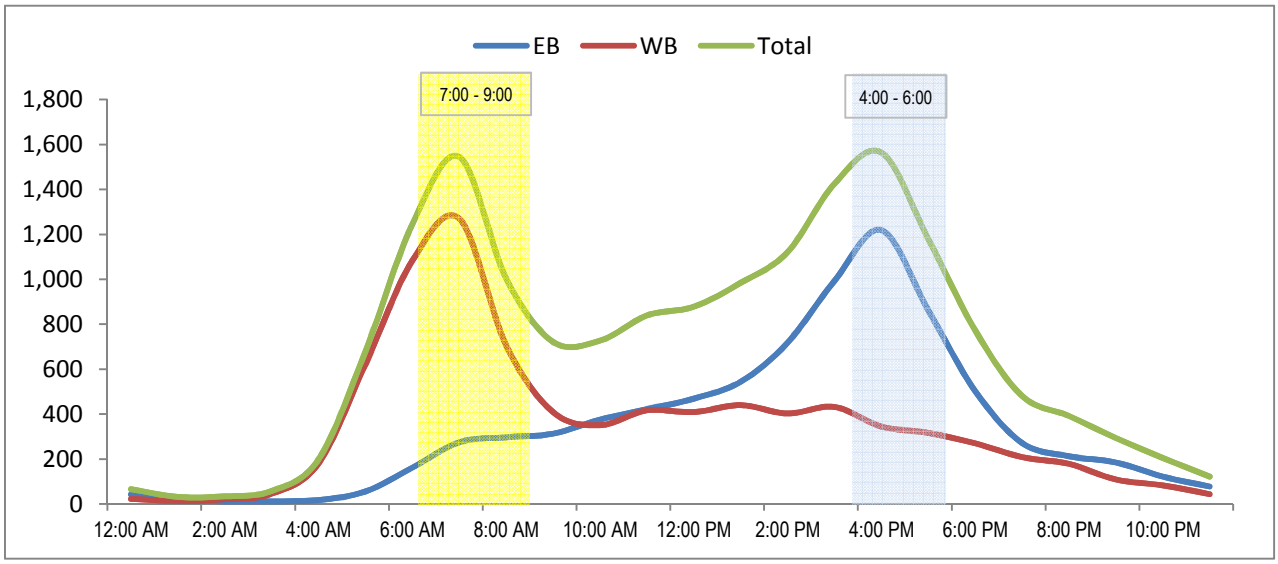
Weather: *Sunny*

AVC Proj. No: *13-0038*

24 Hour Segment Volume ***16,569***

Time	Hourly Volume			Time	Hourly Volume		
	EB	WB	Total		EB	WB	Total
12:00 AM - 1:00 AM	43	23	66	12:00 PM - 1:00 PM	469	409	878
1:00 AM - 2:00 AM	18	14	32	1:00 PM - 2:00 PM	544	440	984
2:00 AM - 3:00 AM	12	22	34	2:00 PM - 3:00 PM	718	403	1,121
3:00 AM - 4:00 AM	12	46	58	3:00 PM - 4:00 PM	993	432	1,425
4:00 AM - 5:00 AM	18	181	199	4:00 PM - 5:00 PM	1,219	345	1,564
5:00 AM - 6:00 AM	56	623	679	5:00 PM - 6:00 PM	863	317	1,180
6:00 AM - 7:00 AM	162	1,083	1,245	6:00 PM - 7:00 PM	503	270	773
7:00 AM - 8:00 AM	275	1,270	1,545	7:00 PM - 8:00 PM	272	209	481
8:00 AM - 9:00 AM	297	707	1,004	8:00 PM - 9:00 PM	213	179	392
9:00 AM - 10:00 AM	313	409	722	9:00 PM - 10:00 PM	185	109	294
10:00 AM - 11:00 AM	376	351	727	10:00 PM - 11:00 PM	122	83	205
11:00 AM - 12:00 PM	422	417	839	11:00 PM - 12:00 AM	78	44	122
Total	**2,004**	**5,146**	**7,150**	**Total**	**6,179**	**3,240**	**9,419**

24-Hour EB Volume 8,183 ***24-Hour WB Volume 8,386***



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Rainbow Dr btwn SR75 and Palm Ave

Orientation: *North-South*

Date of Count: *Wednesday, April 10, 2013*

Analysts: *DASH*

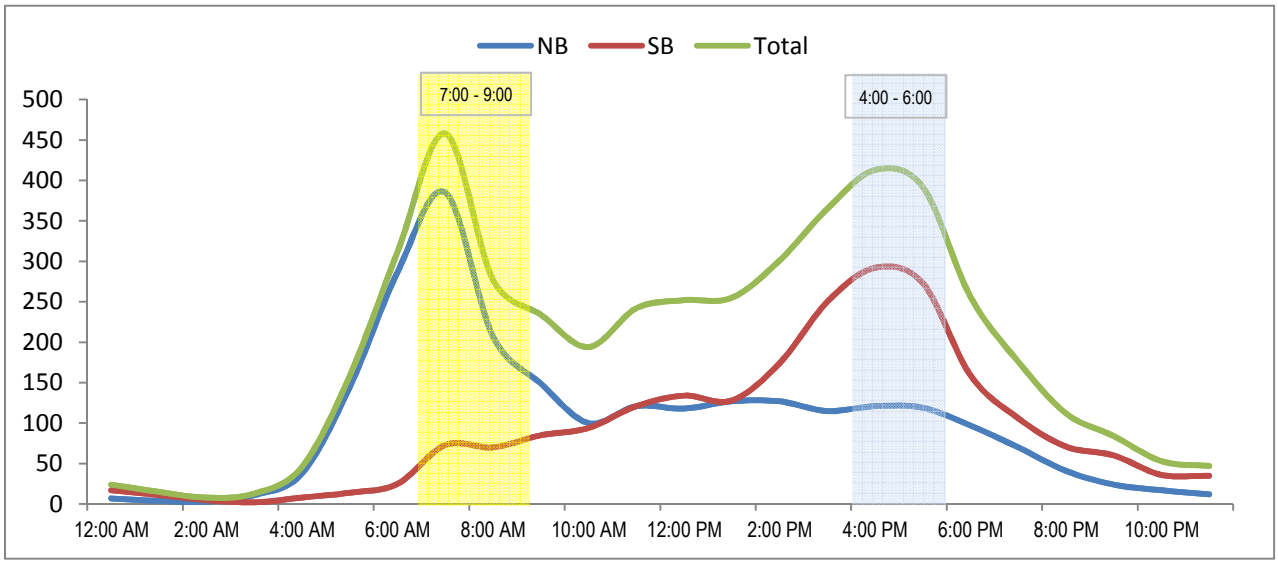
Weather: *Sunny*

AVC Proj. No: *13-0047*

24 Hour Segment Volume ***4,688***

Time	Hourly Volume NB	Hourly Volume SB	Hourly Volume Total	Time	Hourly Volume NB	Hourly Volume SB	Hourly Volume Total
12:00 AM - 1:00 AM	7	17	24	12:00 PM - 1:00 PM	118	134	252
1:00 AM - 2:00 AM	4	11	15	1:00 PM - 2:00 PM	127	128	255
2:00 AM - 3:00 AM	3	5	8	2:00 PM - 3:00 PM	127	174	301
3:00 AM - 4:00 AM	11	2	13	3:00 PM - 4:00 PM	115	250	365
4:00 AM - 5:00 AM	38	8	46	4:00 PM - 5:00 PM	121	292	413
5:00 AM - 6:00 AM	145	14	159	5:00 PM - 6:00 PM	119	273	392
6:00 AM - 7:00 AM	287	25	312	6:00 PM - 7:00 PM	97	159	256
7:00 AM - 8:00 AM	385	73	458	7:00 PM - 8:00 PM	70	106	176
8:00 AM - 9:00 AM	207	70	277	8:00 PM - 9:00 PM	41	71	112
9:00 AM - 10:00 AM	149	85	234	9:00 PM - 10:00 PM	24	60	84
10:00 AM - 11:00 AM	100	94	194	10:00 PM - 11:00 PM	17	36	53
11:00 AM - 12:00 PM	121	121	242	11:00 PM - 12:00 AM	12	35	47
Total	**1,457**	**525**	**1,982**	**Total**	**988**	**1,718**	**2,706**

24-Hour NB Volume 2,445 ***24-Hour SB Volume 2,243***



District	Rte	CO	Post Mile	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
11	75	SD	10.07	IMPERIAL BEACH, 13TH ST	4000	48500	48000	2700	33000	32500
11	75	SD	10.57	IMPERIAL BEACH, 9TH ST	2700	33000	32500	1800	22100	22000
11	75	SD	10.72	IMPERIAL BEACH, DELAWARE	1800	22100	22000	1600	19900	19700
11	75	SD	10.79	IMPERIAL BEACH, 7TH ST	1600	19900	19700	1300	15700	15500
11	75	SD	10.99	RAINBOW DRIVE	1300	15700	15500	1900	18400	16300
11	75	SD	13.973	CORONADO, SILVER STRAND ST PK	1900	18400	16300	2200	23000	20400

APPENDIX B

CALTRANS SIGNAL TIMING PLANS

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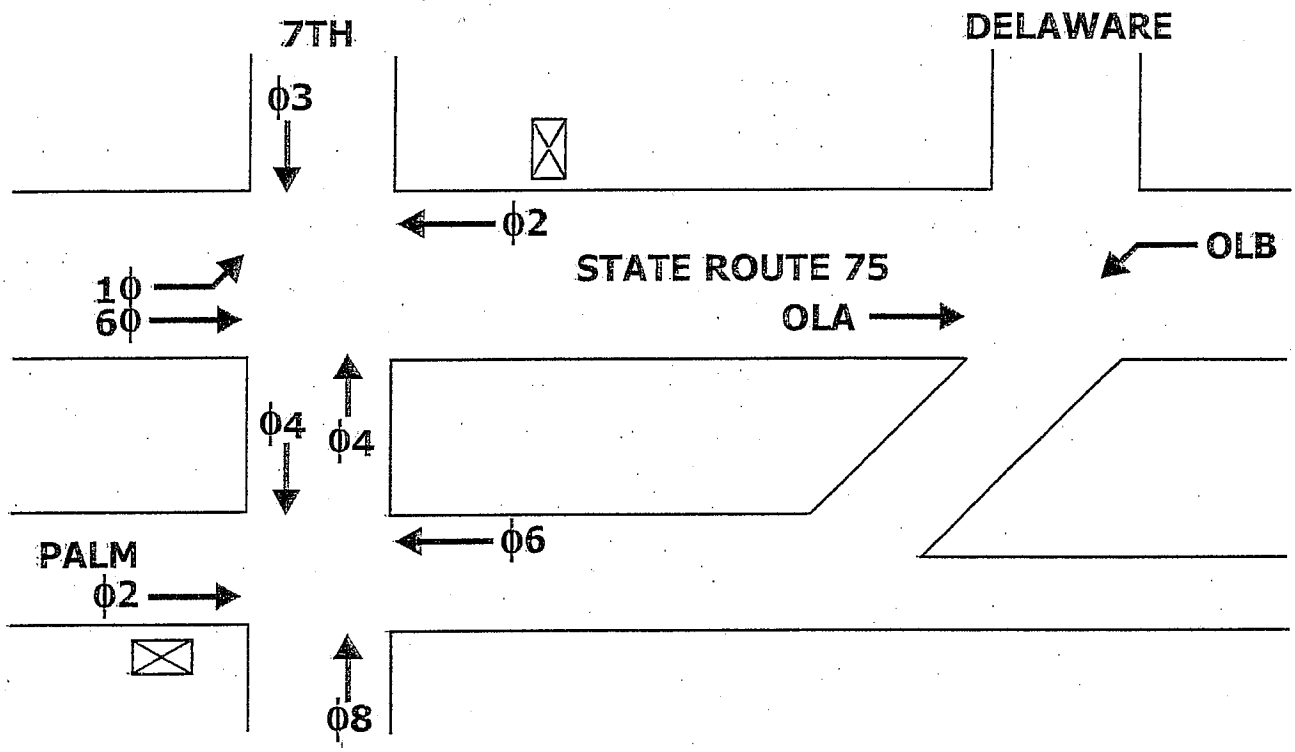
INTERCONNECT
7TH & PALM - RTE 75 @ 7th & DELAWARE



LOCATION: **RTE 75 @ 7th St / Delaware St**

CALTRANS C8 Version 3 DATE: 12/15/11

F PAGE

	INTERVAL	PHASE TIMING 1	2	3	4	5	6	7	8	9
0	WALK	1	7	1	7	1	7	1	1	CLK RST
1	DONT WALK	1	13	1	28	1	13	1	1	
2	MIN GREEN	5	10	10	10	5	15	1	1	
3	TYPE 3 DET	0	0	0	0	0	0	0	0	
4	ADD/VEH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	PASSAGE	1.0	5.5	3.0	3.0	1.0	5.5	0.9	0.9	
6	MAX GAP	1.0	7.0	3.0	3.0	1.0	7.0	0.9	0.9	
7	MIN GAP	1.0	3.0	3.0	3.0	1.0	3.0	0.9	0.9	
8	MAX EXT	15	50	21	21	21	50	9	9	
9	MAX 2									YR
A	MAX 3									MO
B										DAY
C	REDUCE BY	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	DOW
D	EVERY	1.0	0.6	1.0	1.0	1.0	0.6	1.0	1.0	HR
E	YELLOW	3.2	4.5	3.6	3.6	3.2	4.5	3.0	3.0	MIN
F	RED	2.0	1.0	2.0	2.0	2.0	1.0	0.0	0.0	SEC
3.5'	PED XING FT		62'		116'		62'			

PRE-EMPTION E		F FLAGS	1	2	3	4	5	6	7	8	
EV SEL	0	PERMIT	1	2	3	4	5	6	7	8	0
RR1 CLR	5	RED LOCK			3	4					1
EVA DLY	0	YEL LOCK									2
EVA CLR	5	V RECALL		2				6			3
EVB DLY	0	P RECALL									4
EVB CLR	5	PED PHASES		2		4		6			5
EVC DLY	0	RT OLA									6
EVC CLR	5	RT OLB									7
EVD DLY	0	DBL ENTRY									8
EVD CLR	5	MAX 2 PHASES									9
MAX EV	255	LAG PHASES	READ ONLY								A
RR2 CLR	5	RED REST									B
		REST-IN-WALK									C
		MAX 3 PHASES									D
		YEL START UP		2				6			E
		FIRST PHASE				4					F
			1	2	3	4	5	6	7	8	

FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	0
FOF	5
FCO	3
FC1	3
FC2	10
FCA	0.0
FCB	0.0
FCC	0.0
FCD	0.0
FDO TB SELECT	1
FD3 PED SELECT	0
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1
CO5 FLASH TYPE	1
CC2 DOWNLOAD	1

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CC1 FLASH ONLY

LOCATION: **RTE 75 @ 7th St / Delaware St**

CALTRANS C8 Version 3 DATE: 12/15/11

C PAGE

		CONTROL PLANS									Y-COORD			LAG PHASE		FLAGS									
		1	2	3	4	5	6	7	8	9		C	D	E		F	1	2	3	4	5	6	7	8	
0	CYCLE LENGTH			**180**												LAG FZ FREE		**2**	**3**			**6**		**8**	0
1	FZ1 GRN FCTR			**20**										GAPOUT CP1		LAG FZ CP 1									1
2														GAPOUT CP2		LAG FZ CP 2									2
3	FZ3 GRN FCTR			**30**										GAPOUT CP3	**1**	LAG FZ CP 3		**2**	**3**		**5**			**8**	3
4	FZ4 GRN FCTR			**35**							PERM TIME			GAPOUT CP4		LAG FZ CP 4									4
5	FZ5 GRN FCTR			**25**							LAG OFFSET			GAPOUT CP5		LAG FZ CP 5									5
6											FORCE OFF			GAPOUT CP6		LAG FZ CP 6									6
7	FZ7 GRN FCTR										LONG GRN			GAPOUT CP7		LAG FZ CP 7									7
8	FZ8 GRN FCTR										NO GREEN			GAPOUT CP8		LAG FZ CP 8									8
9	MULTI CYCLE													GAPOUT CP9		LAG FZ CP 9									9
A	OFFSET A			**152**							OFFSET					LAG C COORD									A
B	OFFSET B															LAG D COORD									B
C	OFFSET C															COORD FAZES		**2**				**6**			C
D	FZ 3 EXT																								D
E	FZ 7 EXT																								E
F	OFFSET INTRPT																								F
																	1	2	3	4	5	6	7	8	

CO1 MANUAL CP
CO2 MASTER CP
CO3 CURRENT CP
CO4 LAST CP
CO7 TRNSMT CP
COD MANUAL OFFSET
CAO LOCAL CYCLE TIMER
CBO MASTER CYCLE TIMER
CAA LOCAL OFFSET
CBA MASTER OFFSET

SYSTEM MASTER:
7th / Delaware St.

FEATURE	OFF	ON
1		
2		
3		
4		
5		
6		
7		
8		

LOCATION	OFF	ON
1		
2		
3		
4		8
5		
6		
7		
8		

COO = **8**

CCB/CDB OFFSET TIMER
CCC/CDC LAG GREEN TIMER
CCD/CDD FORCE OFF TIMER
CCE/CDE LONG GREEN TIMER
CCF/CDF NO GREEN TIMER

LOCATION: **RTE 75 @ 7th St / Delaware St**

CALTRANS C8 Version 3 DATE: 12/15/11

D PAGE

	D	FLAGS								E	FLAGS								F	FLAGS							
	MAX	1	2	3	4	5	6	7	8	MIN	1	2	3	4	5	6	7	8	PED	1	2	3	4	5	6	7	8
0	RCL									RCL									RCL								
1	CP 1									CP 1									CP 1								
2	CP 2									CP 2									CP 2								
3	CP 3									CP 3				4					CP 3								
4	CP 4									CP 4									CP 4								
5	CP 5									CP 5									CP 5								
6	CP 6									CP 6									CP 6								
7	CP 7									CP 7									CP 7								
8	CP 8									CP 8									CP 8								
9	CP 9									CP 9									CP 9								
A																			RCL 1								
B																			RCL 2								
C																											
D																											
E																											
F																											
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8

E PAGE

	E	FLAGS								F	FLAGS								
	FUNCTION	1	2	3	4	5	6	7	8	FUNCTION	1	2	3	4	5	6	7	8	
0										CODE 4									0
1										CODE 5									1
2										C-RECALL									2
3										D-RECALL									3
4										EXCLUSIVE									4
5										2 PED		2							5
6										6 PED						6			6
7										4 PED				4					7
8										8 PED								8	8
9																			9
A	OLA NOT			3	4	5				OLA ON						6			A
B	OLB NOT						6			OLB ON			3	4	5				B
C	OLC NOT									OLC ON									C
D	OLD NOT									OLD ON									D
E																			E
F																			F
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	

LAST POWER FAILURE REGISTER

HOUR = D-A-E

MINUTE = D-B-E

DAY = D-C-E

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES

(CALL ACTIVE LIGHTS)

RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES

(CALL ACTIVE LIGHTS)

LAST FLASH TIME REGISTER

HOUR = D-A-F

MINUTE = D-B-F

DAY = D-C-F

D-E-E = C8 VERSION NUMBER

D-E-F = LITHIUM BATTERY CONDITION

84 = BAD

85 = GOOD

LOCATION: **RTE 75 @ 7th St / Delaware St**

CALTRANS C8 Version 3 DATE: 12/12/12

7 PAGE

TIME OF DAY ACTIVITY TABLE											
7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW LTS											
	HR	MIN	ACT	ON/ OFF	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0	06	10	8	ON		2	3	4	5	6	
1	09	00	8			2	3	4	5	6	7
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE C09 = 0 or 1

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0	06	30	3	A		2	3	4	5	6	
1	08	01	E	A	1	2	3	4	5	6	7
2	14	30	3	A		2	3	4	5	6	
3	17	30	E	A	1	2	3	4	5	6	7
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE CO9 = 2

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

ACTIVITY CODE

1 TYPE OF MAX TERMINATION
2 MAX 2
3 MAX 3
4 COND SERV (1ST SELECT)
5 COND SERV (2ND SELECT)
6 ENERGIZE AUX OUTPUT-RED

7 ENERGIZE AUX OUTPUT-GREEN

8 ENERGIZE AUX OUTPUT-YELLOW

YELLOW CODE 8 FZ4 GRN HOLDS 7th / PALM FZ4 GRN

9 TIME OF DAY MAX RECALL (1ST SELECT)
A TRAFFIC ACT. MAX 2 OPERATION
B TIME OF DAY MAX RECALL (2ND SELECT)
C YELLOW YIELD COORDINATION
D YELLOW YIELD COORDINATION
E TIME OF DAY FREE OPERATION
F FLASHING OPERATION

LOCATION: **RTE 75 @ 7th St./ Palm Ave**

CALTRANS C8 Version 3 DATE: 02/28/13

F PAGE

	INTERVAL	PHASE TIMING 1	2	3	4	5	6	7	8	9	PRE-EMPTION E		F FLAGS	1	2	3	4	5	6	7	8	
0	WALK	1	7	1	7	1	7	1	7	CLK RST	EV SEL	0	PERMIT		2		4		6		8	0
1	DONT WALK	1	13	1	19	1	13	1	19		RR1 CLR	5	RED LOCK									1
2	MIN GREEN	1	10	1	10	1	10	1	10		EVA DLY	0	YEL LOCK				4					2
3	TYPE 3 DET	0	0	0	0	0	0	0	0		EVA CLR	5	V RECALL		2				6			3
4	ADD/VEH	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0		EVB DLY	0	P RECALL									4
5	PASSAGE	0.9	2.0	0.9	2.0	0.9	2.0	0.9	2.0		EVB CLR	5	PED PHASES		2		4				8	5
6	MAX GAP	0.9	3.0	0.9	3.0	0.9	3.0	0.9	3.0		EVC DLY	0	RT OLA									6
7	MIN GAP	0.9	1.0	0.9	1.0	0.9	1.0	0.9	1.0		EVC CLR	5	RT OLB									7
8	MAX EXT	9	25	9	25		25	9	25		EVD DLY	0	DBL ENTRY				4				8	8
9	MAX 2									YR	EVD CLR	5	MAX 2 PHASES									9
A	MAX 3									MO	MAX EV	255	LAG PHASES	READ ONLY								A
B										DAY	RR2 CLR	5	RED REST									B
C	REDUCE BY	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	DOW			REST-IN-WALK									C
D	EVERY	1.0	0.8	1.0	0.8	1.0	0.8	1.0	0.8	HR			MAX 3 PHASES									D
E	YELLOW	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6	MIN			YEL START UP				4				8	E
F	RED	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	SEC			FIRST PHASE		2				6			F
3.5'	PED XING FT		58'		76'		60'		80'					1	2	3	4	5	6	7	8	

FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	18
FOF	5
FCO	3
FC1	3
FC2	10
FCA	0.0
FCB	0.0
FCC	0.0
FCD	0.0
FDO TB SELECT	1
FD3 PED SELECT	0
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1
CO5 FLASH TYPE	1
CC2 DOWNLOAD	1

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CC1 FLASH ONLY

NOTES:

FZ4 @ DELAWARE HOLDS FZ4 @ 7th WITH CODE 8 @ DELAWARE

LOCATION: **RTE 75 @ 7th./PALM STREET**

CALTRANS C8 Version 3 DATE: 11/23/10

C PAGE

		CONTROL PLANS									Y-COORD			LAG PHASE	FLAGS									
		1	2	3	4	5	6	7	8	9		C	D	E	F	1	2	3	4	5	6	7	8	
0	CYCLE LENGTH														LAG FZ FREE		**2**		**4**		**6**		**8**	0
1	FZ1 GRN FCTR													GAPOUT CP1	LAG FZ CP 1									1
2														GAPOUT CP2	LAG FZ CP 2									2
3	FZ3 GRN FCTR													GAPOUT CP3	LAG FZ CP 3									3
4	FZ4 GRN FCTR										PERM TIME			GAPOUT CP4	LAG FZ CP 4									4
5	FZ5 GRN FCTR										LAG OFFSET			GAPOUT CP5	LAG FZ CP 5									5
6											FORCE OFF			GAPOUT CP6	LAG FZ CP 6									6
7	FZ7 GRN FCTR										LONG GRN			GAPOUT CP7	LAG FZ CP 7									7
8	FZ8 GRN FCTR										NO GREEN			GAPOUT CP8	LAG FZ CP 8									8
9	MULTI CYCLE													GAPOUT CP9	LAG FZ CP 9									9
A	OFFSET A										OFFSET				LAG C COORD									A
B	OFFSET B														LAG D COORD									B
C	OFFSET C														COORD FAZES		**2**				**6**			C
D	FZ 3 EXT																							D
E	FZ 7 EXT																							E
F	OFFSET INTRPT																							F
																1	2	3	4	5	6	7	8	

CO1 MANUAL CP
CO2 MASTER CP
CO3 CURRENT CP
CO4 LAST CP
CO7 TRNSMT CP
COD MANUAL OFFSET
CAO LOCAL CYCLE TIMER
CBO MASTER CYCLE TIMER
CAA LOCAL OFFSET
CBA MASTER OFFSET

SYSTEM MASTER:
7th / DELAWARE ST.

FEATURE	OFF	ON
1		
2		
3		
4		
5		
6		
7		
8		

LOCATION	OFF	ON
1		1
2		
3		
4		8
5		
6		
7		
8		

COO = **9**

CCB/CDB OFFSET TIMER
CCC/CDC LAG GREEN TIMER
CCD/CDD FORCE OFF TIMER
CCE/CDE LONG GREEN TIMER
CCF/CDF NO GREEN TIMER

LOCATION: **RTE 75 @ 7th./PALM STREET**

CALTRANS C8 Version 3 DATE: 11/23/10

D PAGE

	D	FLAGS								E	FLAGS								F	FLAGS							
	MAX	1	2	3	4	5	6	7	8	MIN	1	2	3	4	5	6	7	8	PED	1	2	3	4	5	6	7	8
0	RCL									RCL									RCL								
1	CP 1									CP 1									CP 1								
2	CP 2									CP 2									CP 2								
3	CP 3									CP 3									CP 3								
4	CP 4									CP 4									CP 4								
5	CP 5									CP 5									CP 5								
6	CP 6									CP 6									CP 6								
7	CP 7									CP 7									CP 7								
8	CP 8									CP 8									CP 8								
9	CP 9									CP 9									CP 9								
A																			RCL 1								
B																			RCL 2								
C																											
D																											
E																											
F																											
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8

E PAGE

	E	FLAGS								F	FLAGS								
	FUNCTION	1	2	3	4	5	6	7	8	FUNCTION	1	2	3	4	5	6	7	8	
0										CODE 4									0
1										CODE 5									1
2										C-RECALL									2
3										D-RECALL									3
4										EXCLUSIVE									4
5										2 PED		2							5
6										6 PED						6			6
7										4 PED				4					7
8										8 PED								8	8
9																			9
A	OLA NOT									OLA ON									A
B	OLB NOT									OLB ON									B
C	OLC NOT									OLC ON									C
D	OLD NOT									OLD ON									D
E																			E
F																			F
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	

LAST POWER FAILURE REGISTER

HOUR = D-A-E

MINUTE = D-B-E

DAY = D-C-E

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES

(CALL ACTIVE LIGHTS)

RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES

(CALL ACTIVE LIGHTS)

LAST FLASH TIME REGISTER

HOUR = D-A-F

MINUTE = D-B-F

DAY = D-C-F

D-E-E = C8 VERSION NUMBER

D-E-F = LITHIUM BATTERY CONDITION

84 = BAD

85 = GOOD

LOCATION: **RTE 75 @ 7th./PALM STREET**

CALTRANS C8 Version 3 DATE: 11/23/10

7 PAGE

TIME OF DAY ACTIVITY TABLE											
7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW LTS											
	HR	MIN	ACT	ON/ OFF	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE C09 = 0 or 1

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE CO9 = 2

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

ACTIVITY CODE

1 TYPE OF MAX TERMINATION
2 MAX 2
3 MAX 3
4 COND SERV (1ST SELECT)
5 COND SERV (2ND SELECT)
6 ENERGIZE AUX OUTPUT-RED
7 ENERGIZE AUX OUTPUT-GREEN
8 ENERGIZE AUX OUTPUT-YELLOW
9 TIME OF DAY MAX RECALL (1ST SELECT)
A TRAFFIC ACT. MAX 2 OPERATION
B TIME OF DAY MAX RECALL (2ND SELECT)
C YELLOW YIELD COORDINATION
D YELLOW YIELD COORDINATION
E TIME OF DAY FREE OPERATION
F FLASHING OPERATION

LOCATION: **RTE 75 @ Rainbow Dr.**

CALTRANS C8 Version 3 DATE: 1/12/11

F PAGE

	INTERVAL	PHASE TIMING 1	2	3	4	5	6	7	8	9	PRE-EMPTION E		F FLAGS	1	2	3	4	5	6	7	8	
0	WALK	1	7	1	1	1	7	1	7	CLK RST	EV SEL	0	PERMIT	1	2			5	6	7	8	0
1	DONT WALK	1	22	1	1	1	22	1	29		RR1 CLR	5	RED LOCK									1
2	MIN GREEN	5	10	1	1	5	10	5	5		EVA DLY	0	YEL LOCK									2
3	TYPE 3 DET	0	0	0	0	0	0	0	0		EVA CLR	5	V RECALL		2				6			3
4	ADD/VEH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		EVB DLY	0	P RECALL									4
5	PASSAGE	1.0	6.0	0.9	0.9	1.0	6.0	2.0	2.0		EVB CLR	5	PED PHASES		2				6		8	5
6	MAX GAP	1.0	9.0	0.9	0.9	1.0	9.0	2.0	2.0		EVC DLY	0	RT OLA									6
7	MIN GAP	1.0	3.0	0.9	0.9	1.0	3.0	2.0	2.0		EVC CLR	5	RT OLB									7
8	MAX EXT	20	50	9	9	20	50	20	30		EVD DLY	0	DBL ENTRY									8
9	MAX 2									YR	EVD CLR	5	MAX 2 PHASES									9
A	MAX 3									MO	MAX EV	255	LAG PHASES	READ ONLY								A
B										DAY	RR2 CLR	5	RED REST									B
C	REDUCE BY	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	DOW			REST-IN-WALK									C
D	EVERY	1.0	0.5	1.0	1.0	1.0	0.5	1.0	1.0	HR			MAX 3 PHASES									D
E	YELLOW	3.2	4.5	3.0	3.0	3.2	4.5	3.6	3.6	MIN			YEL START UP		2				6			E
F	RED	1.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	SEC			FIRST PHASE								8	F
	PED XING FT		95'				95'		117'					1	2	3	4	5	6	7	8	

FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	0
FOF	5

FCO	3
FC1	3
FC2	10
FCA	0.0
FCB	0.0
FCC	0.0
FCD	0.0

FDO TB SELECT	1
FD3 PED SELECT	0
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1

CO5 FLASH TYPE	1
CC2 DOWNLOAD	1

NOTES:

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CC1 FLASH ONLY

LOCATION: **RTE 75 @ Rainbow Dr.**

CALTRANS C8 Version 3 DATE: 1/12/11

C PAGE

		CONTROL PLANS									Y-COORD			LAG PHASE	FLAGS									
		1	2	3	4	5	6	7	8	9		C	D	E	F	1	2	3	4	5	6	7	8	
0	CYCLE LENGTH														LAG FZ FREE		**2**		**4**		**6**		**8**	0
1	FZ1 GRN FCTR													GAPOUT CP1	LAG FZ CP 1									1
2														GAPOUT CP2	LAG FZ CP 2									2
3	FZ3 GRN FCTR													GAPOUT CP3	LAG FZ CP 3									3
4	FZ4 GRN FCTR										PERM TIME			GAPOUT CP4	LAG FZ CP 4									4
5	FZ5 GRN FCTR										LAG OFFSET			GAPOUT CP5	LAG FZ CP 5									5
6											FORCE OFF			GAPOUT CP6	LAG FZ CP 6									6
7	FZ7 GRN FCTR										LONG GRN			GAPOUT CP7	LAG FZ CP 7									7
8	FZ8 GRN FCTR										NO GREEN			GAPOUT CP8	LAG FZ CP 8									8
9	MULTI CYCLE													GAPOUT CP9	LAG FZ CP 9									9
A	OFFSET A										OFFSET				LAG C COORD									A
B	OFFSET B														LAG D COORD									B
C	OFFSET C														COORD FAZES		**2**				**6**			C
D	FZ 3 EXT																							D
E	FZ 7 EXT																							E
F	OFFSET INTRPT																							F
																1	2	3	4	5	6	7	8	

CO1 MANUAL CP
CO2 MASTER CP
CO3 CURRENT CP
CO4 LAST CP
CO7 TRNSMT CP
COD MANUAL OFFSET
CAO LOCAL CYCLE TIMER
CBO MASTER CYCLE TIMER
CAA LOCAL OFFSET
CBA MASTER OFFSET

SYSTEM MASTER:
7th / DELAWARE ST.

FEATURE	OFF	ON
1		
2		
3		
4		
5		
6		
7		
8		

LOCATION	OFF	ON
1		
2		2
3		
4		8
5		
6		
7		
8		

COO = **10**

CCB/CDB OFFSET TIMER
CCC/CDC LAG GREEN TIMER
CCD/CDD FORCE OFF TIMER
CCE/CDE LONG GREEN TIMER
CCF/CDF NO GREEN TIMER

LOCATION: **RTE 75 @ Rainbow Dr.**

CALTRANS C8 Version 3 DATE: 1/12/11

D PAGE

	D	FLAGS								E	FLAGS								F	FLAGS							
	MAX	1	2	3	4	5	6	7	8	MIN	1	2	3	4	5	6	7	8	PED	1	2	3	4	5	6	7	8
0	RCL									RCL									RCL								
1	CP 1									CP 1									CP 1								
2	CP 2									CP 2									CP 2								
3	CP 3									CP 3									CP 3								
4	CP 4									CP 4									CP 4								
5	CP 5									CP 5									CP 5								
6	CP 6									CP 6									CP 6								
7	CP 7									CP 7									CP 7								
8	CP 8									CP 8									CP 8								
9	CP 9									CP 9									CP 9								
A																			RCL 1								
B																			RCL 2								
C																											
D																											
E																											
F																											
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8

E PAGE

	E	FLAGS								F	FLAGS								
	FUNCTION	1	2	3	4	5	6	7	8	FUNCTION	1	2	3	4	5	6	7	8	
0										CODE 4									0
1										CODE 5									1
2										C-RECALL									2
3										D-RECALL									3
4										EXCLUSIVE									4
5										2 PED		2							5
6										6 PED						6			6
7										4 PED				4					7
8										8 PED								8	8
9																			9
A	OLA NOT									OLA ON									A
B	OLB NOT									OLB ON									B
C	OLC NOT									OLC ON									C
D	OLD NOT									OLD ON									D
E																			E
F																			F
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	

LAST POWER FAILURE REGISTER

HOUR = D-A-E

MINUTE = D-B-E

DAY = D-C-E

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES
(CALL ACTIVE LIGHTS)

RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES
(CALL ACTIVE LIGHTS)

LAST FLASH TIME REGISTER

HOUR = D-A-F

MINUTE = D-B-F

DAY = D-C-F

D-E-E = C8 VERSION NUMBER

D-E-F = LITHIUM BATTERY CONDITION

84 = BAD

85 = GOOD

LOCATION: **RTE 75 @ Rainbow Dr.**

CALTRANS C8 Version 3 DATE: 1/12/11

7 PAGE

TIME OF DAY ACTIVITY TABLE											
7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW LTS											
	HR	MIN	ACT	ON/ OFF	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE C09 = 0 or 1

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

9 PAGE CO9 = 2

CONTROL PLAN TIME OF DAY											
9+EVENT+HR+MIN+CP+OS+E+DOW											
	HR	MIN	CP	OS	S 1	M 2	T 3	W 4	T 5	F 6	S 7
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
A											
B											
C											
D											
E											
F											

ACTIVITY CODE

1 TYPE OF MAX TERMINATION
2 MAX 2
3 MAX 3
4 COND SERV (1ST SELECT)
5 COND SERV (2ND SELECT)
6 ENERGIZE AUX OUTPUT-RED

7 ENERGIZE AUX OUTPUT-GREEN

8 ENERGIZE AUX OUTPUT-YELLOW

9 TIME OF DAY MAX RECALL (1ST SELECT)
A TRAFFIC ACT. MAX 2 OPERATION
B TIME OF DAY MAX RECALL (2ND SELECT)
C YELLOW YIELD COORDINATION
D YELLOW YIELD COORDINATION
E TIME OF DAY FREE OPERATION
F FLASHING OPERATION

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APPENDIX C

SANTEC/ITE ROADWAY CLASSIFICATION TABLE

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Table 2

ROADWAY CLASSIFICATIONS, LEVELS OF SERVICE (LOS) AND AVERAGE DAILY TRAFFIC (ADT)

			LEVEL OF SERVICE W/ADT**				
STREET CLASSIFICATION	LANES	CROSS SECTIONS* (APPROX.)	A	B	C	D	E
Expressway	6 lanes	102-160/122-200	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6 lanes	102-108/122-128	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	102/122	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	78-82/98-102	15,000	21,000	30,000	35,000	40,000
Secondary Arterial/ Collector	4 lanes	64-72/84-92	10,000	14,000	20,000	25,000	30,000
Collector (no center lane) (continuous left-turn lane)	4 lanes 2 lanes	64/84 50/70	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2 lanes	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2 lanes	40/60	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	36/56	---	---	2,200	---	---

LEGEND:

* Curb to curb width (feet)/right of way width (feet): based upon the City of San Diego Street Design Manual and other jurisdictions within the San Diego region.

** Approximate recommended ADT based upon the City of San Diego Street Design Manual.

NOTES:

1. The volumes and the average daily level of service listed above are only intended as a general planning guideline.
2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

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APPENDIX D

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
EXISTING

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	174	56	41	1270	2	387	0	82	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.2	5.5		4.6	4.6		4.6		
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00		1.00		
Frt		0.96		1.00	1.00		1.00	0.85		1.00		
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95		
Satd. Flow (prot)		3410		1770	3538		1770	1583		1770		
Flt Permitted		1.00		0.95	1.00		0.95	1.00		0.95		
Satd. Flow (perm)		3410		1770	3538		1770	1583		1770		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	189	61	45	1380	2	421	0	89	4	0	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	63	0	0	0	0
Lane Group Flow (vph)	0	225	0	45	1382	0	421	26	0	4	0	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)		53.7		6.6	64.5		35.4	35.4		5.4		
Effective Green, g (s)		53.7		6.6	64.5		35.4	35.4		5.4		
Actuated g/C Ratio		0.45		0.05	0.54		0.29	0.29		0.05		
Clearance Time (s)		5.5		4.2	5.5		4.6	4.6		4.6		
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0		
Lane Grp Cap (vph)		1526		97	1902		522	467		80		
v/s Ratio Prot		0.07		0.03	c0.39		c0.24	0.02		c0.00		
v/s Ratio Perm												
v/c Ratio		0.15		0.46	0.73		0.81	0.06		0.05		
Uniform Delay, d1		19.6		55.0	21.1		39.1	30.3		54.8		
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00		
Incremental Delay, d2		0.2		3.5	2.5		12.6	0.2		1.2		
Delay (s)		19.8		58.5	23.5		51.7	30.6		56.0		
Level of Service		B		E	C		D	C		E		
Approach Delay (s)		19.8			24.6			48.0			56.0	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.7
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	238	15	0	1231	18	36	29	3	19	36	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			1.00		1.00	0.99			0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	5041			5074		1770	1839			1723	
Flt Permitted	0.95	1.00			1.00		0.68	1.00			0.99	
Satd. Flow (perm)	1770	5041			5074		1268	1839			1723	
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)	20	259	16	0	1338	20	39	32	3	21	39	59
RTOR Reduction (vph)	0	3	0	0	0	0	0	2	0	0	20	0
Lane Group Flow (vph)	20	272	0	0	1358	0	39	33	0	0	99	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	5.2	109.2			97.3		30.2	30.2			27.4	
Effective Green, g (s)	5.2	109.2			97.3		30.2	30.2			27.4	
Actuated g/C Ratio	0.03	0.61			0.54		0.17	0.17			0.15	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	51	3058			2743		213	309			262	
v/s Ratio Prot	c0.01	0.05			c0.27			0.02			c0.06	
v/s Ratio Perm							c0.03					
v/c Ratio	0.39	0.09			0.49		0.18	0.11			0.38	
Uniform Delay, d1	85.8	14.7			25.9		64.3	63.5			68.6	
Progression Factor	1.00	1.00			0.71		0.66	0.65			1.00	
Incremental Delay, d2	4.9	0.0			0.6		0.4	0.1			0.9	
Delay (s)	90.8	14.7			19.1		42.7	41.5			69.5	
Level of Service	F	B			B		D	D			E	
Approach Delay (s)		19.9			19.1			42.1			69.5	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	320	16	41	326	1	83	44	79	2	17	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	1.00
Satd. Flow (prot)	1770	3514		1770	3538			1731			1853	1583
Flt Permitted	0.52	1.00		0.51	1.00			0.86			0.96	1.00
Satd. Flow (perm)	963	3514		950	3538			1519			1789	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)	25	348	17	45	354	1	90	48	86	2	18	35
RTOR Reduction (vph)	0	1	0	0	0	0	0	14	0	0	0	30
Lane Group Flow (vph)	25	364	0	45	355	0	0	210	0	0	20	5
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	97.3	97.3		97.3	97.3			30.2			27.4	27.4
Effective Green, g (s)	97.3	97.3		97.3	97.3			30.2			27.4	27.4
Actuated g/C Ratio	0.54	0.54		0.54	0.54			0.17			0.15	0.15
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	521	1900		514	1912			255			272	241
v/s Ratio Prot		c0.10			0.10							
v/s Ratio Perm	0.03			0.05				c0.14			c0.01	0.00
v/c Ratio	0.05	0.19		0.09	0.19			0.82			0.07	0.02
Uniform Delay, d1	19.5	21.2		19.9	21.1			72.3			65.4	64.9
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.49	0.31
Incremental Delay, d2	0.2	0.2		0.3	0.2			18.9			0.1	0.0
Delay (s)	19.7	21.4		20.3	21.3			91.2			31.9	20.4
Level of Service	B	C		C	C			F			C	C
Approach Delay (s)		21.3			21.2			91.2			24.6	
Approach LOS		C			C			F			C	

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	25.1
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	260	0	368	1239	5	0	0	0	0	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	1.00							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3537							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3537							1611
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	283	0	400	1347	5	0	0	0	0	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	283	0	400	1352	0	0	0	0	0	0	6
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		97.3		27.4	180.0							97.3
Effective Green, g (s)		97.3		27.4	180.0							97.3
Actuated g/C Ratio		0.54		0.15	1.00							0.54
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2749		523	3537							871
v/s Ratio Prot		0.06		c0.12	0.38							
v/s Ratio Perm												0.00
v/c Ratio		0.10		0.76	0.38							0.01
Uniform Delay, d1		20.1		73.2	0.0							19.1
Progression Factor		0.50		0.93	1.00							1.00
Incremental Delay, d2		0.1		6.1	0.3							0.0
Delay (s)		10.1		74.1	0.3							19.1
Level of Service		B		E	A							B
Approach Delay (s)		10.1			17.1			0.0			19.1	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	4.6
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	613	27	41	1324	57	196	52	64	119	45	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	5053		1770	5054			3326			3360	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (perm)	1770	5053		1770	5054			3326			3360	
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)	23	666	29	45	1439	62	213	57	70	129	49	29
RTOR Reduction (vph)	0	1	0	0	1	0	0	15	0	0	8	0
Lane Group Flow (vph)	23	694	0	45	1500	0	0	325	0	0	199	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	5.4	114.1		8.7	117.4			22.9			16.0	
Effective Green, g (s)	5.4	114.1		8.7	117.4			22.9			16.0	
Actuated g/C Ratio	0.03	0.63		0.05	0.65			0.13			0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	53	3203		86	3296			423			299	
v/s Ratio Prot	0.01	0.14		c0.03	c0.30			c0.10			c0.06	
v/s Ratio Perm												
v/c Ratio	0.43	0.22		0.52	0.45			0.88dl			0.66	
Uniform Delay, d1	85.8	14.0		83.6	15.5			76.0			79.4	
Progression Factor	1.17	0.61		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.6	0.2		5.6	0.5			8.2			5.5	
Delay (s)	106.3	8.7		89.3	15.9			84.2			84.9	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		11.8			18.1			84.2			84.9	
Approach LOS		B			B			F			F	

Intersection Summary			
HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1172	262	64	283	0	86	0	50	3	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3442		1770	3539		1770	1583		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3442		1770	3539		1770	1583		1770	1723	
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)	5	1274	285	70	308	0	93	0	54	3	1	1
RTOR Reduction (vph)	0	15	0	0	0	0	0	47	0	0	1	0
Lane Group Flow (vph)	5	1544	0	70	308	0	93	7	0	3	1	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	1.1	71.3		8.0	78.2		16.4	16.4		5.4	5.4	
Effective Green, g (s)	1.1	71.3		8.0	78.2		16.4	16.4		5.4	5.4	
Actuated g/C Ratio	0.01	0.59		0.07	0.65		0.14	0.14		0.05	0.05	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	16	2045		118	2306		242	216		80	78	
v/s Ratio Prot	c0.00	c0.45		c0.04	0.09		c0.05	0.00		c0.00	0.00	
v/s Ratio Perm												
v/c Ratio	0.31	0.76		0.59	0.13		0.38	0.03		0.04	0.01	
Uniform Delay, d1	59.1	17.9		54.4	8.0		47.2	44.9		54.8	54.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.9	2.6		7.8	0.1		4.6	0.3		0.9	0.3	
Delay (s)	69.9	20.6		62.2	8.1		51.8	45.2		55.7	55.1	
Level of Service	E	C		E	A		D	D		E	E	
Approach Delay (s)		20.7			18.1			49.4			55.4	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.1
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	1078	85	0	331	43	20	33	4	23	26	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			0.98		1.00	0.98			0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	5030			4997		1770	1835			1777	
Flt Permitted	0.95	1.00			1.00		0.71	1.00			0.98	
Satd. Flow (perm)	1770	5030			4997		1329	1835			1777	
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)	63	1172	92	0	360	47	22	36	4	25	28	14
RTOR Reduction (vph)	0	3	0	0	7	0	0	3	0	0	6	0
Lane Group Flow (vph)	63	1261	0	0	401	0	22	37	0	0	61	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	11.8	120.5			102.0		18.4	18.4			27.9	
Effective Green, g (s)	11.8	120.5			102.0		18.4	18.4			27.9	
Actuated g/C Ratio	0.07	0.67			0.57		0.10	0.10			0.15	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	116	3367			2832		136	188			275	
v/s Ratio Prot	c0.04	c0.25			0.08			c0.02			c0.03	
v/s Ratio Perm							0.02					
v/c Ratio	0.54	0.37			0.14		0.16	0.20			0.22	
Uniform Delay, d1	81.5	13.1			18.4		73.8	74.0			66.6	
Progression Factor	1.00	1.00			0.85		0.93	0.93			1.00	
Incremental Delay, d2	5.1	0.1			0.1		0.6	0.5			0.4	
Delay (s)	86.6	13.2			15.7		69.4	69.6			67.0	
Level of Service	F	B			B		E	E			E	
Approach Delay (s)		16.7			15.7			69.5			67.0	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	354	26	23	350	3	49	23	38	12	70	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	1.00
Satd. Flow (prot)	1770	3503		1770	3535			1737			1849	1583
Flt Permitted	0.50	1.00		0.48	1.00			0.81			0.90	1.00
Satd. Flow (perm)	936	3503		901	3535			1446			1679	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)	34	385	28	25	380	3	53	25	41	13	76	32
RTOR Reduction (vph)	0	2	0	0	0	0	0	12	0	0	0	27
Lane Group Flow (vph)	34	411	0	25	383	0	0	107	0	0	89	5
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	102.0	102.0		102.0	102.0			18.4			27.9	27.9
Effective Green, g (s)	102.0	102.0		102.0	102.0			18.4			27.9	27.9
Actuated g/C Ratio	0.57	0.57		0.57	0.57			0.10			0.15	0.15
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	530	1985		511	2003			148			260	245
v/s Ratio Prot		c0.12			0.11							
v/s Ratio Perm	0.04			0.03				c0.07			c0.05	0.00
v/c Ratio	0.06	0.21		0.05	0.19			0.73			0.34	0.02
Uniform Delay, d1	17.5	19.1		17.4	19.0			78.3			67.9	64.5
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.94	1.64
Incremental Delay, d2	0.2	0.2		0.2	0.2			16.1			0.8	0.0
Delay (s)	17.8	19.4		17.6	19.2			94.5			64.8	105.8
Level of Service	B	B		B	B			F			E	F
Approach Delay (s)		19.3			19.1			94.5			75.6	
Approach LOS		B			B			F			E	

Intersection Summary			
HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	31.7
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1105	0	376	359	38	0	0	0	0	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	0.99							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3489							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3489							1611
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	1201	0	409	390	41	0	0	0	0	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	1201	0	409	431	0	0	0	0	0	0	2
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		102.0		27.9	180.0							102.0
Effective Green, g (s)		102.0		27.9	180.0							102.0
Actuated g/C Ratio		0.57		0.15	1.00							0.57
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2882		532	3489							913
v/s Ratio Prot		c0.24		c0.12	0.12							
v/s Ratio Perm												0.00
v/c Ratio		0.42		0.77	0.12							0.00
Uniform Delay, d1		22.1		73.0	0.0							16.9
Progression Factor		0.47		0.95	1.00							1.00
Incremental Delay, d2		0.4		6.5	0.1							0.0
Delay (s)		10.8		75.6	0.1							16.9
Level of Service		B		E	A							B
Approach Delay (s)		10.8			36.8			0.0			16.9	
Approach LOS		B			D			A			B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	1321	145	115	612	91	78	73	56	147	80	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5010		1770	4986			3332			3409	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (perm)	1770	5010		1770	4986			3332			3409	
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)	47	1436	158	125	665	99	85	79	61	160	87	12
RTOR Reduction (vph)	0	5	0	0	6	0	0	25	0	0	2	0
Lane Group Flow (vph)	47	1589	0	125	758	0	0	200	0	0	257	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	8.9	108.4		18.2	117.7			16.2			18.9	
Effective Green, g (s)	8.9	108.4		18.2	117.7			16.2			18.9	
Actuated g/C Ratio	0.05	0.60		0.10	0.65			0.09			0.10	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	88	3017		179	3260			300			358	
v/s Ratio Prot	0.03	c0.32		c0.07	0.15			c0.06			c0.08	
v/s Ratio Perm												
v/c Ratio	0.53	0.53		0.70	0.23			0.67			0.85dl	
Uniform Delay, d1	83.5	20.9		78.2	12.7			79.3			78.0	
Progression Factor	1.31	0.24		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.9	0.6		11.3	0.2			5.5			6.7	
Delay (s)	115.4	5.6		89.5	12.9			84.8			84.7	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		8.8			23.7			84.8			84.7	
Approach LOS		A			C			F			F	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

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

APPENDIX E

SANDAG SELECT ZONE ASSIGNMENT PLOT

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SANDAG
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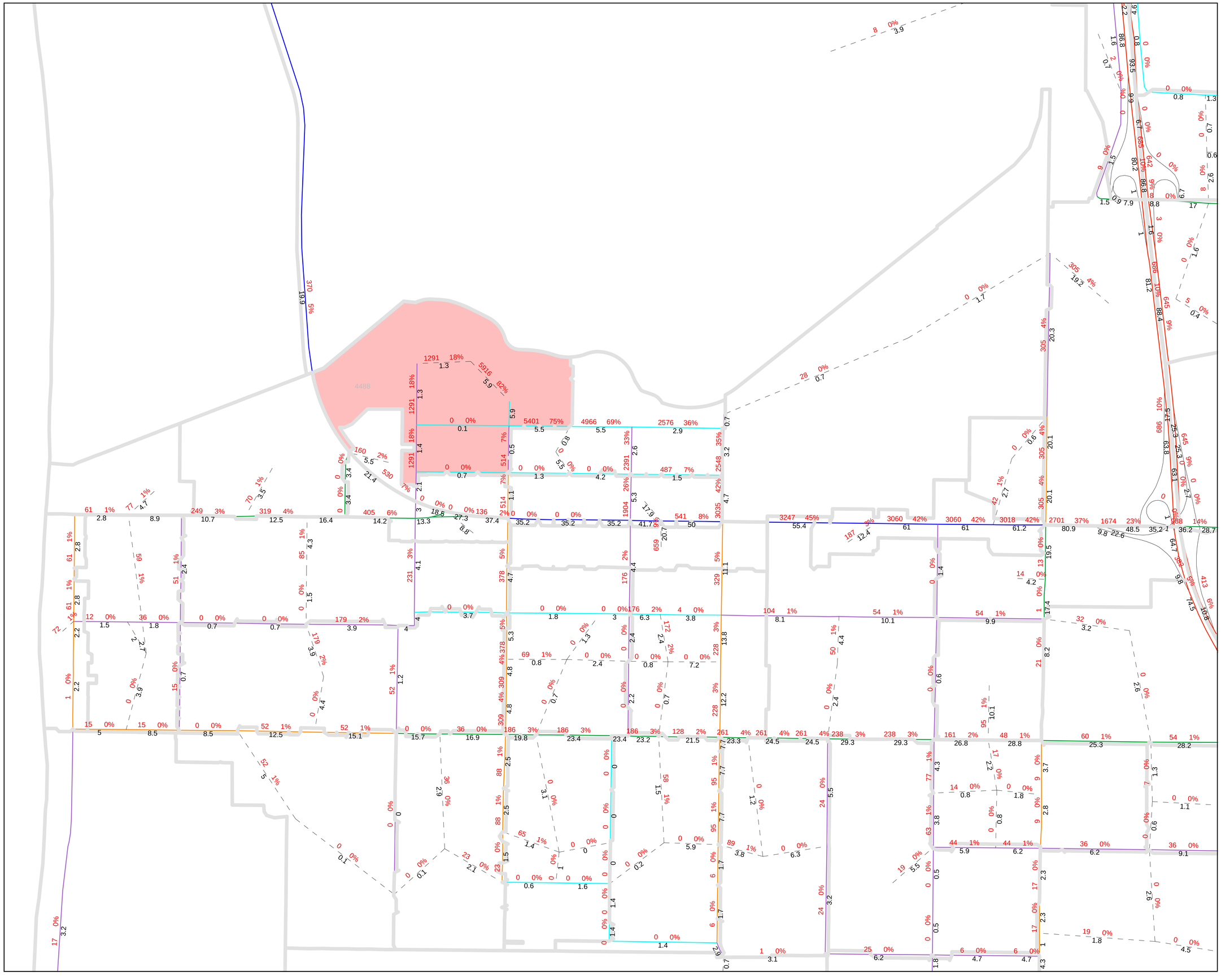
Select Zone Plot

TAZ 879



Functional Classifications

- Freeway
- Prime
- Major
- Collector
- Light Collector
- Rural Collector
- Local
- Freeway Ramp
- Local Ramp
- Zone Connector

Traffic Analysis Zones

Selz Volumes & Percentage

Unadjusted ADT(x1000)

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Date: February 14, 2013

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APPENDIX F

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
EXISTING + PROJECT

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Explanation of Intersection Delay Decrease with the Addition of Project Traffic:

For purposes of this report, a decrease in delay was not shown in the report tables. Where a project induced decrease occurred, the previous scenario's (without project) delay was shown. This reduces any confusion on behalf of the reviewer while still showing there is no significant change in delay due to the project.

Under the HCM unsignalized/signalized methodology, it is possible to have better LOS or a decrease in delay with the project (in comparison to base conditions without the project), because the delay reported for the entire intersection is a weighted average of the different traffic movements on each approach based upon volumes. Therefore, the project-generated traffic may have been added to those movements with very good LOS, so that this benefit is further exemplified in the weighted average reported for the entire intersection.

Typically when the delay improves when volume is added it is due to the effect of volumes being added to movements that previously had lower delays than the intersection average delay, and therefore by adding more volume to those movements the intersection average delay actually decreases. Another factor may be that the allocation of green time given to each phase to balance the allocated green time for heavier movements.

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HCM Signalized Intersection Capacity Analysis
1: Rainbow Dr & SR 75 (Palm Ave)

5/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	174	56	41	1270	13	387	2	82	50	7	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3410		1770	3534		1770	1589		1770	1669	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3410		1770	3534		1770	1589		1770	1669	
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)	4	189	61	45	1380	14	421	2	89	54	8	18
RTOR Reduction (vph)	0	25	0	0	1	0	0	63	0	0	17	0
Lane Group Flow (vph)	4	225	0	45	1393	0	421	28	0	54	9	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	1.1	53.7		6.6	59.2		35.4	35.4		5.4	5.4	
Effective Green, g (s)	1.1	53.7		6.6	59.2		35.4	35.4		5.4	5.4	
Actuated g/C Ratio	0.01	0.45		0.05	0.49		0.29	0.29		0.05	0.05	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	16	1525		97	1743		522	468		79	75	
v/s Ratio Prot	c0.00	0.07		0.03	c0.39		c0.24	0.02		c0.03	0.01	
v/s Ratio Perm												
v/c Ratio	0.25	0.15		0.46	0.80		0.81	0.06		0.68	0.12	
Uniform Delay, d1	59.0	19.6		55.0	25.4		39.1	30.4		56.5	55.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.1	0.2		3.5	3.9		12.6	0.2		38.7	3.2	
Delay (s)	67.1	19.8		58.5	29.4		51.7	30.6		95.2	58.2	
Level of Service	E	B		E	C		D	C		F	E	
Approach Delay (s)		20.6			30.3			47.9			83.1	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	277	22	0	1240	18	38	29	3	19	36	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			1.00		1.00	0.99			0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	5029			5074		1770	1839			1723	
Flt Permitted	0.95	1.00			1.00		0.68	1.00			0.99	
Satd. Flow (perm)	1770	5029			5074		1268	1839			1723	
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)	20	301	24	0	1348	20	41	32	3	21	39	59
RTOR Reduction (vph)	0	4	0	0	0	0	0	2	0	0	20	0
Lane Group Flow (vph)	20	321	0	0	1368	0	41	33	0	0	99	0
Turn Type	Prot	NA			NA		Perm	NA		Split	NA	
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	5.2	108.9			97.0		30.5	30.5			27.4	
Effective Green, g (s)	5.2	108.9			97.0		30.5	30.5			27.4	
Actuated g/C Ratio	0.03	0.61			0.54		0.17	0.17			0.15	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	51	3042			2734		214	311			262	
v/s Ratio Prot	c0.01	0.06			c0.27			0.02			c0.06	
v/s Ratio Perm							c0.03					
v/c Ratio	0.39	0.11			0.50		0.19	0.10			0.38	
Uniform Delay, d1	85.8	15.0			26.2		64.2	63.2			68.6	
Progression Factor	1.00	1.00			0.71		0.66	0.66			1.00	
Incremental Delay, d2	4.9	0.0			0.6		0.4	0.1			0.9	
Delay (s)	90.8	15.0			19.3		42.9	41.6			69.5	
Level of Service	F	B			B		D	D			E	
Approach Delay (s)		19.4			19.3			42.3			69.5	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	320	17	41	326	1	83	46	79	2	24	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	1.00
Satd. Flow (prot)	1770	3513		1770	3538			1733			1856	1583
Flt Permitted	0.52	1.00		0.51	1.00			0.86			0.97	1.00
Satd. Flow (perm)	962	3513		948	3538			1515			1808	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)	25	348	18	45	354	1	90	50	86	2	26	35
RTOR Reduction (vph)	0	1	0	0	0	0	0	14	0	0	0	30
Lane Group Flow (vph)	25	365	0	45	355	0	0	212	0	0	28	5
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	97.0	97.0		97.0	97.0			30.5			27.4	27.4
Effective Green, g (s)	97.0	97.0		97.0	97.0			30.5			27.4	27.4
Actuated g/C Ratio	0.54	0.54		0.54	0.54			0.17			0.15	0.15
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	518	1893		510	1906			256			275	240
v/s Ratio Prot		c0.10			0.10							
v/s Ratio Perm	0.03			0.05				c0.14			c0.02	0.00
v/c Ratio	0.05	0.19		0.09	0.19			0.83			0.10	0.02
Uniform Delay, d1	19.6	21.4		20.1	21.3			72.2			65.7	64.9
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.57	1.00
Incremental Delay, d2	0.2	0.2		0.3	0.2			19.3			0.2	0.0
Delay (s)	19.8	21.6		20.4	21.5			91.5			37.7	64.9
Level of Service	B	C		C	C			F			D	E
Approach Delay (s)		21.5			21.4			91.5			52.8	
Approach LOS		C			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	299	0	368	1248	5	0	0	0	0	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	1.00							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3537							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3537							1611
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	325	0	400	1357	5	0	0	0	0	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	325	0	400	1362	0	0	0	0	0	0	6
Turn Type		NA		Prot	NA							Perm
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		97.0		27.4	180.0							97.0
Effective Green, g (s)		97.0		27.4	180.0							97.0
Actuated g/C Ratio		0.54		0.15	1.00							0.54
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2740		522	3537							868
v/s Ratio Prot		0.06		c0.12	0.39							
v/s Ratio Perm												0.00
v/c Ratio		0.12		0.77	0.39							0.01
Uniform Delay, d1		20.4		73.2	0.0							19.2
Progression Factor		0.47		0.93	1.00							1.00
Incremental Delay, d2		0.1		6.1	0.3							0.0
Delay (s)		9.7		74.2	0.3							19.2
Level of Service		A		E	A							B
Approach Delay (s)		9.7			17.1			0.0			19.2	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	645	34	41	1331	57	198	52	64	119	45	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	5047		1770	5054			3326			3360	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (perm)	1770	5047		1770	5054			3326			3360	
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)	23	701	37	45	1447	62	215	57	70	129	49	29
RTOR Reduction (vph)	0	2	0	0	1	0	0	15	0	0	8	0
Lane Group Flow (vph)	23	736	0	45	1508	0	0	327	0	0	199	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	5.4	113.9		8.7	117.2			23.1			16.0	
Effective Green, g (s)	5.4	113.9		8.7	117.2			23.1			16.0	
Actuated g/C Ratio	0.03	0.63		0.05	0.65			0.13			0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	53	3193		85	3290			426			298	
v/s Ratio Prot	0.01	0.15		c0.03	c0.30			c0.10			c0.06	
v/s Ratio Perm												
v/c Ratio	0.43	0.23		0.53	0.46			0.89dl			0.67	
Uniform Delay, d1	85.8	14.2		83.7	15.6			75.9			79.4	
Progression Factor	1.21	0.58		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.6	0.2		5.8	0.5			8.1			5.6	
Delay (s)	109.0	8.4		89.5	16.1			84.0			85.0	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		11.4			18.2			84.0			85.0	
Approach LOS		B			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

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

HCM Signalized Intersection Capacity Analysis
1: Rainbow Dr & SR 75 (Palm Ave)

5/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	1172	262	64	283	50	86	8	50	23	4	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.87		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3442		1770	3460		1770	1623		1770	1669	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3442		1770	3460		1770	1623		1770	1669	
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)	25	1274	285	70	308	54	93	9	54	25	4	9
RTOR Reduction (vph)	0	15	0	0	11	0	0	47	0	0	9	0
Lane Group Flow (vph)	25	1544	0	70	351	0	93	16	0	25	4	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	3.2	71.3		8.0	76.1		16.4	16.4		5.4	5.4	
Effective Green, g (s)	3.2	71.3		8.0	76.1		16.4	16.4		5.4	5.4	
Actuated g/C Ratio	0.03	0.59		0.07	0.63		0.14	0.14		0.05	0.05	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	47	2045		118	2194		241	221		79	75	
v/s Ratio Prot	0.01	c0.45		c0.04	0.10		c0.05	0.01		c0.01	0.00	
v/s Ratio Perm												
v/c Ratio	0.53	0.76		0.59	0.16		0.39	0.07		0.32	0.06	
Uniform Delay, d1	57.7	17.9		54.4	8.9		47.2	45.2		55.5	54.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.1	2.6		7.8	0.2		4.6	0.7		10.2	1.5	
Delay (s)	68.7	20.6		62.2	9.1		51.8	45.8		65.7	56.4	
Level of Service	E	C		E	A		D	D		E	E	
Approach Delay (s)		21.3			17.7			49.4			62.5	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	1095	88	0	373	43	28	33	4	23	26	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			0.98		1.00	0.98			0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	5028			5006		1770	1835			1777	
Flt Permitted	0.95	1.00			1.00		0.71	1.00			0.98	
Satd. Flow (perm)	1770	5028			5006		1329	1835			1777	
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)	63	1190	96	0	405	47	30	36	4	25	28	14
RTOR Reduction (vph)	0	3	0	0	6	0	0	3	0	0	6	0
Lane Group Flow (vph)	63	1283	0	0	446	0	30	37	0	0	61	0
Turn Type	Prot	NA			NA		Perm	NA		Split	NA	
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	11.8	119.2			100.7		19.7	19.7			27.9	
Effective Green, g (s)	11.8	119.2			100.7		19.7	19.7			27.9	
Actuated g/C Ratio	0.07	0.66			0.56		0.11	0.11			0.15	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	116	3329			2800		145	200			275	
v/s Ratio Prot	c0.04	c0.26			0.09			0.02			c0.03	
v/s Ratio Perm							c0.02					
v/c Ratio	0.54	0.39			0.16		0.21	0.19			0.22	
Uniform Delay, d1	81.5	13.8			19.2		73.0	72.9			66.6	
Progression Factor	1.00	1.00			0.84		0.86	0.84			1.00	
Incremental Delay, d2	5.1	0.1			0.1		0.7	0.4			0.4	
Delay (s)	86.6	13.9			16.3		63.7	61.7			67.0	
Level of Service	F	B			B		E	E			E	
Approach Delay (s)		17.3			16.3			62.6			67.0	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	354	27	23	350	3	51	31	38	12	73	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	1.00
Satd. Flow (prot)	1770	3502		1770	3535			1746			1850	1583
Flt Permitted	0.50	1.00		0.48	1.00			0.82			0.90	1.00
Satd. Flow (perm)	934	3502		898	3535			1463			1670	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)	34	385	29	25	380	3	55	34	41	13	79	32
RTOR Reduction (vph)	0	2	0	0	0	0	0	11	0	0	0	27
Lane Group Flow (vph)	34	412	0	25	383	0	0	119	0	0	92	5
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	100.7	100.7		100.7	100.7			19.7			27.9	27.9
Effective Green, g (s)	100.7	100.7		100.7	100.7			19.7			27.9	27.9
Actuated g/C Ratio	0.56	0.56		0.56	0.56			0.11			0.15	0.15
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	522	1959		502	1977			160			258	245
v/s Ratio Prot		c0.12			0.11							
v/s Ratio Perm	0.04			0.03				c0.08			c0.06	0.00
v/c Ratio	0.07	0.21		0.05	0.19			0.75			0.36	0.02
Uniform Delay, d1	18.1	19.8		18.0	19.6			77.7			68.0	64.5
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.94	1.00
Incremental Delay, d2	0.2	0.2		0.2	0.2			17.1			0.8	0.0
Delay (s)	18.4	20.0		18.2	19.8			94.8			64.9	64.5
Level of Service	B	C		B	B			F			E	E
Approach Delay (s)		19.9			19.7			94.8			64.8	
Approach LOS		B			B			F			E	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1122	0	376	401	38	0	0	0	0	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	0.99							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3494							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3494							1611
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	1220	0	409	436	41	0	0	0	0	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	1220	0	409	477	0	0	0	0	0	0	2
Turn Type		NA		Prot	NA							Perm
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		100.7		27.9	180.0							100.7
Effective Green, g (s)		100.7		27.9	180.0							100.7
Actuated g/C Ratio		0.56		0.15	1.00							0.56
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2844		532	3494							901
v/s Ratio Prot		c0.24		c0.12	0.14							
v/s Ratio Perm												0.00
v/c Ratio		0.43		0.77	0.14							0.00
Uniform Delay, d1		23.0		73.0	0.0							17.5
Progression Factor		0.46		0.95	1.00							1.00
Incremental Delay, d2		0.4		6.5	0.1							0.0
Delay (s)		11.0		75.6	0.1							17.5
Level of Service		B		E	A							B
Approach Delay (s)		11.0			34.9			0.0			17.5	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	1335	148	115	646	91	86	73	56	147	80	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5009		1770	4991			3334			3409	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (perm)	1770	5009		1770	4991			3334			3409	
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)	47	1451	161	125	702	99	93	79	61	160	87	12
RTOR Reduction (vph)	0	5	0	0	6	0	0	23	0	0	2	0
Lane Group Flow (vph)	47	1607	0	125	795	0	0	210	0	0	257	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	8.9	107.9		18.2	117.2			16.7			18.9	
Effective Green, g (s)	8.9	107.9		18.2	117.2			16.7			18.9	
Actuated g/C Ratio	0.05	0.60		0.10	0.65			0.09			0.10	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	87	3002		178	3249			309			357	
v/s Ratio Prot	0.03	c0.32		c0.07	0.16			c0.06			c0.08	
v/s Ratio Perm												
v/c Ratio	0.54	0.54		0.70	0.24			0.68			0.86dl	
Uniform Delay, d1	83.6	21.3		78.3	13.0			79.1			78.0	
Progression Factor	1.33	0.24		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.5	0.7		11.8	0.2			6.1			7.0	
Delay (s)	117.4	5.7		90.1	13.2			85.1			85.0	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		8.8			23.6			85.1			85.0	
Approach LOS		A			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

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

APPENDIX G

INDIVIDUAL NEAR-TERM CUMULATIVE PROJECTS ASSIGNMENT

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INTERSECTION	DIRECTION	TOTAL CUMULATIVE						1. Seascoast Inn						2. IB Bikeway Village					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
1. SR 75 (Palm Avenue) (E/W) & Rainbow Drive (N/S)	Sb	0	0	0	0	3	1												
	Wb	2	1	5	1	0	1											0	1
	Nb	0	1	0	0	1	1					1	1	0	1				
	Eb	1	2	6	2	0	0	1	2										
2. SR 75 (Palm Avenue) & 7th Street	Sb	0	0	0	0	1	0												
	Wb	1	0	7	3	0	0									0	1		
	Nb	0	0	0	0	0	0												
	Eb	0	0	9	4	0	0									0	1		
3. Palm Avenue & 7th Street	Sb	0	0	0	0	0	0												
	Wb	0	0	39	77	0	1			11	26					2	5	0	1
	Nb	5	7	0	0	0	0							1	1				
	Eb	0	0	52	70	0	0			15	15					2	4		
4. SR 75 (Palm Avenue) & Delaware Street	Sb	0	0	0	0	0	0												
	Wb	0	0	20	36	72	121					11	26			0	1	2	6
	Nb	0	0	0	0	0	0												
	Eb	0	0	0	1	0	0									0	1		
5. SR 75 (Palm Avenue) & 9th Street	Sb	0	0	10	14	0	0												
	Wb	0	0	46	76	62	86			11	26					2	7	1	3
	Nb	24	41	4	7	47	81							2	3				
	Eb	0	0	65	103	4	7			15	15					3	6		

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5/6/2013

INTERSECTION	DIRECTION	3. American Legion Post						4. 9th & Palm (Breakwater)						5. IB Beach Rezone (LEAVE OUT OF NEAR-TERM)					
		Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm	Ram	Rpm	Tam	Tpm	Lam	Lpm
1. SR 75 (Palm Avenue) (E/W) & Rainbow Drive (N/S)	Sb											3	1			0	1	0	2
	Wb							2	1	5	1			0	1	0	6	1	1
	Nb															0	1	2	3
	Eb									6	2			1	3	3	8		
2. SR 75 (Palm Avenue) & 7th Street	Sb											1	0			1	2	11	15
	Wb							1	0	7	2			4	10	6	7		
	Nb															1	3		
	Eb									9	3					3	8	0	1
3. Palm Avenue & 7th Street	Sb													1	2				
	Wb			2	0					24	46					21	50	2	2
	Nb							4	6					1	3	0	1	0	1
	Eb			0	2					35	49					29	41	1	3
4. SR 75 (Palm Avenue) & Delaware Street	Sb													1	1				
	Wb					2	0			20	35	57	89	2	7	10	17	22	52
	Nb																		
	Eb															14	23		
5. SR 75 (Palm Avenue) & 9th Street	Sb									10	14			1	2	0	1	2	5
	Wb			2	0	1	0			31	43	60	83	2	4	34	72	12	15
	Nb					0	1	22	38	4	7	47	80	5	13	1	1	4	7
	Eb			0	2					47	80	4	7	3	5	41	64	1	2

	STREET SEGMENT	TOTAL CUMULATIVE PROJECTS	1. Seacoast Inn	2. IB Bikeway Village	3. American Legion	4. 9th & Palm (Breakwater)	5. IB Rezone (LEAVE OUT OF NEAR-TERM)
		Figure 8-1					
	SR 75						
1	1. North of Rainbow Drive	174	30	17	4	123	158
2	2. Rainbow Drive to 7th St	244	30	17	4	193	156
3	3. 7th St. to Delaware St.	231	0	17	4	210	378
4	4. Delaware St. to 9th St.	1,855	478	147	37	1,193	1,359
5	5. 9th St. to Florida St.	1,507	466	216	55	770	1,557
	Palm Ave						
6	6. Rainbow Drive to SR 75	908	478	104	28	298	866
	Rainbow Drive						
7	7. SR 75 to Palm	99	30	17	0	52	169

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APPENDIX H

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
NEAR-TERM WITHOUT PROJECT

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	180	57	41	1275	4	388	0	82	7	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.2	5.5		4.6	4.6		4.6		
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00		1.00		
Frt		0.96		1.00	1.00		1.00	0.85		1.00		
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95		
Satd. Flow (prot)		3412		1770	3538		1770	1583		1770		
Flt Permitted		1.00		0.95	1.00		0.95	1.00		0.95		
Satd. Flow (perm)		3412		1770	3538		1770	1583		1770		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	196	62	45	1386	4	422	0	89	8	0	0
RTOR Reduction (vph)	0	24	0	0	0	0	0	63	0	0	0	0
Lane Group Flow (vph)	0	234	0	45	1390	0	422	26	0	8	0	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)		53.7		6.6	64.5		35.4	35.4		5.4		
Effective Green, g (s)		53.7		6.6	64.5		35.4	35.4		5.4		
Actuated g/C Ratio		0.45		0.05	0.54		0.29	0.29		0.05		
Clearance Time (s)		5.5		4.2	5.5		4.6	4.6		4.6		
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0		
Lane Grp Cap (vph)		1527		97	1902		522	467		80		
v/s Ratio Prot		0.07		0.03	c0.39		c0.24	0.02		c0.00		
v/s Ratio Perm												
v/c Ratio		0.15		0.46	0.73		0.81	0.06		0.10		
Uniform Delay, d1		19.7		55.0	21.1		39.2	30.3		55.0		
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00		
Incremental Delay, d2		0.2		3.5	2.5		12.7	0.2		2.5		
Delay (s)		19.9		58.5	23.7		51.8	30.6		57.5		
Level of Service		B		E	C		D	C		E		
Approach Delay (s)		19.9			24.7			48.1			57.5	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.7
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	247	15	0	1238	19	36	29	3	20	36	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			1.00		1.00	0.99			0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	5042			5074		1770	1839			1723	
Flt Permitted	0.95	1.00			1.00		0.68	1.00			0.99	
Satd. Flow (perm)	1770	5042			5074		1266	1839			1723	
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)	20	268	16	0	1346	21	39	32	3	22	39	59
RTOR Reduction (vph)	0	3	0	0	0	0	0	2	0	0	20	0
Lane Group Flow (vph)	20	281	0	0	1367	0	39	33	0	0	100	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	5.2	105.6			93.7		30.6	30.6			30.6	
Effective Green, g (s)	5.2	105.6			93.7		30.6	30.6			30.6	
Actuated g/C Ratio	0.03	0.59			0.52		0.17	0.17			0.17	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	51	2958			2641		215	313			293	
v/s Ratio Prot	c0.01	0.06			c0.27			0.02			c0.06	
v/s Ratio Perm							c0.03					
v/c Ratio	0.39	0.10			0.52		0.18	0.10			0.34	
Uniform Delay, d1	85.8	16.3			28.3		64.0	63.1			65.8	
Progression Factor	1.00	1.00			0.73		0.67	0.66			1.00	
Incremental Delay, d2	4.9	0.0			0.7		0.4	0.1			0.7	
Delay (s)	90.8	16.3			21.3		43.1	41.7			66.5	
Level of Service	F	B			C		D	D			E	
Approach Delay (s)		21.2			21.3			42.4			66.5	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	372	16	41	365	1	83	44	84	2	17	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	1.00
Satd. Flow (prot)	1770	3518		1770	3538			1729			1853	1583
Flt Permitted	0.49	1.00		0.47	1.00			0.86			0.96	1.00
Satd. Flow (perm)	903	3518		876	3538			1521			1789	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)	25	404	17	45	397	1	90	48	91	2	18	35
RTOR Reduction (vph)	0	1	0	0	0	0	0	15	0	0	0	29
Lane Group Flow (vph)	25	420	0	45	398	0	0	214	0	0	20	6
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	93.7	93.7		93.7	93.7			30.6			30.6	30.6
Effective Green, g (s)	93.7	93.7		93.7	93.7			30.6			30.6	30.6
Actuated g/C Ratio	0.52	0.52		0.52	0.52			0.17			0.17	0.17
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	470	1831		456	1842			259			304	269
v/s Ratio Prot		c0.12			0.11							
v/s Ratio Perm	0.03			0.05				c0.14			c0.01	0.00
v/c Ratio	0.05	0.23		0.10	0.22			0.83			0.07	0.02
Uniform Delay, d1	21.3	23.5		21.8	23.3			72.1			62.7	62.2
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.48	0.33
Incremental Delay, d2	0.2	0.3		0.4	0.3			19.0			0.1	0.0
Delay (s)	21.5	23.8		22.2	23.6			91.1			30.3	20.7
Level of Service	C	C		C	C			F			C	C
Approach Delay (s)		23.7			23.4			91.1			24.2	
Approach LOS		C			C			F			C	

Intersection Summary			
HCM Average Control Delay	36.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	25.1
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	260	0	440	1259	5	0	0	0	0	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	1.00							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3537							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3537							1611
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	283	0	478	1368	5	0	0	0	0	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	283	0	478	1373	0	0	0	0	0	0	6
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		93.7		30.6	180.0							93.7
Effective Green, g (s)		93.7		30.6	180.0							93.7
Actuated g/C Ratio		0.52		0.17	1.00							0.52
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2647		584	3537							839
v/s Ratio Prot		0.06		c0.14	0.39							
v/s Ratio Perm												0.00
v/c Ratio		0.11		0.82	0.39							0.01
Uniform Delay, d1		21.9		72.0	0.0							20.8
Progression Factor		0.48		0.90	1.00							1.00
Incremental Delay, d2		0.1		7.9	0.3							0.0
Delay (s)		10.6		72.9	0.3							20.8
Level of Service		B		E	A							C
Approach Delay (s)		10.6			19.0			0.0			20.8	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	4.6
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	678	27	103	1370	57	243	56	88	119	55	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	5056		1770	5055			3314			3369	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (perm)	1770	5056		1770	5055			3314			3369	
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)	27	737	29	112	1489	62	264	61	96	129	60	29
RTOR Reduction (vph)	0	2	0	0	2	0	0	17	0	0	8	0
Lane Group Flow (vph)	27	764	0	112	1549	0	0	404	0	0	210	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	7.1	97.4		20.1	110.4			27.6			16.6	
Effective Green, g (s)	7.1	97.4		20.1	110.4			27.6			16.6	
Actuated g/C Ratio	0.04	0.54		0.11	0.61			0.15			0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	70	2736		198	3100			508			311	
v/s Ratio Prot	0.02	0.15		c0.06	c0.31			c0.12			c0.06	
v/s Ratio Perm												
v/c Ratio	0.39	0.28		0.57	0.50			0.92dl			0.67	
Uniform Delay, d1	84.3	22.3		75.8	19.4			73.5			79.1	
Progression Factor	1.18	0.65		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.5	0.3		3.7	0.6			8.4			5.7	
Delay (s)	103.1	14.8		79.5	20.0			81.9			84.8	
Level of Service	F	B		E	B			F			F	
Approach Delay (s)		17.8			24.0			81.9			84.8	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1174	264	65	284	1	87	0	51	4	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3442		1770	3538		1770	1583		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3442		1770	3538		1770	1583		1770	1723	
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)	5	1276	287	71	309	1	95	0	55	4	1	1
RTOR Reduction (vph)	0	15	0	0	0	0	0	47	0	0	1	0
Lane Group Flow (vph)	5	1548	0	71	310	0	95	8	0	4	1	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	1.1	71.3		8.0	78.2		16.4	16.4		5.4	5.4	
Effective Green, g (s)	1.1	71.3		8.0	78.2		16.4	16.4		5.4	5.4	
Actuated g/C Ratio	0.01	0.59		0.07	0.65		0.14	0.14		0.05	0.05	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	16	2045		118	2306		242	216		80	78	
v/s Ratio Prot	c0.00	c0.45		c0.04	0.09		c0.05	0.00		c0.00	0.00	
v/s Ratio Perm												
v/c Ratio	0.31	0.76		0.60	0.13		0.39	0.03		0.05	0.01	
Uniform Delay, d1	59.1	18.0		54.5	8.0		47.3	44.9		54.8	54.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.9	2.7		8.4	0.1		4.7	0.3		1.2	0.3	
Delay (s)	69.9	20.6		62.8	8.1		52.0	45.2		56.0	55.1	
Level of Service	E	C		E	A		D	D		E	E	
Approach Delay (s)		20.8			18.3			49.5			55.7	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.1
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	1082	85	0	334	43	20	33	4	23	26	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			0.98		1.00	0.98			0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	5030			4998		1770	1835			1777	
Flt Permitted	0.95	1.00			1.00		0.71	1.00			0.98	
Satd. Flow (perm)	1770	5030			4998		1329	1835			1777	
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)	63	1176	92	0	363	47	22	36	4	25	28	14
RTOR Reduction (vph)	0	4	0	0	7	0	0	3	0	0	6	0
Lane Group Flow (vph)	63	1264	0	0	403	0	22	37	0	0	61	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	11.8	114.6			96.1		19.0	19.0			33.2	
Effective Green, g (s)	11.8	114.6			96.1		19.0	19.0			33.2	
Actuated g/C Ratio	0.07	0.64			0.53		0.11	0.11			0.18	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	116	3202			2668		140	194			328	
v/s Ratio Prot	c0.04	c0.25			0.08			c0.02			c0.03	
v/s Ratio Perm							0.02					
v/c Ratio	0.54	0.39			0.15		0.16	0.19			0.19	
Uniform Delay, d1	81.5	15.9			21.3		73.2	73.5			62.0	
Progression Factor	1.00	1.00			0.83		0.96	0.96			1.00	
Incremental Delay, d2	5.1	0.1			0.1		0.5	0.5			0.3	
Delay (s)	86.6	16.0			17.9		70.7	71.3			62.3	
Level of Service	F	B			B		E	E			E	
Approach Delay (s)		19.3			17.9			71.1			62.3	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	424	26	24	427	3	49	23	45	12	70	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	1.00
Satd. Flow (prot)	1770	3509		1770	3536			1730			1849	1583
Flt Permitted	0.44	1.00		0.43	1.00			0.82			0.90	1.00
Satd. Flow (perm)	829	3509		804	3536			1455			1668	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)	34	461	28	26	464	3	53	25	49	13	76	32
RTOR Reduction (vph)	0	2	0	0	0	0	0	14	0	0	0	26
Lane Group Flow (vph)	34	487	0	26	467	0	0	113	0	0	89	6
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	96.1	96.1		96.1	96.1			19.0			33.2	33.2
Effective Green, g (s)	96.1	96.1		96.1	96.1			19.0			33.2	33.2
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.11			0.18	0.18
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	443	1873		429	1888			154			308	292
v/s Ratio Prot		c0.14			0.13							
v/s Ratio Perm	0.04			0.03				c0.08			c0.05	0.00
v/c Ratio	0.08	0.26		0.06	0.25			0.73			0.29	0.02
Uniform Delay, d1	20.4	22.7		20.2	22.5			78.0			63.2	60.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.97	1.74
Incremental Delay, d2	0.3	0.3		0.3	0.3			16.3			0.5	0.0
Delay (s)	20.7	23.0		20.5	22.8			94.4			61.8	104.7
Level of Service	C	C		C	C			F			E	F
Approach Delay (s)		22.9			22.7			94.4			73.2	
Approach LOS		C			C			F			E	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	31.7
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1106	0	497	395	38	0	0	0	0	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	0.99							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3493							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3493							1611
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	1202	0	540	429	41	0	0	0	0	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	1202	0	540	470	0	0	0	0	0	0	2
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		96.1		33.2	180.0							96.1
Effective Green, g (s)		96.1		33.2	180.0							96.1
Actuated g/C Ratio		0.53		0.18	1.00							0.53
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2715		633	3493							860
v/s Ratio Prot		c0.24		c0.16	0.13							
v/s Ratio Perm												0.00
v/c Ratio		0.44		0.85	0.13							0.00
Uniform Delay, d1		25.6		71.0	0.0							19.6
Progression Factor		0.44		0.97	1.00							1.00
Incremental Delay, d2		0.5		10.5	0.1							0.0
Delay (s)		11.8		79.6	0.1							19.6
Level of Service		B		E	A							B
Approach Delay (s)		11.8			42.6			0.0			19.6	
Approach LOS		B			D			A			B	

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1424	145	201	688	91	159	80	97	147	94	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5015		1770	4996			3308			3416	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (perm)	1770	5015		1770	4996			3308			3416	
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)	54	1548	158	218	748	99	173	87	105	160	102	12
RTOR Reduction (vph)	0	6	0	0	6	0	0	27	0	0	2	0
Lane Group Flow (vph)	54	1700	0	218	841	0	0	338	0	0	272	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	9.5	81.1		36.7	108.3			24.1			19.8	
Effective Green, g (s)	9.5	81.1		36.7	108.3			24.1			19.8	
Actuated g/C Ratio	0.05	0.45		0.20	0.60			0.13			0.11	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	93	2260		361	3006			443			376	
v/s Ratio Prot	0.03	c0.34		c0.12	0.17			c0.10			c0.08	
v/s Ratio Perm												
v/c Ratio	0.58	0.75		0.60	0.28			0.76			0.72	
Uniform Delay, d1	83.3	41.1		65.1	17.2			75.2			77.5	
Progression Factor	1.36	0.56		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.6	2.3		2.8	0.2			7.6			6.8	
Delay (s)	121.6	25.2		67.9	17.4			82.8			84.2	
Level of Service	F	C		E	B			F			F	
Approach Delay (s)		28.2			27.7			82.8			84.2	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX I

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
NEAR-TERM WITH PROJECT

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Explanation of Intersection Delay Decrease with the Addition of Project Traffic:

For purposes of this report, a decrease in delay was not shown in the report tables. Where a project induced decrease occurred, the previous scenario's (without project) delay was shown. This reduces any confusion on behalf of the reviewer while still showing there is no significant change in delay due to the project.

Under the HCM unsignalized/signalized methodology, it is possible to have better LOS or a decrease in delay with the project (in comparison to base conditions without the project), because the delay reported for the entire intersection is a weighted average of the different traffic movements on each approach based upon volumes. Therefore, the project-generated traffic may have been added to those movements with very good LOS, so that this benefit is further exemplified in the weighted average reported for the entire intersection.

Typically when the delay improves when volume is added it is due to the effect of volumes being added to movements that previously had lower delays than the intersection average delay, and therefore by adding more volume to those movements the intersection average delay actually decreases. Another factor may be that the allocation of green time given to each phase to balance the allocated green time for heavier movements.

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HCM Signalized Intersection Capacity Analysis
1: Rainbow Dr & SR 75 (Palm Ave)

5/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	180	57	41	1275	15	388	2	82	53	7	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3412		1770	3533		1770	1589		1770	1669	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3412		1770	3533		1770	1589		1770	1669	
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)	4	196	62	45	1386	16	422	2	89	58	8	18
RTOR Reduction (vph)	0	24	0	0	1	0	0	63	0	0	17	0
Lane Group Flow (vph)	4	234	0	45	1401	0	422	28	0	58	9	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	1.1	53.7		6.6	59.2		35.4	35.4		5.4	5.4	
Effective Green, g (s)	1.1	53.7		6.6	59.2		35.4	35.4		5.4	5.4	
Actuated g/C Ratio	0.01	0.45		0.05	0.49		0.29	0.29		0.05	0.05	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	16	1526		97	1742		522	468		79	75	
v/s Ratio Prot	c0.00	0.07		0.03	c0.40		c0.24	0.02		c0.03	0.01	
v/s Ratio Perm												
v/c Ratio	0.25	0.15		0.46	0.80		0.81	0.06		0.73	0.12	
Uniform Delay, d1	59.0	19.7		55.0	25.5		39.2	30.4		56.6	55.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.1	0.2		3.5	4.1		12.7	0.2		45.6	3.2	
Delay (s)	67.1	19.9		58.5	29.6		51.8	30.6		102.2	58.2	
Level of Service	E	B		E	C		D	C		F	E	
Approach Delay (s)		20.6			30.5			48.1			88.5	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	286	22	0	1247	19	38	29	3	20	36	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			1.00		1.00	0.99			0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	5031			5074		1770	1839			1723	
Flt Permitted	0.95	1.00			1.00		0.68	1.00			0.99	
Satd. Flow (perm)	1770	5031			5074		1266	1839			1723	
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)	20	311	24	0	1355	21	41	32	3	22	39	59
RTOR Reduction (vph)	0	4	0	0	0	0	0	2	0	0	20	0
Lane Group Flow (vph)	20	331	0	0	1376	0	41	33	0	0	100	0
Turn Type	Prot	NA			NA		Perm	NA		Split	NA	
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	5.2	105.3			93.4		30.9	30.9			30.6	
Effective Green, g (s)	5.2	105.3			93.4		30.9	30.9			30.6	
Actuated g/C Ratio	0.03	0.58			0.52		0.17	0.17			0.17	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	51	2943			2632		217	315			292	
v/s Ratio Prot	c0.01	0.07			c0.27			0.02			c0.06	
v/s Ratio Perm							c0.03					
v/c Ratio	0.39	0.11			0.52		0.19	0.10			0.34	
Uniform Delay, d1	85.8	16.6			28.6		63.8	62.9			65.8	
Progression Factor	1.00	1.00			0.73		0.67	0.67			1.00	
Incremental Delay, d2	4.9	0.0			0.7		0.4	0.1			0.7	
Delay (s)	90.8	16.6			21.6		43.1	42.0			66.5	
Level of Service	F	B			C		D	D			E	
Approach Delay (s)		20.8			21.6			42.6			66.5	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	372	17	41	365	1	83	46	84	2	24	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	1.00
Satd. Flow (prot)	1770	3517		1770	3538			1730			1856	1583
Flt Permitted	0.48	1.00		0.47	1.00			0.86			0.97	1.00
Satd. Flow (perm)	903	3517		874	3538			1517			1808	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)	25	404	18	45	397	1	90	50	91	2	26	35
RTOR Reduction (vph)	0	1	0	0	0	0	0	15	0	0	0	29
Lane Group Flow (vph)	25	421	0	45	398	0	0	216	0	0	28	6
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	93.4	93.4		93.4	93.4			30.9			30.6	30.6
Effective Green, g (s)	93.4	93.4		93.4	93.4			30.9			30.6	30.6
Actuated g/C Ratio	0.52	0.52		0.52	0.52			0.17			0.17	0.17
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	468	1824		453	1835			260			307	269
v/s Ratio Prot		c0.12			0.11							
v/s Ratio Perm	0.03			0.05				c0.14			c0.02	0.00
v/c Ratio	0.05	0.23		0.10	0.22			0.83			0.09	0.02
Uniform Delay, d1	21.4	23.7		22.0	23.5			72.0			63.0	62.2
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.57	1.00
Incremental Delay, d2	0.2	0.3		0.4	0.3			19.7			0.1	0.0
Delay (s)	21.6	24.0		22.4	23.7			91.7			36.1	62.3
Level of Service	C	C		C	C			F			D	E
Approach Delay (s)		23.8			23.6			91.7			50.6	
Approach LOS		C			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	299	0	440	1268	5	0	0	0	0	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	1.00							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3537							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3537							1611
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	325	0	478	1378	5	0	0	0	0	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	325	0	478	1383	0	0	0	0	0	0	6
Turn Type		NA		Prot	NA							Perm
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		93.4		30.6	180.0							93.4
Effective Green, g (s)		93.4		30.6	180.0							93.4
Actuated g/C Ratio		0.52		0.17	1.00							0.52
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2638		583	3537							835
v/s Ratio Prot		0.06		c0.14	0.39							
v/s Ratio Perm												0.00
v/c Ratio		0.12		0.82	0.39							0.01
Uniform Delay, d1		22.3		72.0	0.0							20.9
Progression Factor		0.46		0.90	1.00							1.00
Incremental Delay, d2		0.1		7.9	0.3							0.0
Delay (s)		10.3		73.0	0.3							20.9
Level of Service		B		E	A							C
Approach Delay (s)		10.3			19.0			0.0			20.9	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	710	34	103	1377	57	245	56	88	119	55	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.99			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	5050		1770	5055			3315			3369	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (perm)	1770	5050		1770	5055			3315			3369	
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)	27	772	37	112	1497	62	266	61	96	129	60	29
RTOR Reduction (vph)	0	2	0	0	2	0	0	17	0	0	8	0
Lane Group Flow (vph)	27	807	0	112	1557	0	0	406	0	0	210	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	7.1	97.3		20.1	110.3			27.7			16.6	
Effective Green, g (s)	7.1	97.3		20.1	110.3			27.7			16.6	
Actuated g/C Ratio	0.04	0.54		0.11	0.61			0.15			0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	69	2729		197	3097			510			310	
v/s Ratio Prot	0.02	0.16		c0.06	c0.31			c0.12			c0.06	
v/s Ratio Perm												
v/c Ratio	0.39	0.30		0.57	0.50			0.92dl			0.68	
Uniform Delay, d1	84.3	22.6		75.8	19.5			73.4			79.1	
Progression Factor	1.20	0.62		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.6	0.3		3.7	0.6			8.4			5.8	
Delay (s)	104.7	14.3		79.6	20.1			81.8			84.9	
Level of Service	F	B		E	C			F			F	
Approach Delay (s)		17.2			24.1			81.8			84.9	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

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

HCM Signalized Intersection Capacity Analysis
1: Rainbow Dr & SR 75 (Palm Ave)

5/28/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	1174	264	65	284	51	87	8	51	24	4	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.87		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3442		1770	3459		1770	1623		1770	1669	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3442		1770	3459		1770	1623		1770	1669	
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)	25	1276	287	71	309	55	95	9	55	26	4	9
RTOR Reduction (vph)	0	15	0	0	11	0	0	47	0	0	9	0
Lane Group Flow (vph)	25	1548	0	71	353	0	95	17	0	26	4	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	3.2	71.3		8.0	76.1		16.4	16.4		5.4	5.4	
Effective Green, g (s)	3.2	71.3		8.0	76.1		16.4	16.4		5.4	5.4	
Actuated g/C Ratio	0.03	0.59		0.07	0.63		0.14	0.14		0.05	0.05	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	47	2045		118	2193		241	221		79	75	
v/s Ratio Prot	0.01	c0.45		c0.04	0.10		c0.05	0.01		c0.01	0.00	
v/s Ratio Perm												
v/c Ratio	0.53	0.76		0.60	0.16		0.39	0.07		0.33	0.06	
Uniform Delay, d1	57.7	18.0		54.5	8.9		47.3	45.2		55.5	54.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.1	2.7		8.4	0.2		4.8	0.7		10.8	1.5	
Delay (s)	68.7	20.6		62.8	9.1		52.0	45.8		66.3	56.4	
Level of Service	E	C		E	A		D	D		E	E	
Approach Delay (s)		21.4			17.9			49.5			63.0	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	1099	88	0	376	43	28	33	4	23	26	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			0.98		1.00	0.98			0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	5029			5007		1770	1835			1777	
Flt Permitted	0.95	1.00			1.00		0.71	1.00			0.98	
Satd. Flow (perm)	1770	5029			5007		1329	1835			1777	
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)	63	1195	96	0	409	47	30	36	4	25	28	14
RTOR Reduction (vph)	0	4	0	0	6	0	0	3	0	0	6	0
Lane Group Flow (vph)	63	1287	0	0	450	0	30	37	0	0	61	0
Turn Type	Prot	NA			NA		Perm	NA		Split	NA	
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	11.8	113.2			94.7		20.4	20.4			33.2	
Effective Green, g (s)	11.8	113.2			94.7		20.4	20.4			33.2	
Actuated g/C Ratio	0.07	0.63			0.53		0.11	0.11			0.18	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	116	3162			2634		150	207			327	
v/s Ratio Prot	c0.04	c0.26			0.09			0.02			c0.03	
v/s Ratio Perm							c0.02					
v/c Ratio	0.54	0.41			0.17		0.20	0.18			0.19	
Uniform Delay, d1	81.5	16.7			22.2		72.4	72.2			62.0	
Progression Factor	1.00	1.00			0.83		0.88	0.86			1.00	
Incremental Delay, d2	5.1	0.1			0.1		0.6	0.4			0.3	
Delay (s)	86.6	16.7			18.6		64.5	62.8			62.3	
Level of Service	F	B			B		E	E			E	
Approach Delay (s)		20.0			18.6			63.6			62.3	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	424	27	24	427	3	51	31	45	12	73	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	1.00
Satd. Flow (prot)	1770	3508		1770	3536			1739			1850	1583
Flt Permitted	0.44	1.00		0.43	1.00			0.83			0.89	1.00
Satd. Flow (perm)	825	3508		800	3536			1470			1661	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)	34	461	29	26	464	3	55	34	49	13	79	32
RTOR Reduction (vph)	0	2	0	0	0	0	0	12	0	0	0	26
Lane Group Flow (vph)	34	488	0	26	467	0	0	126	0	0	92	6
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	94.7	94.7		94.7	94.7			20.4			33.2	33.2
Effective Green, g (s)	94.7	94.7		94.7	94.7			20.4			33.2	33.2
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.11			0.18	0.18
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	434	1845		420	1860			166			306	291
v/s Ratio Prot		c0.14			0.13							
v/s Ratio Perm	0.04			0.03				c0.09			c0.06	0.00
v/c Ratio	0.08	0.26		0.06	0.25			0.76			0.30	0.02
Uniform Delay, d1	21.1	23.5		20.9	23.3			77.4			63.4	60.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.97	1.00
Incremental Delay, d2	0.4	0.4		0.3	0.3			17.7			0.5	0.0
Delay (s)	21.4	23.8		21.2	23.6			95.1			62.0	60.1
Level of Service	C	C		C	C			F			E	E
Approach Delay (s)		23.7			23.5			95.1			61.5	
Approach LOS		C			C			F			E	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1123	0	497	437	38	0	0	0	0	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	0.99							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3497							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3497							1611
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	1221	0	540	475	41	0	0	0	0	0	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	1221	0	540	516	0	0	0	0	0	0	2
Turn Type		NA		Prot	NA							Perm
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		94.7		33.2	180.0							94.7
Effective Green, g (s)		94.7		33.2	180.0							94.7
Actuated g/C Ratio		0.53		0.18	1.00							0.53
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2675		633	3497							847
v/s Ratio Prot		c0.24		c0.16	0.15							
v/s Ratio Perm												0.00
v/c Ratio		0.46		0.85	0.15							0.00
Uniform Delay, d1		26.6		71.0	0.0							20.2
Progression Factor		0.43		0.97	1.00							1.00
Incremental Delay, d2		0.5		10.5	0.1							0.0
Delay (s)		12.1		79.5	0.1							20.2
Level of Service		B		E	A							C
Approach Delay (s)		12.1			40.7			0.0			20.2	
Approach LOS		B			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1438	148	201	722	91	167	80	97	147	94	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5014		1770	5000			3310			3416	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (perm)	1770	5014		1770	5000			3310			3416	
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)	54	1563	161	218	785	99	182	87	105	160	102	12
RTOR Reduction (vph)	0	6	0	0	6	0	0	25	0	0	2	0
Lane Group Flow (vph)	54	1718	0	218	878	0	0	349	0	0	272	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	9.5	80.9		36.7	108.1			24.4			19.7	
Effective Green, g (s)	9.5	80.9		36.7	108.1			24.4			19.7	
Actuated g/C Ratio	0.05	0.45		0.20	0.60			0.14			0.11	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	93	2253		360	3002			448			373	
v/s Ratio Prot	0.03	c0.34		c0.12	0.18			c0.11			c0.08	
v/s Ratio Perm												
v/c Ratio	0.58	0.76		0.61	0.29			0.78			0.73	
Uniform Delay, d1	83.3	41.5		65.1	17.4			75.2			77.6	
Progression Factor	1.36	0.54		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.6	2.4		2.9	0.2			8.3			7.0	
Delay (s)	122.3	25.0		67.9	17.7			83.5			84.6	
Level of Service	F	C		E	B			F			F	
Approach Delay (s)		27.9			27.6			83.5			84.6	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	38.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	18.3
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX J

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
YEAR 2040 WITHOUT PROJECT

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HCM Signalized Intersection Capacity Analysis
1: SR 75 (Palm Ave) & Rainbow Dr

9/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	185	51	30	2075	2	459	0	45	4	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.2	5.5		4.6	4.6		4.6		
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00		1.00		
Frt		0.97		1.00	1.00		1.00	0.85		1.00		
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95		
Satd. Flow (prot)		3425		1770	3539		1770	1583		1770		
Flt Permitted		1.00		0.95	1.00		0.95	1.00		0.95		
Satd. Flow (perm)		3425		1770	3539		1770	1583		1770		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	201	55	33	2255	2	499	0	49	4	0	0
RTOR Reduction (vph)	0	26	0	0	0	0	0	38	0	0	0	0
Lane Group Flow (vph)	0	230	0	33	2257	0	499	11	0	4	0	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)		42.8		3.5	50.5		19.4	19.4		5.4		
Effective Green, g (s)		42.8		3.5	50.5		19.4	19.4		5.4		
Actuated g/C Ratio		0.48		0.04	0.56		0.22	0.22		0.06		
Clearance Time (s)		5.5		4.2	5.5		4.6	4.6		4.6		
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0		
Lane Grp Cap (vph)		1629		69	1986		382	341		106		
v/s Ratio Prot		0.07		0.02	c0.64		c0.28	0.01		c0.00		
v/s Ratio Perm												
v/c Ratio		0.14		0.48	1.14		1.31	0.03		0.04		
Uniform Delay, d1		13.3		42.4	19.8		35.3	27.9		39.9		
Progression Factor		1.00		0.99	2.13		1.00	1.00		1.00		
Incremental Delay, d2		0.2		3.8	66.5		155.6	0.2		0.7		
Delay (s)		13.4		45.7	108.6		190.9	28.0		40.5		
Level of Service		B		D	F		F	C		D		
Approach Delay (s)		13.4			107.7			176.4			40.5	
Approach LOS		B			F			F			D	

Intersection Summary			
HCM Average Control Delay	111.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.7
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	211	13	0	1897	20	45	27	2	23	48	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			1.00		1.00	0.99			0.94	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	5041			5077		1770	1845			1732	
Flt Permitted	0.95	1.00			1.00		0.67	1.00			0.99	
Satd. Flow (perm)	1770	5041			5077		1241	1845			1732	
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)	10	229	14	0	2062	22	49	29	2	25	52	65
RTOR Reduction (vph)	0	3	0	0	0	0	0	2	0	0	17	0
Lane Group Flow (vph)	10	240	0	0	2084	0	49	29	0	0	125	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	3.1	108.9			99.1		27.2	27.2			30.7	
Effective Green, g (s)	3.1	108.9			99.1		27.2	27.2			30.7	
Actuated g/C Ratio	0.02	0.61			0.55		0.15	0.15			0.17	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	30	3050			2795		188	279			295	
v/s Ratio Prot	c0.01	0.05			c0.41			0.02			c0.07	
v/s Ratio Perm							c0.04					
v/c Ratio	0.33	0.08			0.75		0.26	0.11			0.42	
Uniform Delay, d1	87.4	14.7			30.8		67.5	65.9			66.7	
Progression Factor	1.22	1.38			0.85		0.69	0.70			1.00	
Incremental Delay, d2	6.4	0.0			1.5		0.7	0.2			1.0	
Delay (s)	113.1	20.4			27.6		47.6	46.2			67.7	
Level of Service	F	C			C		D	D			E	
Approach Delay (s)		24.0			27.6			47.1			67.7	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	428	15	27	341	0	67	38	83	2	21	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00			0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	1.00
Satd. Flow (prot)	1770	3522		1770	3539			1721			1855	1583
Flt Permitted	0.51	1.00		0.44	1.00			0.87			0.96	1.00
Satd. Flow (perm)	946	3522		820	3539			1526			1796	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)	18	465	16	29	371	0	73	41	90	2	23	30
RTOR Reduction (vph)	0	1	0	0	0	0	0	18	0	0	0	25
Lane Group Flow (vph)	18	480	0	29	371	0	0	186	0	0	25	5
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	99.1	99.1		99.1	99.1			27.2			30.7	30.7
Effective Green, g (s)	99.1	99.1		99.1	99.1			27.2			30.7	30.7
Actuated g/C Ratio	0.55	0.55		0.55	0.55			0.15			0.17	0.17
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	521	1939		451	1948			231			306	270
v/s Ratio Prot		c0.14			0.10							
v/s Ratio Perm	0.02			0.04				c0.12			c0.01	0.00
v/c Ratio	0.03	0.25		0.06	0.19			0.81			0.08	0.02
Uniform Delay, d1	18.5	21.0		18.8	20.3			73.8			62.8	62.1
Progression Factor	1.00	1.00		2.56	2.75			1.00			0.41	0.19
Incremental Delay, d2	0.1	0.3		0.2	0.1			18.2			0.1	0.0
Delay (s)	18.7	21.4		48.4	56.0			92.1			25.9	11.6
Level of Service	B	C		D	E			F			C	B
Approach Delay (s)		21.3			55.5			92.1			18.1	
Approach LOS		C			E			F			B	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	228	0	457	1907	10	0	0	0	0	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	1.00							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3536							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3536							1611
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	248	0	497	2073	11	0	0	0	0	0	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	248	0	497	2084	0	0	0	0	0	0	9
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		99.1		30.7	180.0							99.1
Effective Green, g (s)		99.1		30.7	180.0							99.1
Actuated g/C Ratio		0.55		0.17	1.00							0.55
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2800		586	3536							887
v/s Ratio Prot		0.05		c0.14	0.59							
v/s Ratio Perm												0.01
v/c Ratio		0.09		0.85	0.59							0.01
Uniform Delay, d1		19.1		72.4	0.0							18.3
Progression Factor		0.53		0.84	1.00							1.00
Incremental Delay, d2		0.1		9.0	0.6							0.0
Delay (s)		10.1		69.8	0.6							18.3
Level of Service		B		E	A							B
Approach Delay (s)		10.1			13.9			0.0			18.3	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	4.6
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	736	32	27	2035	50	186	42	58	102	52	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	1.00			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	5053		1770	5067			3324			3364	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (perm)	1770	5053		1770	5067			3324			3364	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	800	35	29	2212	54	202	46	63	111	57	30
RTOR Reduction (vph)	0	1	0	0	1	0	0	14	0	0	10	0
Lane Group Flow (vph)	26	834	0	29	2265	0	0	297	0	0	188	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	5.7	117.6		7.3	119.2			21.4			15.4	
Effective Green, g (s)	5.7	117.6		7.3	119.2			21.4			15.4	
Actuated g/C Ratio	0.03	0.65		0.04	0.66			0.12			0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	56	3301		72	3355			395			288	
v/s Ratio Prot	0.01	0.16		c0.02	c0.45			c0.09			c0.06	
v/s Ratio Perm												
v/c Ratio	0.46	0.25		0.40	0.68			0.90dl			0.65	
Uniform Delay, d1	85.6	13.0		84.2	18.6			76.7			79.7	
Progression Factor	1.14	0.69		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.0	0.2		3.7	1.1			7.9			5.2	
Delay (s)	104.0	9.2		87.9	19.7			84.6			84.9	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		12.0			20.5			84.6			84.9	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

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

HCM Signalized Intersection Capacity Analysis
1: SR 75 (Palm Ave) & Rainbow Dr

9/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1578	226	85	447	0	102	0	79	3	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3473		1770	3539		1770	1583		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3473		1770	3539		1770	1583		1770	1723	
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)	5	1715	246	92	486	0	111	0	86	3	1	1
RTOR Reduction (vph)	0	13	0	0	0	0	0	71	0	0	1	0
Lane Group Flow (vph)	5	1948	0	92	486	0	111	15	0	3	1	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	1.1	44.4		5.3	48.6		16.0	16.0		5.4	5.4	
Effective Green, g (s)	1.1	44.4		5.3	48.6		16.0	16.0		5.4	5.4	
Actuated g/C Ratio	0.01	0.49		0.06	0.54		0.18	0.18		0.06	0.06	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1713		104	1911		315	281		106	103	
v/s Ratio Prot	c0.00	c0.56		c0.05	0.14		c0.06	0.01		c0.00	0.00	
v/s Ratio Perm												
v/c Ratio	0.23	1.14		0.88	0.25		0.35	0.05		0.03	0.01	
Uniform Delay, d1	44.0	22.8		42.0	11.0		32.5	30.7		39.8	39.8	
Progression Factor	1.00	1.00		1.16	0.85		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	69.6		52.8	0.3		3.1	0.4		0.5	0.2	
Delay (s)	49.2	92.4		101.5	9.7		35.5	31.1		40.3	40.0	
Level of Service	D	F		F	A		D	C		D	D	
Approach Delay (s)		92.2			24.3			33.6			40.2	
Approach LOS		F			C			C			D	

Intersection Summary			
HCM Average Control Delay	73.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	23.1
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	1504	65	0	444	40	12	46	5	28	30	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			0.99		1.00	0.99			0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	5054			5023		1770	1837			1760	
Flt Permitted	0.95	1.00			1.00		0.70	1.00			0.98	
Satd. Flow (perm)	1770	5054			5023		1303	1837			1760	
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)	72	1635	71	0	483	43	13	50	5	30	33	26
RTOR Reduction (vph)	0	2	0	0	5	0	0	3	0	0	8	0
Lane Group Flow (vph)	72	1704	0	0	521	0	13	52	0	0	81	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	14.4	115.0			93.9		17.4	17.4			34.4	
Effective Green, g (s)	14.4	115.0			93.9		17.4	17.4			34.4	
Actuated g/C Ratio	0.08	0.64			0.52		0.10	0.10			0.19	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	142	3229			2620		126	178			336	
v/s Ratio Prot	0.04	c0.34			0.10			c0.03			c0.05	
v/s Ratio Perm							0.01					
v/c Ratio	0.51	0.53			0.20		0.10	0.29			0.24	
Uniform Delay, d1	79.4	17.7			23.0		74.2	75.6			61.7	
Progression Factor	1.13	1.50			0.79		0.97	0.96			1.00	
Incremental Delay, d2	0.3	0.0			0.2		0.4	0.9			0.4	
Delay (s)	89.9	26.6			18.3		72.3	73.2			62.1	
Level of Service	F	C			B		E	E			E	
Approach Delay (s)		29.1			18.3			73.1			62.1	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM Average Control Delay	29.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	441	29	32	468	4	54	19	23	13	41	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	1.00
Satd. Flow (prot)	1770	3506		1770	3535			1754			1841	1583
Flt Permitted	0.41	1.00		0.42	1.00			0.79			0.90	1.00
Satd. Flow (perm)	773	3506		775	3535			1430			1679	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)	32	479	32	35	509	4	59	21	25	14	45	34
RTOR Reduction (vph)	0	2	0	0	0	0	0	7	0	0	0	28
Lane Group Flow (vph)	32	509	0	35	513	0	0	98	0	0	59	6
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	93.9	93.9		93.9	93.9			17.4			34.4	34.4
Effective Green, g (s)	93.9	93.9		93.9	93.9			17.4			34.4	34.4
Actuated g/C Ratio	0.52	0.52		0.52	0.52			0.10			0.19	0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	403	1829		404	1844			138			321	303
v/s Ratio Prot		c0.15			0.15							
v/s Ratio Perm	0.04			0.05				c0.07			c0.04	0.00
v/c Ratio	0.08	0.28		0.09	0.28			0.71			0.18	0.02
Uniform Delay, d1	21.5	24.1		21.6	24.1			78.8			61.0	59.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.94	1.57
Incremental Delay, d2	0.4	0.4		0.4	0.4			15.3			0.3	0.0
Delay (s)	21.9	24.5		22.0	24.5			94.2			57.6	92.7
Level of Service	C	C		C	C			F			E	F
Approach Delay (s)		24.3			24.3			94.2			70.4	
Approach LOS		C			C			F			E	

Intersection Summary			
HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	34.3
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1538	0	580	487	44	0	0	0	0	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	0.99							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3495							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3495							1611
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	1672	0	630	529	48	0	0	0	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	0	1672	0	630	577	0	0	0	0	0	0	2
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		93.9		34.4	180.0							93.9
Effective Green, g (s)		93.9		34.4	180.0							93.9
Actuated g/C Ratio		0.52		0.19	1.00							0.52
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2653		656	3495							840
v/s Ratio Prot		c0.33		c0.18	0.17							
v/s Ratio Perm												0.00
v/c Ratio		0.63		0.96	0.17							0.00
Uniform Delay, d1		30.7		72.1	0.0							20.6
Progression Factor		0.37		0.89	1.00							1.00
Incremental Delay, d2		1.0		24.7	0.1							0.0
Delay (s)		12.4		88.7	0.1							20.6
Level of Service		B		F	A							C
Approach Delay (s)		12.4			46.3			0.0			20.6	
Approach LOS		B			D			A			C	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1848	139	66	921	149	104	102	71	197	90	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5032		1770	4979			3341			3385	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (perm)	1770	5032		1770	4979			3341			3385	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	2009	151	72	1001	162	113	111	77	214	98	32
RTOR Reduction (vph)	0	3	0	0	8	0	0	21	0	0	5	0
Lane Group Flow (vph)	51	2157	0	72	1155	0	0	280	0	0	339	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	9.3	105.2		12.7	108.6			20.4			23.4	
Effective Green, g (s)	9.3	105.2		12.7	108.6			20.4			23.4	
Actuated g/C Ratio	0.05	0.58		0.07	0.60			0.11			0.13	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	91	2941		125	3004			379			440	
v/s Ratio Prot	0.03	c0.43		c0.04	c0.23			c0.08			c0.10	
v/s Ratio Perm												
v/c Ratio	0.56	0.73		0.58	0.38			0.74			0.91dl	
Uniform Delay, d1	83.4	27.2		81.0	18.4			77.2			75.7	
Progression Factor	1.35	0.23		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.9	1.5		6.3	0.4			7.3			7.9	
Delay (s)	119.1	7.6		87.3	18.8			84.5			83.6	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		10.2			22.8			84.5			83.6	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	23.2
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

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

APPENDIX K

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
YEAR 2040 WITH PROJECT

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HCM Signalized Intersection Capacity Analysis
1: SR 75 (Palm Ave) & Rainbow Dr

9/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	185	51	30	2075	14	459	2	45	52	7	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.86		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3425		1770	3536		1770	1594		1770	1701	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3425		1770	3536		1770	1594		1770	1701	
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)	5	201	55	33	2255	15	499	2	49	57	8	11
RTOR Reduction (vph)	0	26	0	0	0	0	0	40	0	0	10	0
Lane Group Flow (vph)	5	230	0	33	2270	0	499	11	0	57	9	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	1.1	46.5		3.2	48.6		16.0	16.0		5.4	5.4	
Effective Green, g (s)	1.1	46.5		3.2	48.6		16.0	16.0		5.4	5.4	
Actuated g/C Ratio	0.01	0.52		0.04	0.54		0.18	0.18		0.06	0.06	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	1770		63	1909		315	283		106	102	
v/s Ratio Prot	c0.00	0.07		0.02	c0.64		c0.28	0.01		c0.03	0.01	
v/s Ratio Perm												
v/c Ratio	0.23	0.13		0.52	1.19		1.58	0.04		0.54	0.08	
Uniform Delay, d1	44.0	11.3		42.7	20.7		37.0	30.6		41.1	40.0	
Progression Factor	1.00	1.00		1.00	2.18		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	0.2		5.7	89.2		277.5	0.3		18.2	1.6	
Delay (s)	49.2	11.4		48.4	134.3		314.5	30.9		59.3	41.6	
Level of Service	D	B		D	F		F	C		E	D	
Approach Delay (s)		12.1			133.1			288.2			54.8	
Approach LOS		B			F			F			D	

Intersection Summary			
HCM Average Control Delay	148.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	252	20	0	1907	20	47	27	2	23	48	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			1.00		1.00	0.99			0.97	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	5029			5077		1770	1845			1778	
Flt Permitted	0.95	1.00			1.00		0.69	1.00			0.99	
Satd. Flow (perm)	1770	5029			5077		1286	1845			1778	
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)	10	274	22	0	2073	22	51	29	2	25	52	26
RTOR Reduction (vph)	0	4	0	0	0	0	0	2	0	0	7	0
Lane Group Flow (vph)	10	292	0	0	2095	0	51	29	0	0	96	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	3.1	108.3			98.5		27.4	27.4			31.1	
Effective Green, g (s)	3.1	108.3			98.5		27.4	27.4			31.1	
Actuated g/C Ratio	0.02	0.60			0.55		0.15	0.15			0.17	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	30	3026			2778		196	281			307	
v/s Ratio Prot	c0.01	0.06			c0.41			0.02			c0.05	
v/s Ratio Perm							c0.04					
v/c Ratio	0.33	0.10			0.75		0.26	0.10			0.31	
Uniform Delay, d1	87.4	15.2			31.4		67.4	65.7			65.1	
Progression Factor	1.10	1.16			0.86		0.68	0.68			1.00	
Incremental Delay, d2	6.4	0.0			1.6		0.7	0.2			0.6	
Delay (s)	102.8	17.6			28.6		46.7	45.1			65.7	
Level of Service	F	B			C		D	D			E	
Approach Delay (s)		20.3			28.6			46.1			65.7	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	428	16	27	341	0	67	40	83	2	28	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			1.00	1.00
Satd. Flow (prot)	1770	3520		1770	3539			1722			1857	1583
Flt Permitted	0.51	1.00		0.44	1.00			0.87			0.97	1.00
Satd. Flow (perm)	945	3520		817	3539			1524			1809	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)	18	465	17	29	371	0	73	43	90	2	30	34
RTOR Reduction (vph)	0	1	0	0	0	0	0	18	0	0	0	28
Lane Group Flow (vph)	18	481	0	29	371	0	0	188	0	0	32	6
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	98.5	98.5		98.5	98.5			27.4			31.1	31.1
Effective Green, g (s)	98.5	98.5		98.5	98.5			27.4			31.1	31.1
Actuated g/C Ratio	0.55	0.55		0.55	0.55			0.15			0.17	0.17
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	517	1926		447	1937			232			313	274
v/s Ratio Prot		c0.14			0.10							
v/s Ratio Perm	0.02			0.04				c0.12			c0.02	0.00
v/c Ratio	0.03	0.25		0.06	0.19			0.81			0.10	0.02
Uniform Delay, d1	18.8	21.4		19.1	20.6			73.8			62.7	61.8
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.44	0.33
Incremental Delay, d2	0.1	0.3		0.3	0.2			19.0			0.1	0.0
Delay (s)	18.9	21.7		19.4	20.8			92.8			27.7	20.5
Level of Service	B	C		B	C			F			C	C
Approach Delay (s)		21.6			20.7			92.8			24.0	
Approach LOS		C			C			F			C	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	269	0	457	1917	10	0	0	0	0	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	1.00							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3536							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3536							1611
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	292	0	497	2084	11	0	0	0	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	0	292	0	497	2095	0	0	0	0	0	0	2
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		98.5		31.1	180.0							98.5
Effective Green, g (s)		98.5		31.1	180.0							98.5
Actuated g/C Ratio		0.55		0.17	1.00							0.55
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2783		593	3536							882
v/s Ratio Prot		0.06		c0.14	0.59							
v/s Ratio Perm												0.00
v/c Ratio		0.10		0.84	0.59							0.00
Uniform Delay, d1		19.6		72.0	0.0							18.5
Progression Factor		0.48		0.84	1.00							1.00
Incremental Delay, d2		0.1		8.2	0.6							0.0
Delay (s)		9.4		68.5	0.6							18.5
Level of Service		A		E	A							B
Approach Delay (s)		9.4			13.6			0.0			18.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	4.6
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	769	40	27	2043	50	188	42	58	102	52	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	1.00			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (prot)	1770	5048		1770	5067			3324			3361	
Flt Permitted	0.95	1.00		0.95	1.00			0.97			0.97	
Satd. Flow (perm)	1770	5048		1770	5067			3324			3361	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	836	43	29	2221	54	204	46	63	111	57	32
RTOR Reduction (vph)	0	2	0	0	1	0	0	14	0	0	10	0
Lane Group Flow (vph)	26	877	0	29	2274	0	0	299	0	0	190	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	5.7	117.5		7.3	119.1			21.1			15.8	
Effective Green, g (s)	5.7	117.5		7.3	119.1			21.1			15.8	
Actuated g/C Ratio	0.03	0.65		0.04	0.66			0.12			0.09	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	56	3295		72	3353			390			295	
v/s Ratio Prot	0.01	0.17		c0.02	c0.45			c0.09			c0.06	
v/s Ratio Perm												
v/c Ratio	0.46	0.27		0.40	0.68			0.92dl			0.64	
Uniform Delay, d1	85.6	13.1		84.2	18.7			77.1			79.4	
Progression Factor	1.15	0.69		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.0	0.2		3.7	1.1			8.7			4.8	
Delay (s)	104.9	9.3		87.9	19.8			85.8			84.1	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		12.0			20.7			85.8			84.1	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

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

HCM Signalized Intersection Capacity Analysis
1: SR 75 (Palm Ave) & Rainbow Dr

9/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1578	226	85	447	53	102	8	79	26	4	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.86		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3473		1770	3483		1770	1610		1770	1658	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3473		1770	3483		1770	1610		1770	1658	
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)	27	1715	246	92	486	58	111	9	86	28	4	11
RTOR Reduction (vph)	0	13	0	0	9	0	0	71	0	0	10	0
Lane Group Flow (vph)	27	1948	0	92	535	0	111	24	0	28	5	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases												
Actuated Green, G (s)	2.1	44.4		5.3	47.6		16.0	16.0		5.4	5.4	
Effective Green, g (s)	2.1	44.4		5.3	47.6		16.0	16.0		5.4	5.4	
Actuated g/C Ratio	0.02	0.49		0.06	0.53		0.18	0.18		0.06	0.06	
Clearance Time (s)	4.2	5.5		4.2	5.5		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	41	1713		104	1842		315	286		106	99	
v/s Ratio Prot	0.02	c0.56		c0.05	0.15		c0.06	0.02		c0.02	0.00	
v/s Ratio Perm												
v/c Ratio	0.66	1.14		0.88	0.29		0.35	0.08		0.26	0.05	
Uniform Delay, d1	43.6	22.8		42.0	11.8		32.5	30.9		40.4	39.9	
Progression Factor	1.00	1.00		1.15	1.10		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.2	69.6		52.7	0.4		3.1	0.6		6.0	0.9	
Delay (s)	75.8	92.4		101.2	13.4		35.5	31.5		46.4	40.8	
Level of Service	E	F		F	B		D	C		D	D	
Approach Delay (s)		92.1			26.1			33.7			44.4	
Approach LOS		F			C			C			D	

Intersection Summary			
HCM Average Control Delay	72.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	1523	69	0	489	40	20	46	5	28	30	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	
Frt	1.00	0.99			0.99		1.00	0.99			0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	5052			5028		1770	1837			1760	
Flt Permitted	0.95	1.00			1.00		0.70	1.00			0.98	
Satd. Flow (perm)	1770	5052			5028		1303	1837			1760	
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)	72	1655	75	0	532	43	22	50	5	30	33	26
RTOR Reduction (vph)	0	2	0	0	4	0	0	3	0	0	8	0
Lane Group Flow (vph)	72	1728	0	0	571	0	22	52	0	0	81	0
Turn Type	Prot						Perm			Split		
Protected Phases	1	12			6			8		3	3	
Permitted Phases							8					
Actuated Green, G (s)	14.4	113.7			92.6		18.7	18.7			34.4	
Effective Green, g (s)	14.4	113.7			92.6		18.7	18.7			34.4	
Actuated g/C Ratio	0.08	0.63			0.51		0.10	0.10			0.19	
Clearance Time (s)	5.2	4.0			5.5		4.6	4.6			4.6	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	142	3191			2587		135	191			336	
v/s Ratio Prot	0.04	c0.34			0.11			c0.03			c0.05	
v/s Ratio Perm							0.02					
v/c Ratio	0.51	0.54			0.22		0.16	0.27			0.24	
Uniform Delay, d1	79.4	18.6			23.9		73.5	74.4			61.7	
Progression Factor	1.13	1.46			0.78		0.90	0.87			1.00	
Incremental Delay, d2	0.3	0.0			0.2		0.6	0.8			0.4	
Delay (s)	90.2	27.2			19.0		66.4	65.2			62.1	
Level of Service	F	C			B		E	E			E	
Approach Delay (s)		29.7			19.0			65.6			62.1	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	441	30	32	468	4	56	27	23	13	45	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	1.00
Satd. Flow (prot)	1770	3505		1770	3535			1761			1842	1583
Flt Permitted	0.41	1.00		0.41	1.00			0.80			0.90	1.00
Satd. Flow (perm)	770	3505		771	3535			1447			1670	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)	32	479	33	35	509	4	61	29	25	14	49	34
RTOR Reduction (vph)	0	2	0	0	0	0	0	6	0	0	0	28
Lane Group Flow (vph)	32	510	0	35	513	0	0	109	0	0	63	6
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		6			6			8			3	
Permitted Phases	6			6			8			3		3
Actuated Green, G (s)	92.6	92.6		92.6	92.6			18.7			34.4	34.4
Effective Green, g (s)	92.6	92.6		92.6	92.6			18.7			34.4	34.4
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.10			0.19	0.19
Clearance Time (s)	5.5	5.5		5.5	5.5			4.6			4.6	4.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	396	1803		397	1819			150			319	303
v/s Ratio Prot		c0.15			0.15							
v/s Ratio Perm	0.04			0.05				c0.08			c0.04	0.00
v/c Ratio	0.08	0.28		0.09	0.28			0.72			0.20	0.02
Uniform Delay, d1	22.1	24.8		22.2	24.8			78.2			61.2	59.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			0.93	1.58
Incremental Delay, d2	0.4	0.4		0.4	0.4			15.9			0.3	0.0
Delay (s)	22.5	25.2		22.7	25.2			94.1			57.3	93.5
Level of Service	C	C		C	C			F			E	F
Approach Delay (s)		25.1			25.0			94.1			70.0	
Approach LOS		C			C			F			E	

Intersection Summary			
HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	34.3
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1557	0	580	532	44	0	0	0	0	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		4.6	4.0							5.5
Lane Util. Factor		0.91		0.97	0.95							1.00
Frt		1.00		1.00	0.99							0.86
Flt Protected		1.00		0.95	1.00							1.00
Satd. Flow (prot)		5085		3433	3499							1611
Flt Permitted		1.00		0.95	1.00							1.00
Satd. Flow (perm)		5085		3433	3499							1611
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	1692	0	630	578	48	0	0	0	0	0	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	0	1692	0	630	626	0	0	0	0	0	0	2
Turn Type				Prot								custom
Protected Phases		6		3	Free							
Permitted Phases												6
Actuated Green, G (s)		92.6		34.4	180.0							92.6
Effective Green, g (s)		92.6		34.4	180.0							92.6
Actuated g/C Ratio		0.51		0.19	1.00							0.51
Clearance Time (s)		5.5		4.6								5.5
Vehicle Extension (s)		3.0		3.0								3.0
Lane Grp Cap (vph)		2616		656	3499							829
v/s Ratio Prot		c0.33		c0.18	0.18							
v/s Ratio Perm												0.00
v/c Ratio		0.65		0.96	0.18							0.00
Uniform Delay, d1		31.8		72.1	0.0							21.2
Progression Factor		0.36		0.88	1.00							1.00
Incremental Delay, d2		1.1		24.6	0.1							0.0
Delay (s)		12.6		88.4	0.1							21.3
Level of Service		B		F	A							C
Approach Delay (s)		12.6			44.4			0.0			21.3	
Approach LOS		B			D			A			C	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1863	143	66	958	149	112	102	71	197	90	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Lane Util. Factor	1.00	0.91		1.00	0.91			0.95			0.95	
Frt	1.00	0.99		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	5031		1770	4983			3342			3385	
Flt Permitted	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (perm)	1770	5031		1770	4983			3342			3385	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	2025	155	72	1041	162	122	111	77	214	98	32
RTOR Reduction (vph)	0	3	0	0	8	0	0	20	0	0	5	0
Lane Group Flow (vph)	51	2177	0	72	1195	0	0	290	0	0	339	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	9.3	104.7		12.7	108.1			20.9			23.4	
Effective Green, g (s)	9.3	104.7		12.7	108.1			20.9			23.4	
Actuated g/C Ratio	0.05	0.58		0.07	0.60			0.12			0.13	
Clearance Time (s)	4.2	4.9		4.2	4.9			4.6			4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	91	2926		125	2993			388			440	
v/s Ratio Prot	0.03	c0.43		c0.04	c0.24			c0.09			c0.10	
v/s Ratio Perm												
v/c Ratio	0.56	0.74		0.58	0.40			0.75			0.91dl	
Uniform Delay, d1	83.4	27.8		81.0	18.9			77.0			75.7	
Progression Factor	1.33	0.22		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.8	1.6		6.3	0.4			7.6			7.9	
Delay (s)	117.9	7.8		87.3	19.3			84.6			83.6	
Level of Service	F	A		F	B			F			F	
Approach Delay (s)		10.3			23.1			84.6			83.6	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	23.2
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

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

Explanation of Intersection Delay Decrease with the Addition of Project Traffic:

For purposes of this report, a decrease in delay was not shown in the report tables. Where a project induced decrease occurred, the previous scenario's (without project) delay was shown. This reduces any confusion on behalf of the reviewer while still showing there is no significant change in delay due to the project.

Under the HCM unsignalized/signalized methodology, it is possible to have better LOS or a decrease in delay with the project (in comparison to base conditions without the project), because the delay reported for the entire intersection is a weighted average of the different traffic movements on each approach based upon volumes. Therefore, the project-generated traffic may have been added to those movements with very good LOS, so that this benefit is further exemplified in the weighted average reported for the entire intersection.

Typically when the delay improves when volume is added it is due to the effect of volumes being added to movements that previously had lower delays than the intersection average delay, and therefore by adding more volume to those movements the intersection average delay actually decreases. Another factor may be that the allocation of green time given to each phase to balance the allocated green time for heavier movements.

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APPENDIX L

QUEUING ANALYSIS

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MAXIMUM QUEUE LENGTH WORKSHEET [1]
Bernardo Shores

Project No.: 3-13-2203 Date: 06/03/14
Facility Type: Multi-Family Residential Time: 08:26 AM

For traffic flow calculations, the vehicle arrival rate is the average number of vehicles arriving in an hour (the peak hour is typically utilized). The vehicle service rate is the average amount of time for any one vehicle to enter, wait in and then depart from the queue. The service rate is typically expressed in minutes and then converted to an hourly basis.

To estimate the maximum queue length, the utilization factor is calculated and the confidence level is determined. The utilization factor is the average arrival rate divided by the average service time. The confidence level is expressed as a percent. If the confidence level is 95 percent, then 95 percent of the time the maximum queue length will be less than or equal to the calculated number of vehicles. For this calculation, it is assumed that the vehicles are serviced in the order of arrival through one service window (i.e., first in-first out or FIFO).

Inbound Peak Hour Volume =	76	vehicles per hour
Vehicles entering driveway =	100	percent
Average Arrival Rate (Drive-Thru Volume) =	76	vehicles per hour
Average Service Time per Vehicle [2] =	0.3	minute(s)
Average Service Rate =	200	vehicles per hour
Utilization Factor =	0.380	
Confidence Level =	95	percent
Maximum Queue Length =	**2**	**vehicles**
Average Vehicle Length [3] =	22	feet
Required Storage Length =	**44**	**feet**

[1] Source: "Traffic Flow Theory," A Monograph, Special Report 165, TRB, 1975.
[2] Source: "Queuing Areas for Drive-Thru Facilities," ITE Journal, May, 1995.
[3] Assumes 19 feet per vehicle and three foot separation between vehicles.

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