A P P E N D I C E S

APPENDIX A

TRAFFIC COUNT DATA

APPENDIX A

TRAFFIC COUNT DATA

- Existing Conditions AM

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 533-3646

File Name : AM_Kualakai Interchange North T.HAI
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	KUALAKAI From North					H-1 OFF RAMP From East					KUALAKAI From South					H-1 ON RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	0	0	0	0	3	0	45	0	48	0	5	39	0	44	0	0	0	0	0	92
Total	0	0	0	0	0	3	0	45	0	48	0	5	39	0	44	0	0	0	0	0	92
06:00 AM	0	0	0	0	0	6	0	40	0	46	0	2	27	0	29	0	0	0	0	0	75
06:15 AM	0	0	0	0	0	2	0	54	0	56	0	0	32	0	32	0	0	0	0	0	88
06:30 AM	0	4	0	0	4	2	0	71	0	73	0	8	43	0	51	0	0	0	0	0	128
06:45 AM	0	1	0	0	1	8	0	84	0	92	0	10	46	0	56	0	0	0	0	0	149
Total	0	5	0	0	5	18	0	249	0	267	0	20	148	0	168	0	0	0	0	0	440
07:00 AM	0	0	0	0	0	0	0	72	0	72	0	2	34	0	36	0	0	0	0	0	108
07:15 AM	0	11	0	0	11	1	0	75	0	76	0	1	48	0	49	0	0	0	0	0	136
07:30 AM	0	6	0	0	6	0	0	91	0	91	0	4	62	0	66	0	0	0	0	0	163
07:45 AM	0	4	0	0	4	1	0	76	0	77	0	3	55	0	58	0	0	0	0	0	139
Total	0	21	0	0	21	2	0	314	0	316	0	10	199	0	209	0	0	0	0	0	546
08:00 AM	0	4	0	0	4	0	0	50	0	50	0	1	47	0	48	0	0	0	0	0	102
08:15 AM	0	2	0	0	2	2	1	51	0	54	0	4	40	0	44	0	0	0	0	0	100
Grand Total	0	32	0	0	32	25	1	709	0	735	0	40	473	0	513	0	0	0	0	0	1280
Apprch %	0	100	0	0		3.4	0.1	96.5	0		0	7.8	92.2	0		0	0	0	0		
Total %	0	2.5	0	0	2.5	2	0.1	55.4	0	57.4	0	3.1	37	0	40.1	0	0	0	0	0	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 533-3646

File Name : AM_Kualakai Interchange North T.HAI
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	KUALAKAI From North					H-1 OFF RAMP From East					KUALAKAI From South					H-1 ON RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	1	0	0	1	**8**	0	84	0	**92**	0	**10**	46	0	56	0	0	0	0	0	149
07:00 AM	0	0	0	0	0	0	0	72	0	72	0	2	34	0	36	0	0	0	0	0	108
07:15 AM	0	**11**	0	0	**11**	1	0	75	0	76	0	1	48	0	49	0	0	0	0	0	136
07:30 AM	0	6	0	0	6	0	0	**91**	0	91	0	4	**62**	0	**66**	0	0	0	0	0	**163**
Total Volume	0	18	0	0	18	9	0	322	0	331	0	17	190	0	207	0	0	0	0	0	556
% App. Total	0	100	0	0		2.7	0	97.3	0		0	8.2	91.8	0		0	0	0	0		
PHF	.000	.409	.000	.000	.409	.281	.000	.885	.000	.899	.000	.425	.766	.000	.784	.000	.000	.000	.000	.000	.853

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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File Name : AM_Kualakai Interchange South GAM
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	KUALAKAI From North					H-1 ON RAMP From East					KUALAKAI From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	43	1	0	44	0	0	0	0	0	135	21	0	0	156	49	0	23	0	72	272
Total	0	43	1	0	44	0	0	0	0	0	135	21	0	0	156	49	0	23	0	72	272
06:00 AM	0	39	0	0	39	0	0	0	0	0	129	25	0	0	154	49	0	4	0	53	246
06:15 AM	0	54	1	0	55	0	0	0	0	0	109	33	0	0	142	61	0	1	0	62	259
06:30 AM	0	74	1	0	75	0	0	0	0	0	91	46	0	0	137	61	0	4	0	65	277
06:45 AM	0	85	1	0	86	0	0	1	0	1	97	49	0	0	146	63	1	6	0	70	303
Total	0	252	3	0	255	0	0	1	0	1	426	153	0	0	579	234	1	15	0	250	1085
07:00 AM	0	70	1	0	71	0	0	0	0	0	101	37	0	0	138	71	1	0	0	72	281
07:15 AM	0	80	6	0	86	0	0	0	0	0	104	49	0	0	153	60	0	1	0	61	300
07:30 AM	0	93	3	0	96	0	0	0	0	0	117	65	0	0	182	45	0	2	0	47	325
07:45 AM	0	83	0	0	83	0	0	0	0	0	128	61	0	0	189	46	1	1	0	48	320
Total	0	326	10	0	336	0	0	0	0	0	450	212	0	0	662	222	2	4	0	228	1226
08:00 AM	0	50	0	0	50	0	0	0	0	0	118	51	0	0	169	34	0	1	0	35	254
08:15 AM	0	57	0	0	57	0	0	0	0	0	100	41	0	0	141	29	0	2	0	31	229
Grand Total	0	728	14	0	742	0	0	1	0	1	1229	478	0	0	1707	568	3	45	0	616	3066
Apprch %	0	98.1	1.9	0		0	0	100	0		72	28	0	0		92.2	0.5	7.3	0		
Total %	0	23.7	0.5	0	24.2	0	0	0	0	0	40.1	15.6	0	0	55.7	18.5	0.1	1.5	0	20.1	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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File Name : AM_Kualakai Interchange South GAM
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	KUALAKAI From North					H-1 ON RAMP From East					KUALAKAI From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	85	1	0	86	0	0	**1**	0	**1**	97	49	0	0	146	63	**1**	**6**	0	70	303
07:00 AM	0	70	1	0	71	0	0	0	0	0	101	37	0	0	138	**71**	1	0	0	**72**	281
07:15 AM	0	80	**6**	0	86	0	0	0	0	0	104	49	0	0	153	60	0	1	0	61	300
07:30 AM	0	**93**	3	0	**96**	0	0	0	0	0	**117**	**65**	0	0	**182**	45	0	2	0	47	**325**
Total Volume	0	328	11	0	339	0	0	1	0	1	419	200	0	0	619	239	2	9	0	250	1209
% App. Total	0	96.8	3.2	0		0	0	100	0		67.7	32.3	0	0		95.6	0.8	3.6	0		
PHF	.000	.882	.458	.000	.883	.000	.000	.250	.000	.250	.895	.769	.000	.000	.850	.842	.500	.375	.000	.868	.930

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File Name : AM_Kualakai - Farrington THANH
Site Code : 00000000
Start Date : 2/16/2012
Page No : 1

Groups Printed- Unshifted

	KUALAKAI From North					FARRINGTON From East					KUALAKAI From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	45	32	10	0	87	13	13	4	0	30	47	101	10	0	158	4	73	42	0	119	394
Total	45	32	10	0	87	13	13	4	0	30	47	101	10	0	158	4	73	42	0	119	394
06:00 AM	29	24	37	0	90	15	19	4	0	38	40	110	9	0	159	2	91	53	0	146	433
06:15 AM	30	41	37	0	108	8	23	4	0	35	33	84	4	0	121	5	121	46	0	172	436
06:30 AM	52	48	44	0	144	22	29	6	0	57	44	84	10	0	138	3	87	43	0	133	472
06:45 AM	42	65	37	0	144	14	15	4	0	33	39	91	6	0	136	5	111	43	0	159	472
Total	153	178	155	0	486	59	86	18	0	163	156	369	29	0	554	15	410	185	0	610	1813
07:00 AM	23	72	42	0	137	11	30	7	0	48	48	76	4	0	128	3	89	50	0	142	455
07:15 AM	20	79	37	0	136	13	30	12	0	55	48	102	1	0	151	8	113	43	0	164	506
07:30 AM	18	94	18	0	130	19	30	10	0	59	36	116	5	0	157	12	58	57	0	127	473
07:45 AM	36	77	23	0	136	11	37	7	0	55	32	122	5	0	159	10	53	68	1	132	482
Total	97	322	120	0	539	54	127	36	0	217	164	416	15	0	595	33	313	218	1	565	1916
08:00 AM	11	54	13	0	78	13	38	7	0	58	28	85	8	0	121	5	58	74	0	137	394
08:15 AM	12	49	13	0	74	13	34	7	0	54	26	81	9	0	116	8	53	71	0	132	376
08:30 AM	33	50	17	0	100	14	30	4	0	48	11	84	2	0	97	4	48	40	0	92	337
Grand Total	351	685	328	0	1364	166	328	76	0	570	432	1136	73	0	1641	69	955	630	1	1655	5230
Apprch %	25.7	50.2	24	0		29.1	57.5	13.3	0		26.3	69.2	4.4	0		4.2	57.7	38.1	0.1		
Total %	6.7	13.1	6.3	0	26.1	3.2	6.3	1.5	0	10.9	8.3	21.7	1.4	0	31.4	1.3	18.3	12	0	31.6	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
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File Name : AM_Kualakai - Farrington THANH
Site Code : 00000000
Start Date : 2/16/2012
Page No : 2

	KUALAKAI From North					FARRINGTON From East					KUALAKAI From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	**42**	65	37	0	**144**	14	15	4	0	33	39	91	**6**	0	136	5	111	43	0	159	472
07:00 AM	23	72	**42**	0	137	11	**30**	7	0	48	**48**	76	4	0	128	3	89	50	0	142	455
07:15 AM	20	79	37	0	136	13	30	**12**	0	55	48	102	1	0	151	8	**113**	43	0	**164**	**506**
07:30 AM	18	**94**	18	0	130	**19**	30	10	0	**59**	36	**116**	5	0	**157**	**12**	58	**57**	0	127	473
Total Volume	103	310	134	0	547	57	105	33	0	195	171	385	16	0	572	28	371	193	0	592	1906
% App. Total	18.8	56.7	24.5	0		29.2	53.8	16.9	0		29.9	67.3	2.8	0		4.7	62.7	32.6	0		
PHF	.613	.824	.798	.000	.950	.750	.875	.688	.000	.826	.891	.830	.667	.000	.911	.583	.821	.846	.000	.902	.942

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
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File Name : AM_Kualakai - Kapolei AN
Site Code : 00000000
Start Date : 2/16/2012
Page No : 1

Groups Printed- Unshifted

	KUALAKAI From North					KAPOLEI From East					KUALAKAI From South					KAPOLEI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	16	0	14	0	30	48	39	0	0	87	0	0	0	0	0	0	16	115	0	131	248
Total	16	0	14	0	30	48	39	0	0	87	0	0	0	0	0	0	16	115	0	131	248
06:00 AM	13	0	13	0	26	43	25	0	0	68	0	0	0	0	0	0	28	91	0	119	213
06:15 AM	19	0	22	0	41	42	54	0	0	96	0	0	0	0	0	0	32	70	0	102	239
06:30 AM	22	0	29	0	51	53	41	0	0	94	0	0	0	0	0	0	48	93	0	141	286
06:45 AM	31	0	38	0	69	40	59	0	0	99	0	0	0	0	0	0	44	82	0	126	294
Total	85	0	102	0	187	178	179	0	0	357	0	0	0	0	0	0	152	336	0	488	1032
07:00 AM	35	0	34	2	71	44	65	0	0	109	0	0	0	0	0	0	41	97	0	138	318
07:15 AM	53	0	56	0	109	46	84	0	0	130	0	0	0	0	0	0	55	98	0	153	392
07:30 AM	55	0	36	2	93	55	94	0	0	149	0	0	0	0	0	0	31	72	0	103	345
07:45 AM	56	0	38	0	94	53	106	0	0	159	0	0	0	0	0	0	55	104	0	159	412
Total	199	0	164	4	367	198	349	0	0	547	0	0	0	0	0	0	182	371	0	553	1467
08:00 AM	31	0	38	0	69	51	67	0	0	118	0	0	0	0	0	0	40	67	0	107	294
08:15 AM	27	0	24	0	51	52	62	0	0	114	0	0	0	0	0	0	29	58	0	87	252
Grand Total	358	0	342	4	704	527	696	0	0	1223	0	0	0	0	0	0	419	947	0	1366	3293
Apprch %	50.9	0	48.6	0.6		43.1	56.9	0	0		0	0	0	0		0	30.7	69.3	0		
Total %	10.9	0	10.4	0.1	21.4	16	21.1	0	0	37.1	0	0	0	0	0	0	12.7	28.8	0	41.5	

Austin Tsutsumi & Asscociates

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File Name : AM_Kualakai - Kapolei AN
Site Code : 00000000
Start Date : 2/16/2012
Page No : 2

	KUALAKAI From North					KAPOLEI From East					KUALAKAI From South					KAPOLEI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	31	0	38	0	69	40	59	0	0	99	0	0	0	0	0	0	44	82	0	126	294
07:00 AM	35	0	34	**2**	71	44	65	0	0	109	0	0	0	0	0	0	41	97	0	138	318
07:15 AM	53	0	**56**	0	**109**	46	84	0	0	130	0	0	0	0	0	0	**55**	**98**	0	**153**	**392**
07:30 AM	**55**	0	36	2	93	**55**	**94**	0	0	**149**	0	0	0	0	0	0	31	72	0	103	345
Total Volume	174	0	164	4	342	185	302	0	0	487	0	0	0	0	0	0	171	349	0	520	1349
% App. Total	50.9	0	48	1.2		38	62	0	0		0	0	0	0		0	32.9	67.1	0		
PHF	.791	.000	.732	.500	.784	.841	.803	.000	.000	.817	.000	.000	.000	.000	.000	.000	.777	.890	.000	.850	.860

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
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Phone:533-3646 Fax:526-1267

File Name : AM_Kunia - Kupuna (north)
Site Code : 00000000
Start Date : 5/10/2012
Page No : 1

Groups Printed- Unshifted - Bank 1

	KUNIA From North					KUPUNA LOOP (NORTH) From East					KUNIA From South					KUPUNA LOOP (NORTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	120	6	1	127	6	0	56	1	63	41	160	0	0	201	0	0	0	0	0	391
Total	0	120	6	1	127	6	0	56	1	63	41	160	0	0	201	0	0	0	0	0	391
06:00 AM	0	163	6	0	169	19	0	50	0	69	43	221	0	0	264	0	0	0	0	0	502
06:15 AM	0	123	3	0	126	15	0	76	0	91	30	299	4	0	333	0	0	0	0	0	550
06:30 AM	0	159	5	0	164	7	0	81	0	88	41	307	0	0	348	0	0	0	0	0	600
06:45 AM	0	162	12	0	174	20	0	58	0	78	42	293	1	0	336	0	0	0	0	0	588
Total	0	607	26	0	633	61	0	265	0	326	156	1120	5	0	1281	0	0	0	0	0	2240
07:00 AM	1	175	9	1	186	10	1	72	0	83	34	256	0	0	290	0	0	0	0	0	559
07:15 AM	0	162	7	0	169	12	1	64	1	78	47	291	1	0	339	0	0	0	0	0	586
07:30 AM	0	112	9	0	121	11	0	73	0	84	64	223	4	1	292	1	0	0	0	1	498
07:45 AM	0	114	10	0	124	18	0	65	0	83	73	206	1	0	280	0	0	0	0	0	487
Total	1	563	35	1	600	51	2	274	1	328	218	976	6	1	1201	1	0	0	0	1	2130
08:00 AM	0	122	7	0	129	4	1	71	0	76	69	190	1	0	260	0	3	0	0	3	468
08:15 AM	1	137	10	1	149	9	0	75	0	84	71	161	0	0	232	0	0	0	0	0	465
08:30 AM	0	90	5	1	96	8	0	52	0	60	49	120	3	0	172	0	0	0	0	0	328
Grand Total	2	1639	89	4	1734	139	3	793	2	937	604	2727	15	1	3347	1	3	0	0	4	6022
Apprch %	0.1	94.5	5.1	0.2		14.8	0.3	84.6	0.2		18	81.5	0.4	0		25	75	0	0		
Total %	0	27.2	1.5	0.1	28.8	2.3	0	13.2	0	15.6	10	45.3	0.2	0	55.6	0	0	0	0	0.1	
Unshifted	2	1639	89	4	1734	139	3	793	2	937	604	2727	15	1	3347	1	3	0	0	4	6022
% Unshifted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Austin Tsutsumi & Associates

501 Sumner Street, Suite 521
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File Name : AM_Kunia - Kupuna (north)
Site Code : 00000000
Start Date : 5/10/2012
Page No : 2

	KUNIA From North					KUPUNA LOOP (NORTH) From East					KUNIA From South					KUPUNA LOOP (NORTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	162	**12**	0	174	**20**	0	58	0	78	42	**293**	1	0	336	0	0	0	0	0	**588**
07:00 AM	**1**	**175**	9	**1**	**186**	10	**1**	72	0	83	34	256	0	0	290	0	0	0	0	0	559
07:15 AM	0	162	7	0	169	12	1	64	**1**	78	47	291	1	0	**339**	0	0	0	0	0	586
07:30 AM	0	112	9	0	121	11	0	**73**	0	**84**	**64**	223	**4**	**1**	292	**1**	0	0	0	**1**	498
Total Volume	1	611	37	1	650	53	2	267	1	323	187	1063	6	1	1257	1	0	0	0	1	2231
% App. Total	0.2	94	5.7	0.2		16.4	0.6	82.7	0.3		14.9	84.6	0.5	0.1		100	0	0	0		
PHF	.250	.873	.771	.250	.874	.663	.500	.914	.250	.961	.730	.907	.375	.250	.927	.250	.000	.000	.000	.250	.949

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File Name : AM_Kunia - Kupuna (south)
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Groups Printed- Unshifted - Bank 1

	KUNIA From North					KUPUNA LOOP (SOUTH) From East					KUNIA From South					KUPUNA LOOP (SOUTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	168	0	0	168	0	0	117	0	117	43	192	0	0	235	0	0	0	0	0	520
Total	0	168	0	0	168	0	0	117	0	117	43	192	0	0	235	0	0	0	0	0	520
06:00 AM	0	204	0	0	204	11	2	120	0	133	55	255	0	0	310	0	0	0	0	0	647
06:15 AM	0	201	0	0	201	10	0	97	0	107	64	326	0	0	390	0	0	0	0	0	698
06:30 AM	0	224	0	0	224	9	0	103	0	112	74	367	0	0	441	0	0	0	0	0	777
06:45 AM	0	231	0	0	231	5	0	104	0	109	82	326	0	0	408	0	0	0	0	0	748
Total	0	860	0	0	860	35	2	424	0	461	275	1274	0	0	1549	0	0	0	0	0	2870
07:00 AM	0	231	0	0	231	5	0	136	0	141	66	296	0	0	362	0	0	0	0	0	734
07:15 AM	0	223	0	0	223	7	0	140	0	147	105	335	0	0	440	0	0	0	0	0	810
07:30 AM	0	207	0	0	207	8	0	126	0	134	109	301	0	0	410	0	0	0	0	0	751
07:45 AM	0	170	0	0	170	9	0	138	0	147	97	268	0	0	365	0	0	0	0	0	682
Total	0	831	0	0	831	29	0	540	0	569	377	1200	0	0	1577	0	0	0	0	0	2977
08:00 AM	0	202	0	0	202	12	0	104	0	116	116	251	0	0	367	0	0	0	0	0	685
08:15 AM	0	203	0	0	203	2	0	99	0	101	91	227	0	0	318	0	0	0	0	0	622
08:30 AM	0	138	0	0	138	10	0	87	0	97	70	161	0	0	231	0	1	0	0	1	467
Grand Total	0	2402	0	0	2402	88	2	1371	0	1461	972	3305	0	0	4277	0	1	0	0	1	8141
Apprch %	0	100	0	0		6	0.1	93.8	0		22.7	77.3	0	0		0	100	0	0		
Total %	0	29.5	0	0	29.5	1.1	0	16.8	0	17.9	11.9	40.6	0	0	52.5	0	0	0	0	0	
Unshifted	0	2402	0	0	2402	88	2	1371	0	1461	972	3305	0	0	4277	0	1	0	0	1	8141
% Unshifted	0	100	0	0	100	100	100	100	0	100	100	100	0	0	100	0	100	0	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : AM_Kunia - Kupuna (south)
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	KUNIA From North					KUPUNA LOOP (SOUTH) From East					KUNIA From South					KUPUNA LOOP (SOUTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	**231**	0	0	**231**	5	0	104	0	109	82	326	0	0	408	0	0	0	0	0	748
07:00 AM	0	231	0	0	231	5	0	136	0	141	66	296	0	0	362	0	0	0	0	0	734
07:15 AM	0	223	0	0	223	7	0	**140**	0	**147**	105	**335**	0	0	**440**	0	0	0	0	0	**810**
07:30 AM	0	207	0	0	207	**8**	0	126	0	134	**109**	301	0	0	410	0	0	0	0	0	751
Total Volume	0	892	0	0	892	25	0	506	0	531	362	1258	0	0	1620	0	0	0	0	0	3043
% App. Total	0	100	0	0		4.7	0	95.3	0		22.3	77.7	0	0		0	0	0	0		
PHF	.000	.965	.000	.000	.965	.781	.000	.904	.000	.903	.830	.939	.000	.000	.920	.000	.000	.000	.000	.000	.939

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Groups Printed- Unshifted

	KUNIA From North					H-1 OFF RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	22	93	0	0	115	21	0	0	0	21	0	82	6	0	88	89	0	0	0	89	313
Total	22	93	0	0	115	21	0	0	0	21	0	82	6	0	88	89	0	0	0	89	313
06:00 AM	55	247	0	0	302	85	0	0	0	85	0	180	22	0	202	252	0	0	0	252	841
06:15 AM	56	243	0	0	299	86	0	0	0	86	0	245	33	0	278	307	0	0	0	307	970
06:30 AM	65	245	0	0	310	108	0	0	0	108	0	265	35	0	300	299	0	0	0	299	1017
06:45 AM	75	255	0	0	330	106	0	0	0	106	0	290	36	0	326	339	0	0	0	339	1101
Total	251	990	0	0	1241	385	0	0	0	385	0	980	126	0	1106	1197	0	0	0	1197	3929
07:00 AM	74	281	0	0	355	72	0	0	0	72	0	264	34	0	298	300	0	0	0	300	1025
07:15 AM	97	295	0	0	392	94	0	0	0	94	0	248	39	0	287	352	0	0	0	352	1125
07:30 AM	81	298	0	0	379	126	0	0	0	126	0	218	49	0	267	325	0	0	0	325	1097
07:45 AM	67	232	0	0	299	117	0	0	0	117	0	209	46	0	255	295	0	0	0	295	966
Total	319	1106	0	0	1425	409	0	0	0	409	0	939	168	0	1107	1272	0	0	0	1272	4213
08:00 AM	59	236	0	0	295	124	0	0	0	124	0	176	45	0	221	280	0	0	0	280	920
08:15 AM	45	210	0	0	255	118	0	0	0	118	0	196	51	0	247	270	0	0	0	270	890
Grand Total	696	2635	0	0	3331	1057	0	0	0	1057	0	2373	396	0	2769	3108	0	0	0	3108	10265
Apprch %	20.9	79.1	0	0		100	0	0	0		0	85.7	14.3	0		100	0	0	0		
Total %	6.8	25.7	0	0	32.5	10.3	0	0	0	10.3	0	23.1	3.9	0	27	30.3	0	0	0	30.3	

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	KUNIA From North					H-1 OFF RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	75	255	0	0	330	106	0	0	0	106	0	**290**	36	0	**326**	339	0	0	0	339	1101
07:00 AM	74	281	0	0	355	72	0	0	0	72	0	264	34	0	298	300	0	0	0	300	1025
07:15 AM	**97**	295	0	0	**392**	94	0	0	0	94	0	248	39	0	287	**352**	0	0	0	**352**	**1125**
07:30 AM	81	**298**	0	0	379	**126**	0	0	0	**126**	0	218	**49**	0	267	325	0	0	0	325	1097
Total Volume	327	1129	0	0	1456	398	0	0	0	398	0	1020	158	0	1178	1316	0	0	0	1316	4348
% App. Total	22.5	77.5	0	0		100	0	0	0		0	86.6	13.4	0		100	0	0	0		
PHF	.843	.947	.000	.000	.929	.790	.000	.000	.000	.790	.000	.879	.806	.000	.903	.935	.000	.000	.000	.935	.966

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Groups Printed- Unshifted

	KUNIA From North					H-1 ON RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	200	185	0	385	0	0	0	0	0	677	132	0	0	809	33	0	85	0	118	1312
Total	0	200	185	0	385	0	0	0	0	0	677	132	0	0	809	33	0	85	0	118	1312
06:00 AM	0	310	225	0	535	0	0	0	0	0	610	122	0	0	732	26	1	81	0	108	1375
06:15 AM	0	352	182	0	534	0	0	0	0	0	675	204	0	0	879	39	0	102	0	141	1554
06:30 AM	0	361	189	0	550	0	0	0	0	0	589	215	0	0	804	33	0	94	0	127	1481
06:45 AM	0	402	169	0	571	0	0	0	0	0	673	213	0	0	886	40	0	126	0	166	1623
Total	0	1425	765	0	2190	0	0	0	0	0	2547	754	0	0	3301	138	1	403	0	542	6033
07:00 AM	0	376	180	0	556	0	0	0	0	0	671	193	0	0	864	37	0	115	0	152	1572
07:15 AM	0	454	238	0	692	0	0	0	0	0	692	207	0	0	899	64	0	100	0	164	1755
07:30 AM	0	422	201	0	623	0	0	0	0	0	618	165	0	0	783	46	0	79	0	125	1531
07:45 AM	0	379	159	0	538	0	0	0	0	0	636	164	0	0	800	62	0	80	0	142	1480
Total	0	1631	778	0	2409	0	0	0	0	0	2617	729	0	0	3346	209	0	374	0	583	6338
08:00 AM	0	360	143	0	503	0	0	0	0	0	576	155	0	0	731	53	0	66	0	119	1353
08:15 AM	0	343	157	0	500	0	0	0	0	0	563	173	0	0	736	50	0	95	0	145	1381
Grand Total	0	3959	2028	0	5987	0	0	0	0	0	6980	1943	0	0	8923	483	1	1023	0	1507	16417
Apprch %	0	66.1	33.9	0		0	0	0	0		78.2	21.8	0	0		32.1	0.1	67.9	0		
Total %	0	24.1	12.4	0	36.5	0	0	0	0	0	42.5	11.8	0	0	54.4	2.9	0	6.2	0	9.2	

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	KUNIA From North					H-1 ON RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	402	169	0	571	0	0	0	0	0	673	**213**	0	0	886	40	0	**126**	0	**166**	1623
07:00 AM	0	376	180	0	556	0	0	0	0	0	671	193	0	0	864	37	0	115	0	152	1572
07:15 AM	0	**454**	**238**	0	**692**	0	0	0	0	0	**692**	207	0	0	**899**	**64**	0	100	0	164	**1755**
07:30 AM	0	422	201	0	623	0	0	0	0	0	618	165	0	0	783	46	0	79	0	125	1531
Total Volume	0	1654	788	0	2442	0	0	0	0	0	2654	778	0	0	3432	187	0	420	0	607	6481
% App. Total	0	67.7	32.3	0		0	0	0	0		77.3	22.7	0	0		30.8	0	69.2	0		
PHF	.000	.911	.828	.000	.882	.000	.000	.000	.000	.000	.959	.913	.000	.000	.954	.730	.000	.833	.000	.914	.923

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Groups Printed- Unshifted - Bank 1

	KUNIA From North					HONOWAI From East					KUNIA From South					HONOWAI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:15 AM	0	445	0	0	445	0	27	0	0	27	14	822	0	0	836	0	0	0	0	0	1308
06:30 AM	0	455	0	0	455	0	27	0	0	27	20	866	0	0	886	0	0	0	0	0	1368
06:45 AM	0	491	0	0	491	0	26	0	0	26	20	833	0	0	853	0	0	0	0	0	1370
Total	0	1391	0	0	1391	0	80	0	0	80	54	2521	0	0	2575	0	0	0	0	0	4046
07:00 AM	0	431	0	0	431	0	29	0	0	29	21	804	0	0	825	0	0	0	0	0	1285
07:15 AM	0	440	0	0	440	0	39	0	0	39	26	836	0	0	862	0	0	0	0	0	1341
07:30 AM	0	367	0	0	367	0	32	0	0	32	36	778	0	0	814	0	0	0	0	0	1213
07:45 AM	0	409	0	0	409	0	36	0	0	36	14	739	0	0	753	0	0	0	0	0	1198
Total	0	1647	0	0	1647	0	136	0	0	136	97	3157	0	0	3254	0	0	0	0	0	5037
08:00 AM	0	453	0	0	453	0	22	0	0	22	10	698	0	0	708	0	0	0	0	0	1183
08:15 AM	0	426	0	0	426	0	27	0	0	27	8	654	0	0	662	0	0	0	0	0	1115
Grand Total	0	3917	0	0	3917	0	265	0	0	265	169	7030	0	0	7199	0	0	0	0	0	11381
Apprch %	0	100	0	0		0	100	0	0		2.3	97.7	0	0		0	0	0	0		
Total %	0	34.4	0	0	34.4	0	2.3	0	0	2.3	1.5	61.8	0	0	63.3	0	0	0	0	0	
Unshifted	0	3917	0	0	3917	0	265	0	0	265	169	7030	0	0	7199	0	0	0	0	0	11381
% Unshifted	0	100	0	0	100	0	100	0	0	100	100	100	0	0	100	0	0	0	0	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	KUNIA From North					HONOWAI From East					KUNIA From South					HONOWAI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	**491**	0	0	**491**	0	26	0	0	26	20	833	0	0	853	0	0	0	0	0	**1370**
07:00 AM	0	431	0	0	431	0	29	0	0	29	21	804	0	0	825	0	0	0	0	0	1285
07:15 AM	0	440	0	0	440	0	**39**	0	0	**39**	26	**836**	0	0	**862**	0	0	0	0	0	1341
07:30 AM	0	367	0	0	367	0	32	0	0	32	**36**	778	0	0	814	0	0	0	0	0	1213
Total Volume	0	1729	0	0	1729	0	126	0	0	126	103	3251	0	0	3354	0	0	0	0	0	5209
% App. Total	0	100	0	0		0	100	0	0		3.1	96.9	0	0		0	0	0	0		
PHF	.000	.880	.000	.000	.880	.000	.808	.000	.000	.808	.715	.972	.000	.000	.973	.000	.000	.000	.000	.000	.951

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	KUNIA From North					WAIPAHU From East					KUNIA From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Leolua - Thru	Kunia NB - Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	0	0	0	0	24	0	0	0	24	48	657	0	0	705	0	0	0	0	0	729
Total	0	0	0	0	0	24	0	0	0	24	48	657	0	0	705	0	0	0	0	0	729
06:00 AM	0	0	0	0	0	35	0	0	0	35	55	755	0	0	810	0	0	0	0	0	845
06:15 AM	0	0	0	0	0	17	0	0	0	17	81	746	0	0	827	0	0	0	0	0	844
06:30 AM	0	0	0	0	0	30	0	0	0	30	88	761	0	0	849	0	0	0	0	0	879
06:45 AM	0	0	0	0	0	27	0	0	0	27	87	739	0	0	826	0	0	0	0	0	853
Total	0	0	0	0	0	109	0	0	0	109	311	3001	0	0	3312	0	0	0	0	0	3421
07:00 AM	0	0	0	0	0	48	0	0	0	48	97	682	0	0	779	0	0	0	0	0	827
07:15 AM	0	0	0	0	0	29	0	0	0	29	105	695	0	0	800	0	0	0	0	0	829
07:30 AM	0	0	0	0	0	40	0	0	0	40	106	641	0	0	747	0	0	0	0	0	787
07:45 AM	0	0	0	0	0	48	0	0	0	48	111	619	0	0	730	0	0	0	0	0	778
Total	0	0	0	0	0	165	0	0	0	165	419	2637	0	0	3056	0	0	0	0	0	3221
08:00 AM	0	0	0	0	0	36	0	0	0	36	116	532	0	0	648	0	0	0	0	0	684
08:15 AM	0	0	0	0	0	45	0	0	0	45	92	534	0	0	626	0	0	0	0	0	671
08:30 AM	0	0	0	0	0	39	0	0	0	39	120	462	0	0	582	0	0	0	0	0	621
Grand Total	0	0	0	0	0	418	0	0	0	418	1106	7823	0	0	8929	0	0	0	0	0	9347
Apprch %	0	0	0	0		100	0	0	0		12.4	87.6	0	0		0	0	0	0		
Total %	0	0	0	0	0	4.5	0	0	0	4.5	11.8	83.7	0	0	95.5	0	0	0	0	0	
Unshifted	0	0	0	0	0	418	0	0	0	418	1106	7823	0	0	8929	0	0	0	0	0	9347
% Unshifted	0	0	0	0	0	100	0	0	0	100	100	100	0	0	100	0	0	0	0	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : AM_Kunia - Waipahu
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Start Date : 5/10/2012
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	KUNIA From North					WAIPAHU From East					KUNIA From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Leolua - Thru	Kunia NB - Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	0	0	0	0	27	0	0	0	27	87	**739**	0	0	**826**	0	0	0	0	0	**853**
07:00 AM	0	0	0	0	0	**48**	0	0	0	**48**	97	682	0	0	779	0	0	0	0	0	827
07:15 AM	0	0	0	0	0	29	0	0	0	29	105	695	0	0	800	0	0	0	0	0	829
07:30 AM	0	0	0	0	0	40	0	0	0	40	**106**	641	0	0	747	0	0	0	0	0	787
Total Volume	0	0	0	0	0	144	0	0	0	144	395	2757	0	0	3152	0	0	0	0	0	3296
% App. Total	0	0	0	0		100	0	0	0		12.5	87.5	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.750	.000	.000	.000	.750	.932	.933	.000	.000	.954	.000	.000	.000	.000	.000	.966

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File Name : AM_Fort Weaver - Laulaunui
Site Code : 00000000
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Groups Printed- Unshifted

	FORT WEAVER From North					LAULAUNUI From East					FORT WEAVER From South					LAULAUNUI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	10	171	3	0	184	58	0	7	0	65	2	836	0	0	838	0	4	1	0	5	1092
Total	10	171	3	0	184	58	0	7	0	65	2	836	0	0	838	0	4	1	0	5	1092
06:00 AM	14	212	11	0	237	62	0	6	0	68	8	782	1	0	791	3	5	4	0	12	1108
06:15 AM	13	287	9	0	309	48	0	4	0	52	7	992	3	0	1002	2	2	1	1	6	1369
06:30 AM	12	306	12	0	330	38	0	7	0	45	2	794	1	2	799	3	4	5	0	12	1186
06:45 AM	24	376	10	0	410	52	0	13	0	65	6	894	6	0	906	1	6	6	3	16	1397
Total	63	1181	42	0	1286	200	0	30	0	230	23	3462	11	2	3498	9	17	16	4	46	5060
07:00 AM	18	328	9	0	355	49	0	22	0	71	8	777	4	5	794	2	3	3	0	8	1228
07:15 AM	28	385	11	0	424	34	3	25	0	62	10	890	7	2	909	2	5	5	0	12	1407
07:30 AM	28	310	18	0	356	41	1	21	0	63	14	795	7	3	819	5	5	7	0	17	1255
07:45 AM	34	299	20	0	353	31	2	12	0	45	15	748	11	1	775	2	6	5	1	14	1187
Total	108	1322	58	0	1488	155	6	80	0	241	47	3210	29	11	3297	11	19	20	1	51	5077
08:00 AM	53	275	10	0	338	30	0	7	0	37	8	659	8	1	676	2	7	11	1	21	1072
08:15 AM	41	300	20	0	361	31	1	3	0	35	7	642	9	1	659	4	4	11	1	20	1075
Grand Total	275	3249	133	0	3657	474	7	127	0	608	87	8809	57	15	8968	26	51	59	7	143	13376
Apprch %	7.5	88.8	3.6	0		78	1.2	20.9	0		1	98.2	0.6	0.2		18.2	35.7	41.3	4.9		
Total %	2.1	24.3	1	0	27.3	3.5	0.1	0.9	0	4.5	0.7	65.9	0.4	0.1	67	0.2	0.4	0.4	0.1	1.1	

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File Name : AM_Fort Weaver - Laulaunui
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	FORT WEAVER From North					LAULAUNUI From East					FORT WEAVER From South					LAULAUNUI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	24	376	10	0	410	**52**	0	13	0	65	6	**894**	6	0	906	1	**6**	6	**3**	16	1397
07:00 AM	18	328	9	0	355	49	0	22	0	**71**	8	777	4	**5**	794	2	3	3	0	8	1228
07:15 AM	**28**	**385**	11	0	**424**	34	**3**	**25**	0	62	10	890	**7**	2	**909**	2	5	5	0	12	**1407**
07:30 AM	28	310	**18**	0	356	41	1	21	0	63	**14**	795	7	3	819	**5**	5	**7**	0	**17**	1255
Total Volume	98	1399	48	0	1545	176	4	81	0	261	38	3356	24	10	3428	10	19	21	3	53	5287
% App. Total	6.3	90.6	3.1	0		67.4	1.5	31	0		1.1	97.9	0.7	0.3		18.9	35.8	39.6	5.7		
PHF	.875	.908	.667	.000	.911	.846	.333	.810	.000	.919	.679	.938	.857	.500	.943	.500	.792	.750	.250	.779	.939

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File Name : AM_Fort Weaver - Aawa
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	FORT WEAVER From North					AAWA From East					FORT WEAVER From South						AAWA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	U-Turns	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	1	166	2	0	169	47	2	8	0	57	6	818	2	2	2	830	4	3	0	1	8	1064
Total	1	166	2	0	169	47	2	8	0	57	6	818	2	2	2	830	4	3	0	1	8	1064
06:00 AM	1	215	5	0	221	56	6	8	0	70	3	749	6	2	2	762	2	4	4	0	10	1063
06:15 AM	3	290	9	0	302	59	3	4	2	68	5	862	6	4	5	882	3	0	0	0	3	1255
06:30 AM	1	306	8	0	315	69	3	12	0	84	6	691	4	3	4	708	7	4	0	0	11	1118
06:45 AM	0	341	8	0	349	45	3	20	0	68	4	846	7	3	4	864	7	3	0	0	10	1291
Total	5	1152	30	0	1187	229	15	44	2	290	18	3148	23	12	15	3216	19	11	4	0	34	4727
07:00 AM	0	359	12	0	371	41	2	27	0	70	9	770	2	2	3	786	15	3	1	0	19	1246
07:15 AM	1	418	5	0	424	30	5	32	0	67	8	788	6	9	2	813	8	3	0	0	11	1315
07:30 AM	0	333	15	0	348	42	3	36	0	81	20	748	10	6	3	787	16	1	0	0	17	1233
07:45 AM	2	277	13	0	292	29	4	14	2	49	22	772	19	21	2	836	10	2	0	0	12	1189
Total	3	1387	45	0	1435	142	14	109	2	267	59	3078	37	38	10	3222	49	9	1	0	59	4983
08:00 AM	1	276	11	0	288	21	4	5	0	30	21	653	6	11	1	692	4	5	1	0	10	1020
08:15 AM	0	310	14	0	324	39	1	5	0	45	6	644	4	11	0	665	7	1	0	0	8	1042
Grand Total		3291	102	0	3403	478	36	171	4	689	110	8341	72	74	28	8625	83	29	6	1	119	12836
Apprch %	0.3	96.7	3	0		69.4	5.2	24.8	0.6		1.3	96.7	0.8	0.9	0.3		69.7	24.4	5	0.8		
Total %	0.1	25.6	0.8	0	26.5	3.7	0.3	1.3	0	5.4	0.9	65	0.6	0.6	0.2	67.2	0.6	0.2	0	0	0.9	

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	FORT WEAVER From North					AAWA From East					FORT WEAVER From South						AAWA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	U-Turns	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 06:45 AM																						
06:45 AM	0	341	8	0	349	**45**	3	20	0	68	4	**846**	7	3	**4**	**864**	7	**3**	0	0	10	1291
07:00 AM	0	359	12	0	371	41	2	27	0	70	9	770	2	2	3	786	15	3	**1**	0	**19**	1246
07:15 AM	**1**	**418**	5	0	**424**	30	**5**	32	0	67	8	788	6	**9**	2	813	8	3	0	0	11	**1315**
07:30 AM	0	333	**15**	0	348	42	3	**36**	0	**81**	**20**	748	**10**	6	3	787	**16**	1	0	0	17	1233
Total Volume	1	1451	40	0	1492	158	13	115	0	286	41	3152	25	20	12	3250	46	10	1	0	57	5085
% App. Total		97.3				55.2		40.2									80.7	17.5				
PHF	.250	.868	.667	.000	.880	.878	.650	.799	.000	.883	.513	.931	.625	.556	.750	.940	.719	.833	.250	.000	.750	.967

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File Name : AM_Fort Weaver - Hale O Ulu School X-walk
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	FORT WEAVER From North					From East					FORT WEAVER From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	183	0	0	183	0	0	0	0	0	0	764	0	1	765	0	0	0	0	0	948
Total	0	183	0	0	183	0	0	0	0	0	0	764	0	1	765	0	0	0	0	0	948
06:00 AM	0	225	0	0	225	0	0	0	0	0	0	836	0	2	838	0	0	0	0	0	1063
06:15 AM	0	316	0	0	316	0	0	0	0	0	0	777	0	0	777	0	0	0	0	0	1093
06:30 AM	0	353	0	0	353	0	0	0	0	0	0	712	0	3	715	0	0	0	0	0	1068
06:45 AM	0	383	0	0	383	0	0	0	0	0	0	871	0	0	871	0	0	0	0	0	1254
Total	0	1277	0	0	1277	0	0	0	0	0	0	3196	0	5	3201	0	0	0	0	0	4478
07:00 AM	0	437	0	0	437	0	0	0	0	0	0	905	0	3	908	0	0	0	0	0	1345
07:15 AM	0	430	0	0	430	0	0	0	0	0	0	755	0	2	757	0	0	0	0	0	1187
07:30 AM	0	353	0	0	353	0	0	0	0	0	0	800	0	3	803	0	0	0	0	0	1156
07:45 AM	0	333	0	0	333	0	0	0	0	0	0	789	0	4	793	0	0	0	0	0	1126
Total	0	1553	0	0	1553	0	0	0	0	0	0	3249	0	12	3261	0	0	0	0	0	4814
08:00 AM	0	287	0	0	287	0	0	0	0	0	0	669	0	2	671	0	0	0	0	0	958
08:15 AM	0	320	0	0	320	0	0	0	0	0	0	616	0	0	616	0	0	0	0	0	936
Grand Total	0	3620	0	0	3620	0	0	0	0	0	0	8494	0	20	8514	0	0	0	0	0	12134
Apprch %	0	100	0	0		0	0	0	0		0	99.8	0	0.2		0	0	0	0		
Total %	0	29.8	0	0	29.8	0	0	0	0	0	0	70	0	0.2	70.2	0	0	0	0	0	

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	FORT WEAVER From North					From East					FORT WEAVER From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	383	0	0	383	0	0	0	0	0	0	871	0	0	871	0	0	0	0	0	1254
07:00 AM	0	**437**	0	0	**437**	0	0	0	0	0	0	**905**	0	**3**	**908**	0	0	0	0	0	**1345**
07:15 AM	0	430	0	0	430	0	0	0	0	0	0	755	0	2	757	0	0	0	0	0	1187
07:30 AM	0	353	0	0	353	0	0	0	0	0	0	800	0	3	803	0	0	0	0	0	1156
Total Volume	0	1603	0	0	1603	0	0	0	0	0	0	3331	0	8	3339	0	0	0	0	0	4942
% App. Total	0	100	0	0		0	0	0	0		0	99.8	0	0.2		0	0	0	0		
PHF	.000	.917	.000	.000	.917	.000	.000	.000	.000	.000	.000	.920	.000	.667	.919	.000	.000	.000	.000	.000	.919

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File Name : AM_Fort Weaver - Renton THANH
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	FORT WEAVER From North						RENTON From East					FORT WEAVER From South					RENTON From West					
Start Time	Right	Thru	U-Turns	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	22	131	20	2	0	175	0	2	0	7	9	1	663	14	5	683	2	3	104	0	109	976
Total	22	131	20	2	0	175	0	2	0	7	9	1	663	14	5	683	2	3	104	0	109	976
06:00 AM	31	182	13	1	0	227	1	3	2	9	15	11	708	8	8	735	6	6	107	0	119	1096
06:15 AM	45	255	16	2	0	318	10	10	12	9	41	11	701	22	6	740	6	3	87	0	96	1195
06:30 AM	38	276	16	3	0	333	1	2	1	10	14	1	701	23	3	728	10	1	108	0	119	1194
06:45 AM	51	312	15	0	0	378	1	0	2	8	11	4	767	27	6	804	9	0	95	0	104	1297
Total	165	1025	60	6	0	1256	13	15	17	36	81	27	2877	80	23	3007	31	10	397	0	438	4782
07:00 AM	63	329	9	1	0	402	0	3	0	8	11	2	710	23	13	748	20	4	114	0	138	1299
07:15 AM	59	374	9	1	0	443	3	4	2	4	13	3	833	59	7	902	46	0	77	1	124	1482
07:30 AM	59	346	14	1	0	420	0	0	2	11	13	2	702	65	17	786	46	1	119	1	167	1386
07:45 AM	48	243	14	1	0	306	0	1	2	2	5	2	677	51	6	736	28	4	113	0	145	1192
Total	229	1292	46	4	0	1571	3	8	6	25	42	9	2922	198	43	3172	140	9	423	2	574	5359
08:00 AM	33	261	11	3	0	308	4	2	1	7	14	3	593	40	7	643	18	2	112	1	133	1098
08:15 AM	48	260	30	2	0	340	2	0	2	4	8	1	559	15	4	579	13	0	57	3	73	1000
Grand Total		2969	167	17	0	3650	22	27	26	79	154	41	7614	347	82	8084	204	24	1093	6	1327	13215
Apprch %	13.6	81.3	4.6	0.5	0		14.3	17.5	16.9	51.3		0.5	94.2	4.3	1		15.4	1.8	82.4	0.5		
Total %	3.8	22.5	1.3	0.1	0	27.6	0.2	0.2	0.2	0.6	1.2	0.3	57.6	2.6	0.6	61.2	1.5	0.2	8.3	0	10	

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	FORT WEAVER From North						RENTON From East					FORT WEAVER From South					RENTON From West					
Start Time	Right	Thru	U-Turns	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 06:45 AM																						
06:45 AM	51	312	**15**	0	0	378	1	0	**2**	8	11	**4**	767	27	6	804	9	0	95	0	104	1297
07:00 AM	**63**	329	9	**1**	0	402	0	3	0	8	11	2	710	23	13	748	20	**4**	114	0	138	1299
07:15 AM	59	**374**	9	1	0	**443**	**3**	**4**	2	4	**13**	3	**833**	59	7	**902**	**46**	0	77	**1**	124	**1482**
07:30 AM	59	346	14	1	0	420	0	0	2	**11**	13	2	702	**65**	**17**	786	46	1	**119**	1	**167**	1386
Total Volume	232	1361	47	3	0	1643	4	7	6	31	48	11	3012	174	43	3240	121	5	405	2	533	5464
% App. Total	14.1	82.8						14.6	12.5	64.6							22.7					
PHF	.921	.910	.783	.750	.000	.927	.333	.438	.750	.705	.923	.688	.904	.669	.632	.898	.658	.313	.851	.500	.798	.922

Austin Tsutsumi & Associates

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File Name : AM_Fort Weaver - Kolowaka
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Groups Printed- Unshifted - Bank 1

	FORT WEAVER From North					KOLOWAKA From East					FORT WEAVER From South					KOLOWAKA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	18	126	22	0	166	128	3	2	1	134	0	418	0	8	426	5	7	146	0	158	884
06:15 AM	11	167	46	0	224	126	4	1	0	131	0	522	3	2	527	10	2	159	0	171	1053
06:30 AM	6	232	48	0	286	134	8	2	2	146	0	412	4	10	426	18	14	152	0	184	1042
06:45 AM	21	204	49	0	274	139	13	1	2	155	0	428	3	7	438	10	11	168	0	189	1056
Total	56	729	165	0	950	527	28	6	5	566	0	1780	10	27	1817	43	34	625	0	702	4035
07:00 AM	5	261	43	0	309	107	13	1	1	122	0	502	9	1	512	11	7	152	0	170	1113
07:15 AM	11	251	61	0	323	124	32	6	1	163	0	459	6	3	468	14	11	112	1	138	1092
07:30 AM	7	192	76	0	275	120	20	5	2	147	1	464	13	1	479	15	18	122	1	156	1057
07:45 AM	15	151	40	0	206	147	24	1	5	177	0	401	10	1	412	8	12	124	0	144	939
Total	38	855	220	0	1113	498	89	13	9	609	1	1826	38	6	1871	48	48	510	2	608	4201
08:00 AM	30	199	25	0	254	82	5	0	4	91	0	435	0	2	437	12	5	96	0	113	895
08:15 AM	23	213	51	0	287	106	2	4	0	112	0	379	4	1	384	9	6	80	0	95	878
Grand Total	147	1996	461	0	2604	1213	124	23	18	1378	1	4420	52	36	4509	112	93	1311	2	1518	10009
Apprch %	5.6	76.7	17.7	0		88	9	1.7	1.3		0	98	1.2	0.8		7.4	6.1	86.4	0.1		
Total %	1.5	19.9	4.6	0	26	12.1	1.2	0.2	0.2	13.8	0	44.2	0.5	0.4	45	1.1	0.9	13.1	0	15.2	
Unshifted	147	1996	461	0	2604	1213	124	23	18	1378	1	4420	52	36	4509	112	93	1311	2	1518	10009
% Unshifted	100	100	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Austin Tsutsumi & Associates

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File Name : AM_Fort Weaver - Kolowaka
Site Code : 00000000
Start Date : 5/10/2012
Page No : 2

	FORT WEAVER From North					KOLOWAKA From East					FORT WEAVER From South					KOLOWAKA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	**21**	204	49	0	274	**139**	13	1	**2**	155	0	428	3	**7**	438	10	11	**168**	0	**189**	1056
07:00 AM	5	**261**	43	0	309	107	13	1	1	122	0	**502**	9	1	**512**	11	7	152	0	170	**1113**
07:15 AM	11	251	61	0	**323**	124	**32**	**6**	1	**163**	0	459	6	3	468	14	11	112	**1**	138	1092
07:30 AM	7	192	**76**	0	275	120	20	5	2	147	**1**	464	**13**	1	479	**15**	**18**	122	1	156	1057
Total Volume	44	908	229	0	1181	490	78	13	6	587	1	1853	31	12	1897	50	47	554	2	653	4318
% App. Total	3.7	76.9	19.4	0		83.5	13.3	2.2	1		0.1	97.7	1.6	0.6		7.7	7.2	84.8	0.3		
PHF	.524	.870	.753	.000	.914	.881	.609	.542	.750	.900	.250	.923	.596	.429	.926	.833	.653	.824	.500	.864	.970

Austin Tsutsumi & Associates

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File Name : AM_Fort Weaver - Geiger
Site Code : 00000000
Start Date : 5/10/2012
Page No : 1

Groups Printed- Unshifted - Bank 1

	FORT WEAVER From North					GEIGER From East					FORT WEAVER From South					GEIGER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	34	174	39	0	247	67	56	0	0	123	1	330	16	6	353	13	28	47	2	90	813
06:45 AM	31	153	27	0	211	62	47	11	1	121	0	286	21	7	314	28	36	59	2	125	771
Total	65	327	66	0	458	129	103	11	1	244	1	616	37	13	667	41	64	106	4	215	1584
07:00 AM	31	183	34	0	248	83	52	12	2	149	13	310	13	1	337	33	25	64	0	122	856
07:15 AM	28	256	37	0	321	49	54	25	6	134	5	342	43	13	403	36	37	50	6	129	987
07:30 AM	20	191	45	0	256	71	67	41	1	180	16	329	65	3	413	45	35	52	1	133	982
07:45 AM	24	153	37	0	214	33	60	15	3	111	1	293	54	6	354	29	29	71	0	129	808
Total	103	783	153	0	1039	236	233	93	12	574	35	1274	175	23	1507	143	126	237	7	513	3633
08:00 AM	38	135	36	0	209	48	45	2	2	97	8	206	26	14	254	14	23	87	6	130	690
08:15 AM	35	131	30	0	196	38	28	5	2	73	3	219	26	11	259	12	22	99	1	134	662
Grand Total	241	1376	285	0	1902	451	409	111	17	988	47	2315	264	61	2687	210	235	529	18	992	6569
Apprch %	12.7	72.3	15	0		45.6	41.4	11.2	1.7		1.7	86.2	9.8	2.3		21.2	23.7	53.3	1.8		
Total %	3.7	20.9	4.3	0	29	6.9	6.2	1.7	0.3	15	0.7	35.2	4	0.9	40.9	3.2	3.6	8.1	0.3	15.1	
Unshifted	241	1376	285	0	1902	451	409	111	17	988	47	2315	264	61	2687	210	235	529	18	992	6569
% Unshifted	100	100	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : AM_Fort Weaver - Geiger
Site Code : 00000000
Start Date : 5/10/2012
Page No : 2

	FORT WEAVER From North					GEIGER From East					FORT WEAVER From South					GEIGER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	**31**	153	27	0	211	62	47	11	1	121	0	286	21	7	314	28	36	59	2	125	771
07:00 AM	31	183	34	0	248	**83**	52	12	2	149	13	310	13	1	337	33	25	**64**	0	122	856
07:15 AM	28	**256**	37	0	**321**	49	54	25	**6**	134	5	**342**	43	**13**	403	36	**37**	50	**6**	129	**987**
07:30 AM	20	191	**45**	0	256	71	**67**	**41**	1	**180**	**16**	329	**65**	3	**413**	**45**	35	52	1	**133**	982
Total Volume	110	783	143	0	1036	265	220	89	10	584	34	1267	142	24	1467	142	133	225	9	509	3596
% App. Total	10.6	75.6	13.8	0		45.4	37.7	15.2	1.7		2.3	86.4	9.7	1.6		27.9	26.1	44.2	1.8		
PHF	.887	.765	.794	.000	.807	.798	.821	.543	.417	.811	.531	.926	.546	.462	.888	.789	.899	.879	.375	.957	.911

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501 Sumner St. Ste. 521
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File Name : AM_Farrington - Old Fort Weaver (West)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	OLD FORT WEAVER From North					FARRINGTON From East					OLD FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	0	0	0	0	0	21	1	0	22	0	0	4	0	4	5	102	0	0	107	133
Total	0	0	0	0	0	0	21	1	0	22	0	0	4	0	4	5	102	0	0	107	133
06:00 AM	0	0	0	0	0	0	23	3	0	26	0	0	4	0	4	5	115	0	0	120	150
06:15 AM	0	0	0	0	0	0	38	2	0	40	1	0	10	0	11	6	133	0	0	139	190
06:30 AM	0	0	0	0	0	0	41	0	0	41	3	0	6	0	9	3	151	0	0	154	204
06:45 AM	0	0	0	0	0	0	42	0	0	42	1	0	6	0	7	6	137	0	0	143	192
Total	0	0	0	0	0	0	144	5	0	149	5	0	26	0	31	20	536	0	0	556	736
07:00 AM	0	0	0	0	0	0	52	1	0	53	2	0	7	0	9	5	134	0	0	139	201
07:15 AM	0	0	0	0	0	0	64	1	0	65	1	0	10	0	11	10	116	0	0	126	202
07:30 AM	0	0	0	0	0	0	62	4	0	66	0	0	2	0	2	10	99	0	0	109	177
07:45 AM	0	0	0	0	0	0	54	3	0	57	2	0	6	0	8	18	96	0	0	114	179
Total	0	0	0	0	0	0	232	9	0	241	5	0	25	0	30	43	445	0	0	488	759
08:00 AM	0	0	0	0	0	0	47	1	0	48	2	0	4	0	6	13	69	0	0	82	136
08:15 AM	0	0	0	0	0	0	45	5	0	50	2	0	3	0	5	3	70	0	0	73	128
Grand Total	0	0	0	0	0	0	489	21	0	510	14	0	62	0	76	84	1222	0	0	1306	1892
Apprch %	0	0	0	0		0	95.9	4.1	0		18.4	0	81.6	0		6.4	93.6	0	0		
Total %	0	0	0	0	0	0	25.8	1.1	0	27	0.7	0	3.3	0	4	4.4	64.6	0	0	69	

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501 Sumner St. Ste. 521
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File Name : AM_Farrington - Old Fort Weaver (West)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	OLD FORT WEAVER From North					FARRINGTON From East					OLD FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	0	0	0	0	0	42	0	0	42	1	0	6	0	7	6	**137**	0	0	**143**	192
07:00 AM	0	0	0	0	0	0	52	1	0	53	**2**	0	7	0	9	5	134	0	0	139	201
07:15 AM	0	0	0	0	0	0	**64**	1	0	65	1	0	**10**	0	**11**	**10**	116	0	0	126	**202**
07:30 AM	0	0	0	0	0	0	62	**4**	0	**66**	0	0	2	0	2	10	99	0	0	109	177
Total Volume	0	0	0	0	0	0	220	6	0	226	4	0	25	0	29	31	486	0	0	517	772
% App. Total	0	0	0	0		0	97.3	2.7	0		13.8	0	86.2	0		6	94	0	0		
PHF	.000	.000	.000	.000	.000	.000	.859	.375	.000	.856	.500	.000	.625	.000	.659	.775	.887	.000	.000	.904	.955

Austin Tsutsumi & Asscociates

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File Name : AM_Farrington - Weaver (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	WEAVER From North					FARRINGTON From East					WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	0	0	0	0	0	19	9	1	29	10	0	0	0	10	0	108	0	0	108	147
Total	0	0	0	0	0	0	19	9	1	29	10	0	0	0	10	0	108	0	0	108	147
06:00 AM	0	0	0	0	0	0	32	18	0	50	12	0	0	0	12	0	130	0	0	130	192
06:15 AM	0	0	0	0	0	0	45	22	0	67	6	0	0	0	6	0	138	0	0	138	211
06:30 AM	0	0	0	0	0	0	31	12	0	43	12	0	0	0	12	0	139	0	0	139	194
06:45 AM	0	0	0	0	0	0	43	7	0	50	7	0	0	0	7	0	149	0	0	149	206
Total	0	0	0	0	0	0	151	59	0	210	37	0	0	0	37	0	556	0	0	556	803
07:00 AM	0	0	0	0	0	0	62	15	0	77	18	0	0	0	18	0	132	0	0	132	227
07:15 AM	0	0	0	0	0	0	70	13	0	83	5	0	0	0	5	0	107	0	0	107	195
07:30 AM	0	0	0	0	0	0	60	10	0	70	7	0	0	0	7	0	99	0	0	99	176
07:45 AM	0	0	0	0	0	0	49	20	0	69	20	0	0	0	20	0	93	0	0	93	182
Total	0	0	0	0	0	0	241	58	0	299	50	0	0	0	50	0	431	0	0	431	780
08:00 AM	0	0	0	0	0	0	43	15	0	58	11	0	0	0	11	0	77	0	0	77	146
08:15 AM	0	0	0	0	0	0	49	15	0	64	9	0	0	0	9	0	64	0	0	64	137
Grand Total	0	0	0	0	0	0	503	156	1	660	117	0	0	0	117	0	1236	0	0	1236	2013
Apprch %	0	0	0	0		0	76.2	23.6	0.2		100	0	0	0		0	100	0	0		
Total %	0	0	0	0	0	0	25	7.7	0	32.8	5.8	0	0	0	5.8	0	61.4	0	0	61.4	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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File Name : AM_Farrington - Weaver (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	WEAVER From North					FARRINGTON From East					WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	0	0	0	0	0	43	7	0	50	7	0	0	0	7	0	**149**	0	0	**149**	206
07:00 AM	0	0	0	0	0	0	62	**15**	0	77	**18**	0	0	0	**18**	0	132	0	0	132	**227**
07:15 AM	0	0	0	0	0	0	**70**	13	0	**83**	5	0	0	0	5	0	107	0	0	107	195
07:30 AM	0	0	0	0	0	0	60	10	0	70	7	0	0	0	7	0	99	0	0	99	176
Total Volume	0	0	0	0	0	0	235	45	0	280	37	0	0	0	37	0	487	0	0	487	804
% App. Total	0	0	0	0		0	83.9	16.1	0		100	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.839	.750	.000	.843	.514	.000	.000	.000	.514	.000	.817	.000	.000	.817	.885

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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File Name : AM_Weaver (E) - Old Fort Weaver (W) Q.ANH
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	OLD FORT WEAVER From North					WEAVER From East					OLD FORT WEAVER From South					WEAVER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	5	0	0	5	1	2	6	0	9	8	4	1	0	13	0	0	0	0	0	27
Total	0	5	0	0	5	1	2	6	0	9	8	4	1	0	13	0	0	0	0	0	27
06:00 AM	2	1	2	0	5	1	3	6	0	10	10	4	2	0	16	0	0	0	0	0	31
06:15 AM	1	2	0	0	3	6	3	14	0	23	3	12	0	0	15	0	0	0	0	0	41
06:30 AM	0	3	1	0	4	6	1	5	0	12	9	4	0	0	13	0	0	0	0	0	29
06:45 AM	0	5	3	0	8	3	0	6	0	9	8	6	0	0	14	0	0	0	0	0	31
Total	3	11	6	0	20	16	7	31	0	54	30	26	2	0	58	0	0	0	0	0	132
07:00 AM	0	4	5	0	9	2	0	11	0	13	10	4	0	0	14	0	0	0	0	0	36
07:15 AM	0	6	2	0	8	3	0	9	0	12	7	11	1	0	19	0	0	0	0	0	39
07:30 AM	0	6	5	0	11	1	1	7	0	9	3	3	3	0	9	0	0	0	0	0	29
07:45 AM	10	9	1	0	20	1	1	7	0	9	14	7	8	0	29	0	0	0	0	0	58
Total	10	25	13	0	48	7	2	34	0	43	34	25	12	0	71	0	0	0	0	0	162
08:00 AM	2	7	0	0	9	2	0	10	0	12	11	6	1	0	18	0	0	0	0	0	39
08:15 AM	1	3	0	0	4	4	0	11	0	15	6	2	0	0	8	0	0	0	0	0	27
Grand Total	16	51	19	0	86	30	11	92	0	133	89	63	16	0	168	0	0	0	0	0	387
Apprch %	18.6	59.3	22.1	0		22.6	8.3	69.2	0		53	37.5	9.5	0		0	0	0	0		
Total %	4.1	13.2	4.9	0	22.2	7.8	2.8	23.8	0	34.4	23	16.3	4.1	0	43.4	0	0	0	0	0	

Austin Tsutsumi & Asscociates

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File Name : AM_Weaver (E) - Old Fort Weaver (W) Q.ANH
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	OLD FORT WEAVER From North					WEAVER From East					OLD FORT WEAVER From South					WEAVER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	5	3	0	8	**3**	0	6	0	9	8	6	0	0	14	0	0	0	0	0	31
07:00 AM	0	4	**5**	0	9	2	0	**11**	0	**13**	**10**	4	0	0	14	0	0	0	0	0	36
07:15 AM	0	**6**	2	0	8	3	0	9	0	12	7	**11**	1	0	**19**	0	0	0	0	0	**39**
07:30 AM	0	6	5	0	**11**	1	**1**	7	0	9	3	3	**3**	0	9	0	0	0	0	0	29
Total Volume	0	21	15	0	36	9	1	33	0	43	28	24	4	0	56	0	0	0	0	0	135
% App. Total	0	58.3	41.7	0		20.9	2.3	76.7	0		50	42.9	7.1	0		0	0	0	0		
PHF	.000	.875	.750	.000	.818	.750	.250	.750	.000	.827	.700	.545	.333	.000	.737	.000	.000	.000	.000	.000	.865

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 533-3646

File Name : AM_Fort Weaver Ramps (West)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	4	0	0	0	4	0	7	16	0	23	46	0	0	0	46	1	46	0	0	47	120
Total	4	0	0	0	4	0	7	16	0	23	46	0	0	0	46	1	46	0	0	47	120
06:00 AM	15	0	0	0	15	0	42	23	0	65	77	0	0	0	77	7	117	0	0	124	281
06:15 AM	29	0	0	0	29	0	49	24	0	73	96	0	0	0	96	8	131	0	0	139	337
06:30 AM	8	0	0	0	8	0	49	50	0	99	96	0	0	0	96	3	139	0	0	142	345
06:45 AM	6	0	0	0	6	0	38	68	0	106	129	0	0	0	129	4	144	0	0	148	389
Total	58	0	0	0	58	0	178	165	0	343	398	0	0	0	398	22	531	0	0	553	1352
07:00 AM	8	0	0	0	8	0	57	81	0	138	111	0	0	0	111	2	140	0	0	142	399
07:15 AM	11	0	0	0	11	0	69	59	0	128	167	0	0	0	167	2	112	0	0	114	420
07:30 AM	13	0	0	0	13	0	68	68	0	136	189	0	0	0	189	7	105	0	0	112	450
07:45 AM	11	0	0	0	11	0	66	80	0	146	175	0	0	0	175	9	108	0	0	117	449
Total	43	0	0	0	43	0	260	288	0	548	642	0	0	0	642	20	465	0	0	485	1718
08:00 AM	10	0	0	0	10	0	59	87	0	146	158	0	0	0	158	7	101	0	0	108	422
08:15 AM	11	0	0	0	11	0	66	87	0	153	135	0	0	0	135	6	69	0	0	75	374
Grand Total	126	0	0	0	126	0	570	643	0	1213	1379	0	0	0	1379	56	1212	0	0	1268	3986
Apprch %	100	0	0	0		0	47	53	0		100	0	0	0		4.4	95.6	0	0		
Total %	3.2	0	0	0	3.2	0	14.3	16.1	0	30.4	34.6	0	0	0	34.6	1.4	30.4	0	0	31.8	

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File Name : AM_Fort Weaver Ramps (West)
Site Code : 00000000
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Page No : 2

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	6	0	0	0	6	0	38	68	0	106	129	0	0	0	129	4	**144**	0	0	**148**	389
07:00 AM	8	0	0	0	8	0	57	**81**	0	**138**	111	0	0	0	111	2	140	0	0	142	399
07:15 AM	11	0	0	0	11	0	**69**	59	0	128	167	0	0	0	167	2	112	0	0	114	420
07:30 AM	**13**	0	0	0	**13**	0	68	68	0	136	**189**	0	0	0	**189**	**7**	105	0	0	112	**450**
Total Volume	38	0	0	0	38	0	232	276	0	508	596	0	0	0	596	15	501	0	0	516	1658
% App. Total	100	0	0	0		0	45.7	54.3	0		100	0	0	0		2.9	97.1	0	0		
PHF	.731	.000	.000	.000	.731	.000	.841	.852	.000	.920	.788	.000	.000	.000	.788	.536	.870	.000	.000	.872	.921

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File Name : AM_Fort Weaver Ramps (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
05:45 AM	0	0	0	0	0	16	47	0	0	63	165	0	0	0	165	0	153	30	0	183	411
Total	0	0	0	0	0	16	47	0	0	63	165	0	0	0	165	0	153	30	0	183	411
06:00 AM	0	0	0	0	0	18	61	0	0	79	230	0	0	0	230	0	144	48	0	192	501
06:15 AM	0	0	0	0	0	30	88	0	0	118	227	0	0	0	227	0	179	60	0	239	584
06:30 AM	0	0	0	0	0	30	93	0	0	123	165	0	0	0	165	0	193	60	0	253	541
06:45 AM	0	0	0	0	0	35	119	0	0	154	182	0	0	0	182	0	218	57	0	275	611
Total	0	0	0	0	0	113	361	0	0	474	804	0	0	0	804	0	734	225	0	959	2237
07:00 AM	0	0	0	0	0	31	143	0	0	174	182	0	0	0	182	0	193	56	0	249	605
07:15 AM	0	0	0	0	0	38	131	0	0	169	176	0	1	0	177	0	197	68	0	265	611
07:30 AM	0	0	0	0	0	43	136	0	0	179	186	0	0	0	186	0	213	59	0	272	637
07:45 AM	0	0	0	0	0	50	125	0	0	175	179	0	0	0	179	0	195	57	0	252	606
Total	0	0	0	0	0	162	535	0	0	697	723	0	1	0	724	0	798	240	0	1038	2459
08:00 AM	0	0	0	0	0	64	143	0	0	207	178	0	0	0	178	0	203	49	0	252	637
08:15 AM	0	0	0	0	0	75	149	0	0	224	140	0	0	0	140	0	154	29	0	183	547
Grand Total	0	0	0	0	0	430	1235	0	0	1665	2010	0	1	0	2011	0	2042	573	0	2615	6291
Apprch %	0	0	0	0		25.8	74.2	0	0		100	0	0	0		0	78.1	21.9	0		
Total %	0	0	0	0	0	6.8	19.6	0	0	26.5	32	0	0	0	32	0	32.5	9.1	0	41.6	

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File Name : AM_Fort Weaver Ramps (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	0	0	0	0	35	119	0	0	154	182	0	0	0	182	0	**218**	57	0	**275**	611
07:00 AM	0	0	0	0	0	31	**143**	0	0	174	182	0	0	0	182	0	193	56	0	249	605
07:15 AM	0	0	0	0	0	38	131	0	0	169	176	0	**1**	0	177	0	197	**68**	0	265	611
07:30 AM	0	0	0	0	0	**43**	136	0	0	**179**	**186**	0	0	0	**186**	0	213	59	0	272	**637**
Total Volume	0	0	0	0	0	147	529	0	0	676	726	0	1	0	727	0	821	240	0	1061	2464
% App. Total	0	0	0	0		21.7	78.3	0	0		99.9	0	0.1	0		0	77.4	22.6	0		
PHF	.000	.000	.000	.000	.000	.855	.925	.000	.000	.944	.976	.000	.250	.000	.977	.000	.942	.882	.000	.965	.967

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501 Sumner Street Suite 521
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File Name : AM_Paiwa Interchange (North)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:15 AM	97	49	0	0	146	37	0	43	2	82	0	82	60	0	142	0	0	0	0	0	370
06:30 AM	145	92	0	0	237	38	0	46	1	85	0	105	71	0	176	0	0	0	0	0	498
06:45 AM	151	67	0	0	218	38	0	67	3	108	0	146	71	0	217	0	0	0	0	0	543
Total	393	208	0	0	601	113	0	156	6	275	0	333	202	0	535	0	0	0	0	0	1411
07:00 AM	139	92	0	0	231	34	0	66	2	102	0	154	67	0	221	0	0	0	0	0	554
07:15 AM	174	89	0	0	263	48	0	92	3	143	0	143	70	0	213	0	0	0	0	0	619
07:30 AM	151	84	0	1	236	54	0	85	6	145	0	154	68	0	222	0	0	0	0	0	603
07:45 AM	143	98	0	0	241	70	0	93	2	165	0	140	78	0	218	0	0	0	0	0	624
Total	607	363	0	1	971	206	0	336	13	555	0	591	283	0	874	0	0	0	0	0	2400
08:00 AM	126	78	0	0	204	62	0	91	3	156	0	89	59	0	148	0	0	0	0	0	508
Grand Total	1126	649	0	1	1776	381	0	583	22	986	0	1013	544	0	1557	0	0	0	0	0	4319
Apprch %	63.4	36.5	0	0.1		38.6	0	59.1	2.2		0	65.1	34.9	0		0	0	0	0		
Total %	26.1	15	0	0	41.1	8.8	0	13.5	0.5	22.8	0	23.5	12.6	0	36.1	0	0	0	0	0	

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File Name : AM_Paiwa Interchange (North)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	151	67	0	0	218	38	0	67	3	108	0	146	**71**	0	217	0	0	0	0	0	543
07:00 AM	139	**92**	0	0	231	34	0	66	2	102	0	**154**	67	0	221	0	0	0	0	0	554
07:15 AM	**174**	89	0	0	**263**	48	0	**92**	3	143	0	143	70	0	213	0	0	0	0	0	**619**
07:30 AM	151	84	0	**1**	236	**54**	0	85	**6**	**145**	0	154	68	0	**222**	0	0	0	0	0	603
Total Volume	615	332	0	1	948	174	0	310	14	498	0	597	276	0	873	0	0	0	0	0	2319
% App. Total	64.9	35	0	0.1		34.9	0	62.2	2.8		0	68.4	31.6	0		0	0	0	0		
PHF	.884	.902	.000	.250	.901	.806	.000	.842	.583	.859	.000	.969	.972	.000	.983	.000	.000	.000	.000	.000	.937

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File Name : AM_Paiwa Interchange (South)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	0	76	62	0	138	0	0	0	2	2	97	92	0	0	189	116	57	90	0	263	592
06:45 AM	0	79	58	0	137	0	0	0	7	7	81	136	0	0	217	114	25	107	0	246	607
Total	0	155	120	0	275	0	0	0	9	9	178	228	0	0	406	230	82	197	0	509	1199
07:00 AM	0	98	58	0	156	0	0	0	2	2	77	97	0	0	174	106	21	125	0	252	584
07:15 AM	0	116	72	0	188	0	0	0	4	4	115	121	0	0	236	102	18	125	0	245	673
07:30 AM	0	115	57	0	172	0	0	0	5	5	73	118	0	0	191	139	16	131	1	287	655
07:45 AM	0	128	64	0	192	0	0	0	3	3	86	120	0	0	206	110	9	120	0	239	640
Total	0	457	251	0	708	0	0	0	14	14	351	456	0	0	807	457	64	501	1	1023	2552
Grand Total	0	612	371	0	983	0	0	0	23	23	529	684	0	0	1213	687	146	698	1	1532	3751
Apprch %	0	62.3	37.7	0		0	0	0	100		43.6	56.4	0	0		44.8	9.5	45.6	0.1		
Total %	0	16.3	9.9	0	26.2	0	0	0	0.6	0.6	14.1	18.2	0	0	32.3	18.3	3.9	18.6	0	40.8	

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File Name : AM_Paiwa Interchange (South)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	79	58	0	137	0	0	0	**7**	**7**	81	**136**	0	0	217	114	**25**	107	0	246	607
07:00 AM	0	98	58	0	156	0	0	0	2	2	77	97	0	0	174	106	21	125	0	252	584
07:15 AM	0	**116**	**72**	0	**188**	0	0	0	4	4	**115**	121	0	0	**236**	102	18	125	0	245	**673**
07:30 AM	0	115	57	0	172	0	0	0	5	5	73	118	0	0	191	**139**	16	**131**	**1**	**287**	655
Total Volume	0	408	245	0	653	0	0	0	18	18	346	472	0	0	818	461	80	488	1	1030	2519
% App. Total	0	62.5	37.5	0		0	0	0	100		42.3	57.7	0	0		44.8	7.8	47.4	0.1		
PHF	.000	.879	.851	.000	.868	.000	.000	.000	.643	.643	.752	.868	.000	.000	.867	.829	.800	.931	.250	.897	.936

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File Name : AM_H-2 SB to H-1 WB & H-1 EB Zipper Lane
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	H-2 SB TO H-1 WB ON RAMP From North					H-1 WB From East					ZIPPER LANE EB From South					A From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:15 AM	0	279	0	0	279	0	858	0	0	858	0	307	0	0	307	0	0	0	0	0	1444
06:30 AM	0	258	0	0	258	0	953	0	0	953	0	346	0	0	346	0	0	0	0	0	1557
06:45 AM	0	249	0	0	249	0	812	0	0	812	0	277	0	0	277	0	0	0	0	0	1338
Total	0	786	0	0	786	0	2623	0	0	2623	0	930	0	0	930	0	0	0	0	0	4339
07:00 AM	0	251	0	0	251	0	844	0	0	844	0	204	0	0	204	0	0	0	0	0	1299
07:15 AM	0	301	0	0	301	0	839	0	0	839	0	185	0	0	185	0	0	0	0	0	1325
07:30 AM	0	274	0	0	274	0	849	0	0	849	0	109	0	0	109	0	0	0	0	0	1232
07:45 AM	0	212	0	0	212	0	855	0	0	855	0	91	0	0	91	0	0	0	0	0	1158
Total	0	1038	0	0	1038	0	3387	0	0	3387	0	589	0	0	589	0	0	0	0	0	5014
08:00 AM	0	184	0	0	184	0	856	0	0	856	0	84	0	0	84	0	0	0	0	0	1124
Grand Total	0	2008	0	0	2008	0	6866	0	0	6866	0	1603	0	0	1603	0	0	0	0	0	10477
Apprch %	0	100	0	0		0	100	0	0		0	100	0	0		0	0	0	0		
Total %	0	19.2	0	0	19.2	0	65.5	0	0	65.5	0	15.3	0	0	15.3	0	0	0	0	0	

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File Name : AM_H-2 SB to H-1 WB & H-1 EB Zipper Lane
Site Code : 00000000
Start Date : 4/3/2012
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	H-2 SB TO H-1 WB ON RAMP From North					H-1 WB From East					ZIPPER LANE EB From South					A From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	249	0	0	249	0	812	0	0	812	0	**277**	0	0	**277**	0	0	0	0	0	**1338**
07:00 AM	0	251	0	0	251	0	844	0	0	844	0	204	0	0	204	0	0	0	0	0	1299
07:15 AM	0	**301**	0	0	**301**	0	839	0	0	839	0	185	0	0	185	0	0	0	0	0	1325
07:30 AM	0	274	0	0	274	0	**849**	0	0	**849**	0	109	0	0	109	0	0	0	0	0	1232
Total Volume	0	1075	0	0	1075	0	3344	0	0	3344	0	775	0	0	775	0	0	0	0	0	5194
% App. Total	0	100	0	0		0	100	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.893	.000	.000	.893	.000	.985	.000	.000	.985	.000	.699	.000	.000	.699	.000	.000	.000	.000	.000	.970

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File Name : AM_H-1 EB to Kamehameha SB (Farrington)
Site Code : 00000000
Start Date : 4/3/2012
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Groups Printed- Unshifted

	A From North					H-1 From East					Farrington Hwy From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	308	0	0	0	308	308
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	320	0	0	0	320	320
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317	0	0	0	317	317
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	945	0	0	0	945	945
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	0	0	0	330	330
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	318	0	0	0	318	318
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317	0	0	0	317	317
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	276	0	0	0	276	276
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1241	0	0	0	1241	1241
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163	0	0	0	163	163
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2349	0	0	0	2349	2349
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		100	0	0	0		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100	

Austin, Tsutsumi & Associates

501 Sumner Street Suite 521
Honolulu, HI, Zip 96817
(808) 533-3646

File Name : AM_H-1 EB to Kamehameha SB (Farrington)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	A From North					H-1 From East					Farrington Hwy From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317	0	0	0	317	317
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**330**	0	0	0	**330**	**330**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	318	0	0	0	318	318
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317	0	0	0	317	317
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1282	0	0	0	1282	1282
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.971	.000	.000	.000	.971	.971

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File Name : AM_H-1 EB to Kamehameha NB Lp & H-1 EB to H-2 NB
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	H-2 From North					H-1 From East					Kamehameha NB LP From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	1	0	54	54
06:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	0	1	0	73	73
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	0	5	0	78	78
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	198	0	7	0	205	205
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	0	8	0	81	81
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	0	12	0	134	134
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144	0	33	0	177	177
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	162	0	25	0	187	187
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	501	0	78	0	579	579
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	143	0	36	0	179	179
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	842	0	121	0	963	963
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		87.4	0	12.6	0		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	87.4	0	12.6	0	100	

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File Name : AM_H-1 EB to Kamehameha NB Lp & H-1 EB to H-2 NB
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	H-2 From North					H-1 From East					Kamehameha NB LP From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	0	5	0	78	78
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	0	8	0	81	81
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	0	12	0	134	134
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**144**	0	**33**	0	**177**	**177**
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	412	0	58	0	470	470
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		87.7	0	12.3	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.715	.000	.439	.000	.664	.664

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File Name : AM_WB Kamehameha to H-1 WB On Ramp
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	H1 From North					KAMEHAMEHA From East					H1 From South					KAMEHAMEHA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:15 AM	0	0	0	0	0	0	133	0	0	133	0	0	0	0	0	0	0	0	0	0	133
06:30 AM	0	0	0	0	0	0	165	0	0	165	0	0	0	0	0	0	0	0	0	0	165
06:45 AM	0	0	0	0	0	0	148	0	0	148	0	0	0	0	0	0	0	0	0	0	148
Total	0	0	0	0	0	0	446	0	0	446	0	0	0	0	0	0	0	0	0	0	446
07:00 AM	0	0	0	0	0	0	165	0	0	165	0	0	0	0	0	0	0	0	0	0	165
07:15 AM	0	0	0	0	0	0	176	0	0	176	0	0	0	0	0	0	0	0	0	0	176
07:30 AM	0	0	0	0	0	0	187	0	0	187	0	0	0	0	0	0	0	0	0	0	187
07:45 AM	0	0	0	0	0	0	197	0	0	197	0	0	0	0	0	0	0	0	0	0	197
Total	0	0	0	0	0	0	725	0	0	725	0	0	0	0	0	0	0	0	0	0	725
08:00 AM	0	0	0	0	0	0	167	0	0	167	0	0	0	0	0	0	0	0	0	0	167
Grand Total	0	0	0	0	0	0	1338	0	0	1338	0	0	0	0	0	0	0	0	0	0	1338
Apprch %	0	0	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
Total %	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	

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(808) 533-3646

File Name : AM_WB Kamehameha to H-1 WB On Ramp
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	H1 From North					KAMEHAMEHA From East					H1 From South					KAMEHAMEHA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
06:45 AM	0	0	0	0	0	0	148	0	0	148	0	0	0	0	0	0	0	0	0	0	148
07:00 AM	0	0	0	0	0	0	165	0	0	165	0	0	0	0	0	0	0	0	0	0	165
07:15 AM	0	0	0	0	0	0	176	0	0	176	0	0	0	0	0	0	0	0	0	0	176
07:30 AM	0	0	0	0	0	0	**187**	0	0	**187**	0	0	0	0	0	0	0	0	0	0	**187**
Total Volume	0	0	0	0	0	0	676	0	0	676	0	0	0	0	0	0	0	0	0	0	676
% App. Total	0	0	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.904	.000	.000	.904	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.904

APPENDIX A

TRAFFIC COUNT DATA

- Existing Conditions PM

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 535-3646

File Name : PM_Kualakai Interchange North PHUONG
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	KUALAKAI From North					H-1 OFF RAMP From East					KUALAKAI From South					H-1 ON RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	2	2	0	0	4	0	0	134	0	134	0	0	69	0	69	0	0	0	0	0	207
03:30 PM	2	14	0	0	16	1	0	155	0	156	0	2	72	0	74	0	0	0	0	0	246
03:45 PM	3	5	0	0	8	0	2	146	0	148	0	2	85	0	87	0	0	0	0	0	243
Total	7	21	0	0	28	1	2	435	0	438	0	4	226	0	230	0	0	0	0	0	696
04:00 PM	1	0	0	0	1	0	0	166	0	166	0	0	77	0	77	0	0	0	0	0	244
04:15 PM	1	1	0	0	2	0	0	154	0	154	0	0	66	0	66	0	0	0	0	0	222
04:30 PM	0	1	0	0	1	0	0	157	0	157	0	1	65	0	66	0	0	0	0	0	224
04:45 PM	1	1	0	0	2	1	2	158	0	161	0	0	60	0	60	0	0	0	0	0	223
Total	3	3	0	0	6	1	2	635	0	638	0	1	268	0	269	0	0	0	0	0	913
05:00 PM	0	0	0	0	0	0	0	156	0	156	0	2	39	0	41	0	0	0	0	0	197
05:15 PM	0	0	0	0	0	0	0	153	0	153	0	0	51	0	51	0	0	0	0	0	204
05:30 PM	0	0	0	0	0	0	0	151	0	151	0	0	42	0	42	0	0	0	0	0	193
05:45 PM	0	1	0	0	1	0	0	133	0	133	0	0	35	0	35	0	0	0	0	0	169
Total	0	1	0	0	1	0	0	593	0	593	0	2	167	0	169	0	0	0	0	0	763
Grand Total	10	25	0	0	35	2	4	1663	0	1669	0	7	661	0	668	0	0	0	0	0	2372
Apprch %	28.6	71.4	0	0		0.1	0.2	99.6	0		0	1	99	0		0	0	0	0		
Total %	0.4	1.1	0	0	1.5	0.1	0.2	70.1	0	70.4	0	0.3	27.9	0	28.2	0	0	0	0	0	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 538-3048

File Name : PM_Kualakai Interchange North PHUONG
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	KUALAKAI From North					H-1 OFF RAMP From East					KUALAKAI From South					H-1 ON RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	**3**	**5**	0	0	**8**	0	**2**	146	0	148	0	**2**	**85**	0	**87**	0	0	0	0	0	243
04:00 PM	1	0	0	0	1	0	0	**166**	0	**166**	0	0	77	0	77	0	0	0	0	0	**244**
04:15 PM	1	1	0	0	2	0	0	154	0	154	0	0	66	0	66	0	0	0	0	0	222
04:30 PM	0	1	0	0	1	0	0	157	0	157	0	1	65	0	66	0	0	0	0	0	224
Total Volume	5	7	0	0	12	0	2	623	0	625	0	3	293	0	296	0	0	0	0	0	933
% App. Total	41.7	58.3	0	0		0	0.3	99.7	0		0	1	99	0		0	0	0	0		
PHF	.417	.350	.000	.000	.375	.000	.250	.938	.000	.941	.000	.375	.862	.000	.851	.000	.000	.000	.000	.000	.956

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 533-3646

File Name : PM_Kualakai Interchange South GAM
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	KUALAKAI From North					H-1 ON RAMP From East					KUALAKAI From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	162	6	0	168	0	0	0	0	0	113	63	0	0	176	38	0	9	0	47	391
03:30 PM	0	144	2	0	146	0	0	0	0	0	142	69	0	0	211	35	0	7	0	42	399
03:45 PM	0	168	9	0	177	0	0	0	0	0	159	78	0	0	237	33	1	10	0	44	458
Total	0	474	17	0	491	0	0	0	0	0	414	210	0	0	624	106	1	26	0	133	1248
04:00 PM	0	158	4	0	162	0	0	0	0	0	132	66	0	0	198	42	1	15	0	58	418
04:15 PM	0	175	0	0	175	0	0	0	0	0	114	71	0	0	185	31	0	7	0	38	398
04:30 PM	0	154	2	0	156	0	0	0	0	0	96	52	0	0	148	40	0	14	0	54	358
04:45 PM	0	102	0	0	102	0	0	0	0	0	84	45	0	0	129	19	0	5	0	24	255
Total	0	589	6	0	595	0	0	0	0	0	426	234	0	0	660	132	1	41	0	174	1429
05:00 PM	0	160	3	0	163	0	0	0	0	0	136	60	0	0	196	30	0	11	0	41	400
05:15 PM	0	158	1	0	159	0	0	0	0	0	94	51	0	0	145	37	0	7	0	44	348
05:30 PM	0	162	0	0	162	0	0	0	0	0	86	36	0	0	122	36	0	3	0	39	323
05:45 PM	0	161	0	0	161	0	0	0	0	0	112	45	0	0	157	28	0	12	0	40	358
Total	0	641	4	0	645	0	0	0	0	0	428	192	0	0	620	131	0	33	0	164	1429
Grand Total	0	1704	27	0	1731	0	0	0	0	0	1268	636	0	0	1904	369	2	100	0	471	4106
Apprch %	0	98.4	1.6	0		0	0	0	0		66.6	33.4	0	0		78.3	0.4	21.2	0		
Total %	0	41.5	0.7	0	42.2	0	0	0	0	0	30.9	15.5	0	0	46.4	9	0	2.4	0	11.5	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 533-3646

File Name : PM_Kualakai Interchange South GAM
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	KUALAKAI From North					H-1 ON RAMP From East					KUALAKAI From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	168	**9**	0	**177**	0	0	0	0	0	**159**	**78**	0	0	**237**	33	**1**	10	0	44	**458**
04:00 PM	0	158	4	0	162	0	0	0	0	0	132	66	0	0	198	**42**	1	**15**	0	**58**	418
04:15 PM	0	**175**	0	0	175	0	0	0	0	0	114	71	0	0	185	31	0	7	0	38	398
04:30 PM	0	154	2	0	156	0	0	0	0	0	96	52	0	0	148	40	0	14	0	54	358
Total Volume	0	655	15	0	670	0	0	0	0	0	501	267	0	0	768	146	2	46	0	194	1632
% App. Total	0	97.8	2.2	0		0	0	0	0		65.2	34.8	0	0		75.3	1	23.7	0		
PHF	.000	.936	.417	.000	.946	.000	.000	.000	.000	.000	.788	.856	.000	.000	.810	.869	.500	.767	.000	.836	.891

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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File Name : PM_Kualakai - Farrington 2 THANH
Site Code : 00000000
Start Date : 2/16/2012
Page No : 1

Groups Printed- Unshifted

	KUALAKAI From North					FARRINGTON From East					KUALAKAI From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	84	94	14	0	192	26	39	18	0	83	8	105	7	0	120	10	50	99	1	160	555
03:30 PM	66	137	6	0	209	42	42	21	0	105	10	106	4	0	120	10	58	92	0	160	594
03:45 PM	85	126	10	0	221	30	50	16	0	96	13	109	7	0	129	8	47	72	0	127	573
Total	235	357	30	0	622	98	131	55	0	284	31	320	18	0	369	28	155	263	1	447	1722
04:00 PM	68	131	10	0	209	29	48	15	0	92	13	101	2	0	116	2	57	58	0	117	534
04:15 PM	74	130	6	0	210	18	54	16	0	88	15	108	3	0	126	6	34	38	0	78	502
04:30 PM	52	96	8	0	156	25	70	19	0	114	14	81	3	0	98	8	34	72	0	114	482
04:45 PM	70	142	7	0	219	24	68	11	0	103	7	86	5	0	98	5	47	41	0	93	513
Total	264	499	31	0	794	96	240	61	0	397	49	376	13	0	438	21	172	209	0	402	2031
05:00 PM	63	134	9	0	206	10	55	15	0	80	5	81	3	0	89	3	41	44	0	88	463
05:15 PM	73	109	6	0	188	15	72	19	0	106	9	84	6	0	99	7	40	52	0	99	492
05:30 PM	53	99	9	0	161	15	40	15	0	70	11	77	4	0	92	11	42	59	0	112	435
05:45 PM	60	113	5	0	178	8	47	14	0	69	9	68	1	0	78	8	37	61	0	106	431
Total	249	455	29	0	733	48	214	63	0	325	34	310	14	0	358	29	160	216	0	405	1821
Grand Total	748	1311	90	0	2149	242	585	179	0	1006	114	1006	45	0	1165	78	487	688	1	1254	5574
Apprch %	34.8	61	4.2	0		24.1	58.2	17.8	0		9.8	86.4	3.9	0		6.2	38.8	54.9	0.1		
Total %	13.4	23.5	1.6	0	38.6	4.3	10.5	3.2	0	18	2	18	0.8	0	20.9	1.4	8.7	12.3	0	22.5	

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File Name : PM_Kualakai - Farrington 2 THANH
Site Code : 00000000
Start Date : 2/16/2012
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	KUALAKAI From North					FARRINGTON From East					KUALAKAI From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	**85**	126	**10**	0	**221**	**30**	50	16	0	96	13	**109**	**7**	0	**129**	**8**	47	**72**	0	**127**	**573**
04:00 PM	68	**131**	10	0	209	29	48	15	0	92	13	101	2	0	116	2	**57**	58	0	117	534
04:15 PM	74	130	6	0	210	18	54	16	0	88	**15**	108	3	0	126	6	34	38	0	78	502
04:30 PM	52	96	8	0	156	25	**70**	**19**	0	**114**	14	81	3	0	98	8	34	72	0	114	482
Total Volume	279	483	34	0	796	102	222	66	0	390	55	399	15	0	469	24	172	240	0	436	2091
% App. Total	35.1	60.7	4.3	0		26.2	56.9	16.9	0		11.7	85.1	3.2	0		5.5	39.4	55	0		
PHF	.821	.922	.850	.000	.900	.850	.793	.868	.000	.855	.917	.915	.536	.000	.909	.750	.754	.833	.000	.858	.912

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Groups Printed- Unshifted

	KUALAKAI From North					KAPOLEI From East					KUALAKAI From South					KAPOLEI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	72	0	39	2	113	39	63	0	0	102	0	0	0	0	0	0	65	66	0	131	346
03:30 PM	88	0	69	2	159	45	75	0	0	120	0	0	0	0	0	0	63	65	0	128	407
03:45 PM	85	0	65	0	150	49	60	0	0	109	0	0	0	0	0	0	87	82	0	169	428
Total	245	0	173	4	422	133	198	0	0	331	0	0	0	0	0	0	215	213	0	428	1181
04:00 PM	73	0	63	1	137	41	66	0	0	107	0	0	0	0	0	0	56	73	0	129	373
04:15 PM	85	0	55	0	140	35	58	0	0	93	0	0	0	0	0	0	72	62	3	137	370
04:30 PM	67	0	41	0	108	28	71	0	0	99	0	0	0	0	0	0	89	69	0	158	365
04:45 PM	97	0	84	0	181	25	63	0	0	88	0	0	0	0	0	0	75	67	0	142	411
Total	322	0	243	1	566	129	258	0	0	387	0	0	0	0	0	0	292	271	3	566	1519
05:00 PM	92	0	51	1	144	34	60	0	0	94	0	0	0	0	0	0	46	59	0	105	343
05:15 PM	101	0	61	3	165	31	69	0	0	100	0	0	0	0	0	0	62	60	0	122	387
05:30 PM	93	0	52	1	146	31	48	0	0	79	0	0	0	0	0	0	60	53	1	114	339
05:45 PM	97	0	56	0	153	24	56	0	0	80	0	0	0	0	0	0	57	53	0	110	343
Total	383	0	220	5	608	120	233	0	0	353	0	0	0	0	0	0	225	225	1	451	1412
Grand Total	950	0	636	10	1596	382	689	0	0	1071	0	0	0	0	0	0	732	709	4	1445	4112
Apprch %	59.5	0	39.8	0.6		35.7	64.3	0	0		0	0	0	0		0	50.7	49.1	0.3		
Total %	23.1	0	15.5	0.2	38.8	9.3	16.8	0	0	26	0	0	0	0	0	0	17.8	17.2	0.1	35.1	

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	KUALAKAI From North					KAPOLEI From East					KUALAKAI From South					KAPOLEI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	**85**	0	**65**	0	**150**	**49**	60	0	0	**109**	0	0	0	0	0	0	87	**82**	0	**169**	**428**
04:00 PM	73	0	63	**1**	137	41	66	0	0	107	0	0	0	0	0	0	56	73	0	129	373
04:15 PM	85	0	55	0	140	35	58	0	0	93	0	0	0	0	0	0	72	62	**3**	137	370
04:30 PM	67	0	41	0	108	28	**71**	0	0	99	0	0	0	0	0	0	**89**	69	0	158	365
Total Volume	310	0	224	1	535	153	255	0	0	408	0	0	0	0	0	0	304	286	3	593	1536
% App. Total	57.9	0	41.9	0.2		37.5	62.5	0	0		0	0	0	0		0	51.3	48.2	0.5		
PHF	.912	.000	.862	.250	.892	.781	.898	.000	.000	.936	.000	.000	.000	.000	.000	.000	.854	.872	.250	.877	.897

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Groups Printed- Unshifted - Bank 1

	KUNIA From North					KUPUNA LOOP (NORTH) From East					KUNIA From South					KUPUNA LOOP (NORTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
02:45 PM	0	189	20	0	209	13	0	104	1	118	120	120	0	0	240	2	0	0	0	2	569
Total	0	189	20	0	209	13	0	104	1	118	120	120	0	0	240	2	0	0	0	2	569
03:00 PM	1	233	15	2	251	10	0	96	0	106	104	157	0	0	261	2	1	0	0	3	621
03:15 PM	1	287	21	0	309	8	0	117	0	125	113	141	0	0	254	0	0	2	0	2	690
03:30 PM	1	295	20	1	317	11	1	105	0	117	114	143	0	0	257	0	1	1	0	2	693
03:45 PM	0	300	30	0	330	9	0	119	0	128	129	144	1	0	274	2	0	0	0	2	734
Total	3	1115	86	3	1207	38	1	437	0	476	460	585	1	0	1046	4	2	3	0	9	2738
04:00 PM	0	283	21	0	304	10	0	118	0	128	95	171	1	0	267	0	0	0	0	0	699
04:15 PM	0	256	39	0	295	11	0	149	0	160	109	161	0	0	270	2	0	0	0	2	727
04:30 PM	0	241	24	0	265	12	0	136	0	148	114	168	3	0	285	4	0	0	0	4	702
04:45 PM	0	260	23	0	283	17	0	122	1	140	127	170	1	0	298	4	0	0	0	4	725
Total	0	1040	107	0	1147	50	0	525	1	576	445	670	5	0	1120	10	0	0	0	10	2853
05:00 PM	0	212	28	0	240	13	0	139	0	152	103	156	0	0	259	1	0	0	0	1	652
05:15 PM	0	225	15	0	240	19	0	130	1	150	133	158	0	0	291	1	1	0	0	2	683
Grand Total	3	2781	256	3	3043	133	1	1335	3	1472	1261	1689	6	0	2956	18	3	3	0	24	7495
Apprch %	0.1	91.4	8.4	0.1		9	0.1	90.7	0.2		42.7	57.1	0.2	0		75	12.5	12.5	0		
Total %	0	37.1	3.4	0	40.6	1.8	0	17.8	0	19.6	16.8	22.5	0.1	0	39.4	0.2	0	0	0	0.3	
Unshifted	3	2781	256	3	3043	133	1	1335	3	1472	1261	1689	6	0	2956	18	3	3	0	24	7495
% Unshifted	100	100	100	100	100	100	100	100	100	100	100	100	100	0	100	100	100	100	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	KUNIA From North					KUPUNA LOOP (NORTH) From East					KUNIA From South					KUPUNA LOOP (NORTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	**300**	30	0	**330**	9	0	119	0	128	**129**	144	1	0	274	2	0	0	0	2	**734**
04:00 PM	0	283	21	0	304	10	0	118	0	128	95	**171**	1	0	267	0	0	0	0	0	699
04:15 PM	0	256	**39**	0	295	11	0	**149**	0	**160**	109	161	0	0	270	2	0	0	0	2	727
04:30 PM	0	241	24	0	265	**12**	0	136	0	148	114	168	**3**	0	**285**	**4**	0	0	0	**4**	702
Total Volume	0	1080	114	0	1194	42	0	522	0	564	447	644	5	0	1096	8	0	0	0	8	2862
% App. Total	0	90.5	9.5	0		7.4	0	92.6	0		40.8	58.8	0.5	0		100	0	0	0		
PHF	.000	.900	.731	.000	.905	.875	.000	.876	.000	.881	.866	.942	.417	.000	.961	.500	.000	.000	.000	.500	.975

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Groups Printed- Unshifted - Bank 1

	KUNIA From North					KUPUNA LOOP (SOUTH) From East					KUNIA From South					KUPUNA LOOP (SOUTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
02:45 PM	0	296	0	0	296	3	0	92	0	95	224	239	0	0	463	0	1	0	0	1	855
Total	0	296	0	0	296	3	0	92	0	95	224	239	0	0	463	0	1	0	0	1	855
03:00 PM	0	321	0	0	321	1	0	91	0	92	204	277	0	0	481	0	0	0	0	0	894
03:15 PM	0	389	0	0	389	4	0	81	0	85	179	254	0	0	433	0	0	0	0	0	907
03:30 PM	0	393	0	0	393	5	0	94	0	99	208	259	0	0	467	0	0	0	0	0	959
03:45 PM	0	421	0	0	421	7	0	91	1	99	210	274	0	0	484	0	0	0	0	0	1004
Total	0	1524	0	0	1524	17	0	357	1	375	801	1064	0	0	1865	0	0	0	0	0	3764
04:00 PM	0	413	0	0	413	6	0	92	0	98	245	282	0	0	527	0	0	0	0	0	1038
04:15 PM	0	417	0	0	417	4	0	103	0	107	215	269	0	0	484	0	0	0	0	0	1008
04:30 PM	0	397	1	0	398	3	0	104	0	107	240	292	0	0	532	0	0	0	0	0	1037
04:45 PM	0	371	0	0	371	5	0	82	0	87	204	299	0	0	503	0	0	0	0	0	961
Total	0	1598	1	0	1599	18	0	381	0	399	904	1142	0	0	2046	0	0	0	0	0	4044
05:00 PM	0	326	0	0	326	1	0	111	0	112	222	280	0	0	502	0	0	0	0	0	940
05:15 PM	0	349	0	0	349	11	0	109	0	120	192	283	0	0	475	0	0	0	0	0	944
Grand Total	0	4093	1	0	4094	50	0	1050	1	1101	2343	3008	0	0	5351	0	1	0	0	1	10547
Apprch %	0	100	0	0		4.5	0	95.4	0.1		43.8	56.2	0	0		0	100	0	0		
Total %	0	38.8	0	0	38.8	0.5	0	10	0	10.4	22.2	28.5	0	0	50.7	0	0	0	0	0	
Unshifted	0	4093	1	0	4094	50	0	1050	1	1101	2343	3008	0	0	5351	0	1	0	0	1	10547
% Unshifted	0	100	100	0	100	100	0	100	100	100	100	100	0	0	100	0	100	0	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	KUNIA From North					KUPUNA LOOP (SOUTH) From East					KUNIA From South					KUPUNA LOOP (SOUTH) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	**421**	0	0	**421**	**7**	0	91	**1**	99	210	274	0	0	484	0	0	0	0	0	1004
04:00 PM	0	413	0	0	413	6	0	92	0	98	**245**	282	0	0	527	0	0	0	0	0	**1038**
04:15 PM	0	417	0	0	417	4	0	103	0	**107**	215	269	0	0	484	0	0	0	0	0	1008
04:30 PM	0	397	**1**	0	398	3	0	**104**	0	107	240	**292**	0	0	**532**	0	0	0	0	0	1037
Total Volume	0	1648	1	0	1649	20	0	390	1	411	910	1117	0	0	2027	0	0	0	0	0	4087
% App. Total	0	99.9	0.1	0		4.9	0	94.9	0.2		44.9	55.1	0	0		0	0	0	0		
PHF	.000	.979	.250	.000	.979	.714	.000	.938	.250	.960	.929	.956	.000	.000	.953	.000	.000	.000	.000	.000	.984

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Groups Printed- Unshifted

	KUNIA From North					H-1 OFF RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	113	294	0	0	407	245	0	0	0	245	0	241	60	0	301	508	0	0	0	508	1461
03:30 PM	116	320	0	0	436	218	0	0	0	218	0	243	75	0	318	498	0	0	0	498	1470
03:45 PM	111	315	0	0	426	219	0	0	0	219	0	227	62	0	289	538	0	0	0	538	1472
Total	340	929	0	0	1269	682	0	0	0	682	0	711	197	0	908	1544	0	0	0	1544	4403
04:00 PM	144	289	0	0	433	253	0	0	0	253	0	191	69	0	260	566	0	0	0	566	1512
04:15 PM	149	315	0	0	464	251	0	0	0	251	0	216	56	0	272	516	0	0	0	516	1503
04:30 PM	164	337	0	0	501	225	0	0	0	225	0	197	58	0	255	555	0	0	0	555	1536
04:45 PM	120	341	0	0	461	275	0	0	0	275	0	211	62	0	273	573	0	0	0	573	1582
Total	577	1282	0	0	1859	1004	0	0	0	1004	0	815	245	0	1060	2210	0	0	0	2210	6133
05:00 PM	134	354	0	0	488	249	0	0	0	249	0	192	45	0	237	578	0	0	0	578	1552
05:15 PM	148	349	0	0	497	295	0	0	0	295	0	195	84	0	279	532	0	0	0	532	1603
05:30 PM	144	384	0	0	528	264	0	0	0	264	0	243	99	0	342	560	0	0	0	560	1694
05:45 PM	148	331	0	0	479	255	0	0	0	255	0	204	62	0	266	508	0	0	0	508	1508
Total	574	1418	0	0	1992	1063	0	0	0	1063	0	834	290	0	1124	2178	0	0	0	2178	6357
Grand Total	1491	3629	0	0	5120	2749	0	0	0	2749	0	2360	732	0	3092	5932	0	0	0	5932	16893
Apprch %	29.1	70.9	0	0		100	0	0	0		0	76.3	23.7	0		100	0	0	0		
Total %	8.8	21.5	0	0	30.3	16.3	0	0	0	16.3	0	14	4.3	0	18.3	35.1	0	0	0	35.1	

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	KUNIA From North					H-1 OFF RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	111	315	0	0	426	219	0	0	0	219	0	**227**	62	0	**289**	538	0	0	0	538	1472
04:00 PM	144	289	0	0	433	**253**	0	0	0	**253**	0	191	**69**	0	260	**566**	0	0	0	**566**	1512
04:15 PM	149	315	0	0	464	251	0	0	0	251	0	216	56	0	272	516	0	0	0	516	1503
04:30 PM	**164**	**337**	0	0	**501**	225	0	0	0	225	0	197	58	0	255	555	0	0	0	555	**1536**
Total Volume	568	1256	0	0	1824	948	0	0	0	948	0	831	245	0	1076	2175	0	0	0	2175	6023
% App. Total	31.1	68.9	0	0		100	0	0	0		0	77.2	22.8	0		100	0	0	0		
PHF	.866	.932	.000	.000	.910	.937	.000	.000	.000	.937	.000	.915	.888	.000	.931	.961	.000	.000	.000	.961	.980

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Groups Printed- Unshifted

	KUNIA From North					H-1 ON RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	715	145	0	860	0	0	0	0	0	435	188	0	0	623	59	1	97	0	157	1640
03:30 PM	0	714	134	0	848	0	0	0	0	0	496	196	0	0	692	64	1	77	0	142	1682
03:45 PM	0	754	168	0	922	0	0	0	0	0	486	207	0	0	693	66	0	95	0	161	1776
Total	0	2183	447	0	2630	0	0	0	0	0	1417	591	0	0	2008	189	2	269	0	460	5098
04:00 PM	0	774	105	0	879	0	0	0	0	0	394	176	0	0	570	61	0	90	0	151	1600
04:15 PM	0	795	136	0	931	0	0	0	0	0	462	207	0	0	669	68	0	80	0	148	1748
04:30 PM	0	779	147	0	926	0	0	0	0	0	430	219	0	0	649	44	0	80	0	124	1699
04:45 PM	0	808	132	0	940	0	0	0	0	0	374	188	0	0	562	56	0	102	0	158	1660
Total	0	3156	520	0	3676	0	0	0	0	0	1660	790	0	0	2450	229	0	352	0	581	6707
05:00 PM	0	833	171	0	1004	0	0	0	0	0	407	182	0	0	589	51	0	92	0	143	1736
05:15 PM	0	809	147	0	956	0	0	0	0	0	412	213	0	0	625	45	0	74	0	119	1700
05:30 PM	0	865	139	0	1004	0	0	0	0	0	399	194	0	0	593	47	0	75	0	122	1719
05:45 PM	0	809	150	0	959	0	0	0	0	0	368	178	0	0	546	35	1	94	0	130	1635
Total	0	3316	607	0	3923	0	0	0	0	0	1586	767	0	0	2353	178	1	335	0	514	6790
Grand Total	0	8655	1574	0	10229	0	0	0	0	0	4663	2148	0	0	6811	596	3	956	0	1555	18595
Apprch %	0	84.6	15.4	0		0	0	0	0		68.5	31.5	0	0		38.3	0.2	61.5	0		
Total %	0	46.5	8.5	0	55	0	0	0	0	0	25.1	11.6	0	0	36.6	3.2	0	5.1	0	8.4	

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File Name : PM_Kunia Interchange South VAN-PHUONG
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Start Date : 2/15/2012
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	KUNIA From North					H-1 ON RAMP From East					KUNIA From South					H-1 OFF RAMP From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	754	**168**	0	922	0	0	0	0	0	**486**	207	0	0	**693**	66	0	**95**	0	**161**	**1776**
04:00 PM	0	774	105	0	879	0	0	0	0	0	394	176	0	0	570	61	0	90	0	151	1600
04:15 PM	0	**795**	136	0	**931**	0	0	0	0	0	462	207	0	0	669	**68**	0	80	0	148	1748
04:30 PM	0	779	147	0	926	0	0	0	0	0	430	**219**	0	0	649	44	0	80	0	124	1699
Total Volume	0	3102	556	0	3658	0	0	0	0	0	1772	809	0	0	2581	239	0	345	0	584	6823
% App. Total	0	84.8	15.2	0		0	0	0	0		68.7	31.3	0	0		40.9	0	59.1	0		
PHF	.000	.975	.827	.000	.982	.000	.000	.000	.000	.000	.912	.924	.000	.000	.931	.879	.000	.908	.000	.907	.960

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File Name : PM_Kunia - Honowai
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Groups Printed- Unshifted - Bank 1

	KUNIA From North					HONOWAI From East					KUNIA From South					HONOWAI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	0	734	0	0	734	0	20	0	0	20	13	585	0	0	598	0	0	0	0	0	1352
03:15 PM	0	836	0	0	836	0	30	0	0	30	28	574	0	0	602	0	0	0	0	0	1468
03:30 PM	0	809	0	0	809	0	26	0	0	26	14	665	0	0	679	0	0	0	0	0	1514
03:45 PM	0	873	0	0	873	0	24	0	0	24	14	681	0	0	695	0	0	0	0	0	1592
Total	0	3252	0	0	3252	0	100	0	0	100	69	2505	0	0	2574	0	0	0	0	0	5926
04:00 PM	0	828	0	0	828	0	19	0	0	19	14	650	0	0	664	0	0	0	0	0	1511
04:15 PM	0	777	0	0	777	0	26	0	0	26	11	648	0	0	659	0	0	0	0	0	1462
04:30 PM	0	816	0	0	816	0	27	0	0	27	17	597	0	0	614	0	0	0	0	0	1457
04:45 PM	0	815	0	0	815	0	24	0	2	26	21	638	0	0	659	0	0	0	0	0	1500
Total	0	3236	0	0	3236	0	96	0	2	98	63	2533	0	0	2596	0	0	0	0	0	5930
05:00 PM	0	817	0	0	817	0	25	0	0	25	18	603	0	0	621	0	0	0	0	0	1463
05:15 PM	0	776	0	0	776	0	14	0	2	16	22	608	0	0	630	0	0	0	0	0	1422
Grand Total	0	8081	0	0	8081	0	235	0	4	239	172	6249	0	0	6421	0	0	0	0	0	14741
Apprch %	0	100	0	0		0	98.3	0	1.7		2.7	97.3	0	0		0	0	0	0		
Total %	0	54.8	0	0	54.8	0	1.6	0	0	1.6	1.2	42.4	0	0	43.6	0	0	0	0	0	
Unshifted	0	8081	0	0	8081	0	235	0	4	239	172	6249	0	0	6421	0	0	0	0	0	14741
% Unshifted	0	100	0	0	100	0	100	0	100	100	100	100	0	0	100	0	0	0	0	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	KUNIA From North					HONOWAI From East					KUNIA From South					HONOWAI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	**873**	0	0	**873**	0	24	0	0	24	14	**681**	0	0	**695**	0	0	0	0	0	**1592**
04:00 PM	0	828	0	0	828	0	19	0	0	19	14	650	0	0	664	0	0	0	0	0	1511
04:15 PM	0	777	0	0	777	0	26	0	0	26	11	648	0	0	659	0	0	0	0	0	1462
04:30 PM	0	816	0	0	816	0	**27**	0	0	**27**	**17**	597	0	0	614	0	0	0	0	0	1457
Total Volume	0	3294	0	0	3294	0	96	0	0	96	56	2576	0	0	2632	0	0	0	0	0	6022
% App. Total	0	100	0	0		0	100	0	0		2.1	97.9	0	0		0	0	0	0		
PHF	.000	.943	.000	.000	.943	.000	.889	.000	.000	.889	.824	.946	.000	.000	.947	.000	.000	.000	.000	.000	.946

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File Name : PM_Kunia NB Ramp THANH-PHUONG recounted
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Groups Printed- Unshifted

	KUNIA From North						WAIPAHU From East						LEOLUA-NB RAMP From Southeast						NB KUNIA From South						From West						
Start Time	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	0	0	0	0	0	55	0	0	0	0	55	22	170	0	0	0	192	0	0	370	0	0	370	0	0	0	0	0	0	617
03:30 PM	0	0	0	0	0	0	51	0	0	0	0	51	28	184	0	0	0	212	0	0	444	0	0	444	0	0	0	0	0	0	707
03:45 PM	0	0	0	0	0	0	62	0	0	0	0	62	28	198	0	0	0	226	0	0	447	0	0	447	0	0	0	0	0	0	735
Total	0	0	0	0	0	0	168	0	0	0	0	168	78	552	0	0	0	630	0	0	1261	0	0	1261	0	0	0	0	0	0	2059
04:00 PM	0	0	0	0	0	0	51	0	0	0	3	54	30	189	0	0	0	219	0	0	336	0	0	336	0	0	0	0	0	0	609
04:15 PM	0	0	0	0	0	0	36	0	0	0	0	36	32	184	0	0	0	216	0	0	404	0	0	404	0	0	0	0	0	0	656
04:30 PM	0	0	0	0	0	0	49	0	0	0	1	50	25	195	0	0	0	220	0	0	389	0	0	389	0	0	0	0	0	0	659
04:45 PM	0	0	0	0	0	0	49	0	0	0	0	49	26	166	0	0	0	192	0	0	352	0	0	352	0	0	0	0	0	0	593
Total	0	0	0	0	0	0	185	0	0	0	4	189	113	734	0	0	0	847	0	0	1481	0	0	1481	0	0	0	0	0	0	2517
05:00 PM	0	0	0	0	0	0	49	0	0	0	0	49	38	195	0	0	0	233	0	0	339	0	0	339	0	0	0	0	0	0	621
05:15 PM	0	0	0	0	0	0	42	0	0	0	2	44	21	196	0	0	0	217	0	0	356	0	0	356	0	0	0	0	0	0	617
05:30 PM	0	0	0	0	0	0	37	0	0	0	1	38	22	172	0	0	0	194	0	0	377	0	0	377	0	0	0	0	0	0	609
05:45 PM	0	0	0	0	0	0	35	0	0	0	0	35	21	140	0	0	0	161	0	0	387	0	0	387	0	0	0	0	0	0	583
Total	0	0	0	0	0	0	163	0	0	0	3	166	102	703	0	0	0	805	0	0	1459	0	0	1459	0	0	0	0	0	0	2430
Grand Total	0	0	0	0	0	0	516	0	0	0	7	523	293	1989	0	0	0	2282	0	0	4201	0	0	4201	0	0	0	0	0	0	7006
Apprch %	0	0	0	0	0		98.7	0	0	0	1.3		12.8	87.2	0	0	0		0	0	100	0	0		0	0	0	0	0		
Total %	0	0	0	0	0	0	7.4	0	0	0	0.1	7.5	4.2	28.4	0	0	0	32.6	0	0	60	0	0	60	0	0	0	0	0	0	

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	KUNIA From North						WAIPAHU From East						LEOLUA-NB RAMP From Southeast						NB KUNIA From South						From West						
Start Time	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 03:45 PM																															
03:45 PM	0	0	0	0	0	0	**62**	0	0	0	0	**62**	28	**198**	0	0	0	**226**	0	0	**447**	0	0	**447**	0	0	0	0	0	0	**735**
04:00 PM	0	0	0	0	0	0	51	0	0	0	**3**	54	30	189	0	0	0	219	0	0	336	0	0	336	0	0	0	0	0	0	609
04:15 PM	0	0	0	0	0	0	36	0	0	0	0	36	**32**	184	0	0	0	216	0	0	404	0	0	404	0	0	0	0	0	0	656
04:30 PM	0	0	0	0	0	0	49	0	0	0	1	50	25	195	0	0	0	220	0	0	389	0	0	389	0	0	0	0	0	0	659
Total Volume	0	0	0	0	0	0	198	0	0	0	4	202	115	766	0	0	0	881	0	0	1576	0	0	1576	0	0	0	0	0	0	2659
% App. Total	0	0	0	0	0		98	0	0	0	2		13.1	86.9	0	0	0		0	0	100	0	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.798	.000	.000	.000	.333	.815	.898	.967	.000	.000	.000	.975	.000	.000	.881	.000	.000	.881	.000	.000	.000	.000	.000	.000	.904

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File Name : PM_Fort Weaver - Laulaunui
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Groups Printed- Unshifted

	FORT WEAVER From North					LAULAUNUI From East					FORT WEAVER From South					LAULAUNUI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	38	666	26	0	730	28	0	11	1	40	8	433	5	2	448	14	15	21	2	52	1270
03:30 PM	23	625	25	0	673	18	0	7	3	28	9	511	3	4	527	12	14	28	3	57	1285
03:45 PM	33	750	29	0	812	26	0	6	2	34	11	547	5	2	565	5	10	21	0	36	1447
Total	94	2041	80	0	2215	72	0	24	6	102	28	1491	13	8	1540	31	39	70	5	145	4002
04:00 PM	36	747	43	0	826	24	0	9	0	33	11	421	6	1	439	7	23	38	1	69	1367
04:15 PM	34	737	32	0	803	27	0	8	0	35	6	414	8	6	434	12	19	24	0	55	1327
04:30 PM	26	762	20	0	808	23	0	15	4	42	9	455	6	7	477	7	12	25	5	49	1376
04:45 PM	25	812	25	0	862	19	0	6	0	25	9	408	4	1	422	9	5	25	0	39	1348
Total	121	3058	120	0	3299	93	0	38	4	135	35	1698	24	15	1772	35	59	112	6	212	5418
05:00 PM	32	787	25	0	844	25	1	10	0	36	5	379	2	3	389	9	19	39	0	67	1336
05:15 PM	29	811	30	0	870	19	1	9	1	30	8	401	4	0	413	8	18	26	0	52	1365
05:30 PM	36	822	30	0	888	29	1	9	0	39	6	418	3	6	433	7	22	25	3	57	1417
05:45 PM	22	832	39	0	893	26	1	10	0	37	14	452	1	4	471	9	10	18	0	37	1438
Total	119	3252	124	0	3495	99	4	38	1	142	33	1650	10	13	1706	33	69	108	3	213	5556
Grand Total	334	8351	324	0	9009	264	4	100	11	379	96	4839	47	36	5018	99	167	290	14	570	14976
Apprch %	3.7	92.7	3.6	0		69.7	1.1	26.4	2.9		1.9	96.4	0.9	0.7		17.4	29.3	50.9	2.5		
Total %	2.2	55.8	2.2	0	60.2	1.8	0	0.7	0.1	2.5	0.6	32.3	0.3	0.2	33.5	0.7	1.1	1.9	0.1	3.8	

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	FORT WEAVER From North					LAULAUNUI From East					FORT WEAVER From South					LAULAUNUI From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	33	750	29	0	812	26	0	6	2	34	**11**	**547**	5	2	**565**	5	10	21	0	36	**1447**
04:00 PM	**36**	747	**43**	0	**826**	24	0	9	0	33	11	421	6	1	439	7	**23**	**38**	1	**69**	1367
04:15 PM	34	737	32	0	803	**27**	0	8	0	35	6	414	**8**	6	434	**12**	19	24	0	55	1327
04:30 PM	26	**762**	20	0	808	23	0	**15**	**4**	**42**	9	455	6	**7**	477	7	12	25	**5**	49	1376
Total Volume	129	2996	124	0	3249	100	0	38	6	144	37	1837	25	16	1915	31	64	108	6	209	5517
% App. Total	4	92.2	3.8	0		69.4	0	26.4	4.2		1.9	95.9	1.3	0.8		14.8	30.6	51.7	2.9		
PHF	.896	.983	.721	.000	.983	.926	.000	.633	.375	.857	.841	.840	.781	.571	.847	.646	.696	.711	.300	.757	.953

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Groups Printed- Unshifted - Bank 1

	FORT WEAVER From North					AAWA From East					FORT WEAVER From South						AAWA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	U-Turns	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	3	654	32	0	689	23	3	15	0	41	13	437	2	4	5	461	6	15	1	0	22	1213
03:30 PM	2	634	31	0	667	25	0	8	1	34	14	475	3	2	0	494	18	17	3	0	38	1233
03:45 PM	1	756	31	0	788	21	1	1	2	25	6	521	5	4	2	538	19	7	1	0	27	1378
Total	6	2044	94	0	2144	69	4	24	3	100	33	1433	10	10	7	1493	43	39	5	0	87	3824
04:00 PM	1	696	39	0	736	29	3	9	0	41	17	425	4	4	2	452	18	18	0	0	36	1265
04:15 PM	2	702	50	0	754	25	1	12	0	38	12	397	7	8	1	425	23	19	1	0	43	1260
04:30 PM	0	771	37	0	808	17	3	10	1	31	14	427	6	5	4	456	26	15	0	1	42	1337
04:45 PM	3	815	26	0	844	17	2	8	1	28	11	386	3	0	4	404	14	15	1	0	30	1306
Total	6	2984	152	0	3142	88	9	39	2	138	54	1635	20	17	11	1737	81	67	2	1	151	5168
05:00 PM	2	773	50	0	825	26	3	12	0	41	9	376	5	2	0	392	16	17	2	1	36	1294
05:15 PM	0	765	37	0	802	23	1	9	0	33	16	414	7	4	6	447	19	19	1	0	39	1321
05:30 PM	2	802	33	0	837	33	7	9	0	49	14	376	3	12	1	406	17	23	2	0	42	1334
05:45 PM	4	796	38	0	838	32	2	9	0	43	10	437	8	7	4	466	24	11	0	2	37	1384
Total	8	3136	158	0	3302	114	13	39	0	166	49	1603	23	25	11	1711	76	70	5	3	154	5333
Grand Total		8164	404	0	8588	271	26	102	5	404	136	4671	53	52	29	4941	200	176	12	4	392	14325
Apprch %	0.2	95.1	4.7	0		67.1	6.4	25.2	1.2		2.8	94.5	1.1	1.1	0.6		51	44.9	3.1	1		
Total %	0.1	57	2.8	0	60	1.9	0.2	0.7	0	2.8	0.9	32.6	0.4	0.4	0.2	34.5	1.4	1.2	0.1	0	2.7	
Unshifted	20	8164	404	0	8588	271	26	102	5	404	136	4671	53	52	29	4941	200	176	12	4	392	14325
% Unshifted	100	100	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : PM_Fort Weaver - Aawa
Site Code : 00000000
Start Date : 2/15/2012
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	FORT WEAVER From North					AAWA From East					FORT WEAVER From South						AAWA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	U-Turns	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 03:45 PM																						
03:45 PM	1	756	31	0	788	21	1	1	**2**	25	6	**521**	5	4	2	**538**	19	7	**1**	0	27	**1378**
04:00 PM	1	696	39	0	736	**29**	**3**	9	0	**41**	**17**	425	4	4	2	452	18	18	0	0	36	1265
04:15 PM	**2**	702	**50**	0	754	25	1	**12**	0	38	12	397	**7**	**8**	1	425	23	**19**	1	0	**43**	1260
04:30 PM	0	**771**	37	0	**808**	17	3	10	1	31	14	427	6	5	**4**	456	**26**	15	0	**1**	42	1337
Total Volume	4	2925	157	0	3086	92	8	32	3	135	49	1770	22	21	9	1871	86	59	2	1	148	5240
% App. Total		94.8				68.1		23.7				94.6					58.1	39.9				
PHF	.500	.948	.785	.000	.955	.793	.667	.667	.375	.823	.721	.849	.786	.656	.563	.869	.827	.776	.500	.250	.860	.951

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File Name : PM_Fort Weaver - Hale O Ulu School X-walk
Site Code : 00000000
Start Date : 2/15/2012
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Groups Printed- Unshifted

	FORT WEAVER From North					From East					FORT WEAVER From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	709	0	0	709	0	0	0	0	0	0	486	0	3	489	0	0	0	0	0	1198
03:30 PM	0	680	0	0	680	0	0	0	0	0	0	554	0	1	555	0	0	0	0	0	1235
03:45 PM	0	775	0	0	775	0	0	0	0	0	0	504	0	5	509	0	0	0	0	0	1284
Total	0	2164	0	0	2164	0	0	0	0	0	0	1544	0	9	1553	0	0	0	0	0	3717
04:00 PM	0	768	0	0	768	0	0	0	0	0	0	459	0	2	461	0	0	0	0	0	1229
04:15 PM	0	706	0	0	706	0	0	0	0	0	0	428	0	3	431	0	0	0	0	0	1137
04:30 PM	0	927	0	0	927	0	0	0	0	0	0	446	0	0	446	0	0	0	0	0	1373
04:45 PM	0	873	0	0	873	0	0	0	0	0	0	423	0	0	423	0	0	0	0	0	1296
Total	0	3274	0	0	3274	0	0	0	0	0	0	1756	0	5	1761	0	0	0	0	0	5035
05:00 PM	0	861	0	0	861	0	0	0	0	0	0	411	0	2	413	0	0	0	0	0	1274
05:15 PM	0	811	0	0	811	0	0	0	0	0	0	447	0	7	454	0	0	0	0	0	1265
05:30 PM	0	817	0	0	817	0	0	0	0	0	0	465	0	1	466	0	0	0	0	0	1283
05:45 PM	0	814	0	0	814	0	0	0	0	0	0	422	0	3	425	0	0	0	0	0	1239
Total	0	3303	0	0	3303	0	0	0	0	0	0	1745	0	13	1758	0	0	0	0	0	5061
Grand Total	0	8741	0	0	8741	0	0	0	0	0	0	5045	0	27	5072	0	0	0	0	0	13813
Apprch %	0	100	0	0		0	0	0	0		0	99.5	0	0.5		0	0	0	0		
Total %	0	63.3	0	0	63.3	0	0	0	0	0	0	36.5	0	0.2	36.7	0	0	0	0	0	

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File Name : PM_Fort Weaver - Hale O Ulu School X-walk
Site Code : 00000000
Start Date : 2/15/2012
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	FORT WEAVER From North					From East					FORT WEAVER From South					From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	775	0	0	775	0	0	0	0	0	0	**504**	0	**5**	**509**	0	0	0	0	0	1284
04:00 PM	0	768	0	0	768	0	0	0	0	0	0	459	0	2	461	0	0	0	0	0	1229
04:15 PM	0	706	0	0	706	0	0	0	0	0	0	428	0	3	431	0	0	0	0	0	1137
04:30 PM	0	**927**	0	0	**927**	0	0	0	0	0	0	446	0	0	446	0	0	0	0	0	**1373**
Total Volume	0	3176	0	0	3176	0	0	0	0	0	0	1837	0	10	1847	0	0	0	0	0	5023
% App. Total	0	100	0	0		0	0	0	0		0	99.5	0	0.5		0	0	0	0		
PHF	.000	.857	.000	.000	.857	.000	.000	.000	.000	.000	.000	.911	.000	.500	.907	.000	.000	.000	.000	.000	.915

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File Name : PM_Fort Weaver - Renton THANH
Site Code : 00000000
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Groups Printed- Unshifted

	FORT WEAVER From North						RENTON From East					FORT WEAVER From South					RENTON From West					
Start Time	Right	Thru	Left	U-Turns	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	78	567	3	4	0	652	1	0	3	3	7	1	426	22	6	455	24	4	84	3	115	1229
03:30 PM	65	567	3	11	0	646	3	2	2	1	8	7	526	40	12	585	38	1	70	6	115	1354
03:45 PM	100	641	7	4	0	752	4	1	7	2	14	6	397	46	9	458	33	5	113	6	157	1381
Total	243	1775	13	19	0	2050	8	3	12	6	29	14	1349	108	27	1498	95	10	267	15	387	3964
04:00 PM	93	593	2	8	1	697	1	2	3	8	14	3	378	39	14	434	34	2	67	10	113	1258
04:15 PM	80	558	6	9	0	653	4	2	9	2	17	8	317	32	8	365	40	4	71	5	120	1155
04:30 PM	63	728	21	12	0	824	7	7	6	7	27	16	379	39	11	445	38	5	48	0	91	1387
04:45 PM	87	626	9	2	1	725	5	10	7	3	25	19	327	30	5	381	24	11	82	0	117	1248
Total	323	2505	38	31	2	2899	17	21	25	20	83	46	1401	140	38	1625	136	22	268	15	441	5048
05:00 PM	84	696	7	6	0	793	6	4	10	3	23	7	337	17	5	366	49	7	77	0	133	1315
05:15 PM	79	718	7	9	0	813	5	8	4	6	23	4	328	13	7	352	20	2	79	3	104	1292
05:30 PM	53	773	6	7	0	839	4	4	1	1	10	9	374	38	1	422	32	2	74	0	108	1379
05:45 PM	95	743	6	3	1	848	2	4	8	0	14	1	333	28	4	366	40	1	96	6	143	1371
Total	311	2930	26	25	1	3293	17	20	23	10	70	21	1372	96	17	1506	141	12	326	9	488	5357
Grand Total		7210	77	75	3	8242	42	44	60	36	182	81	4122	344	82	4629	372	44	861	39	1316	14369
Apprch %	10.6	87.5	0.9	0.9	0		23.1	24.2	33	19.8		1.7	89	7.4	1.8		28.3	3.3	65.4	3		
Total %	6.1	50.2	0.5	0.5	0	57.4	0.3	0.3	0.4	0.3	1.3	0.6	28.7	2.4	0.6	32.2	2.6	0.3	6	0.3	9.2	

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File Name : PM_Fort Weaver - Renton THANH
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	FORT WEAVER From North						RENTON From East					FORT WEAVER From South					RENTON From West					
Start Time	Right	Thru	Left	U-Turns	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																						
Peak Hour for Entire Intersection Begins at 03:45 PM																						
03:45 PM	**100**	641	7	4	0	752	4	1	7	2	14	6	**397**	**46**	9	**458**	33	**5**	**113**	6	**157**	1381
04:00 PM	93	593	2	8	**1**	697	1	2	3	**8**	14	3	378	39	**14**	434	34	2	67	**10**	113	1258
04:15 PM	80	558	6	9	0	653	4	2	**9**	2	17	8	317	32	8	365	**40**	4	71	5	120	1155
04:30 PM	63	**728**	**21**	**12**	0	**824**	**7**	**7**	6	7	**27**	**16**	379	39	11	445	38	5	48	0	91	**1387**
Total Volume	336	2520	36	33	1	2926	16	12	25	19	72	33	1471	156	42	1702	145	16	299	21	481	5181
% App. Total	11.5	86.1					22.2	16.7	34.7	26.4			86.4				30.1		62.2			
PHF	.840	.865	.429	.688	.250	.888	.571	.429	.694	.594	.667	.516	.926	.848	.750	.929	.906	.800	.662	.525	.766	.934

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File Name : PM_Fort Weaver - Kolowaka GAM recount
Site Code : 00000000
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Groups Printed- Unshifted - Bank 1

	FORT WEAVER From North					KOLOWAKA From East					FORT WEAVER From South					KOLOWAKA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:45 PM	110	465	106	4	685	70	16	0	1	87	0	277	14	2	293	10	15	59	0	84	1149
Total	110	465	106	4	685	70	16	0	1	87	0	277	14	2	293	10	15	59	0	84	1149
04:00 PM	138	566	91	0	795	81	19	1	0	101	0	272	10	8	290	13	21	48	0	82	1268
04:15 PM	116	541	109	3	769	87	19	3	3	112	2	313	4	8	327	13	11	40	0	64	1272
04:30 PM	91	438	95	5	629	84	13	2	5	104	0	271	10	9	290	9	18	65	0	92	1115
Grand Total	455	2010	401	12	2878	322	67	6	9	404	2	1133	38	27	1200	45	65	212	0	322	4804
Apprch %	15.8	69.8	13.9	0.4		79.7	16.6	1.5	2.2		0.2	94.4	3.2	2.2		14	20.2	65.8	0		
Total %	9.5	41.8	8.3	0.2	59.9	6.7	1.4	0.1	0.2	8.4	0	23.6	0.8	0.6	25	0.9	1.4	4.4	0	6.7	
Unshifted	455	2010	401	12	2878	322	67	6	9	404	2	1133	38	27	1200	45	65	212	0	322	4804
% Unshifted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : PM_Fort Weaver - Kolowaka GAM recount
Site Code : 00000000
Start Date : 5/10/2012
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	FORT WEAVER From North					KOLOWAKA From East					FORT WEAVER From South					KOLOWAKA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	110	465	106	4	685	70	16	0	1	87	0	277	**14**	2	293	10	15	59	0	84	1149
04:00 PM	**138**	**566**	91	0	**795**	81	**19**	1	0	101	0	272	10	8	290	**13**	**21**	48	0	82	1268
04:15 PM	116	541	**109**	3	769	**87**	19	**3**	3	**112**	**2**	**313**	4	8	**327**	13	11	40	0	64	**1272**
04:30 PM	91	438	95	**5**	629	84	13	2	**5**	104	0	271	10	**9**	290	9	18	**65**	0	**92**	1115
Total Volume	455	2010	401	12	2878	322	67	6	9	404	2	1133	38	27	1200	45	65	212	0	322	4804
% App. Total	15.8	69.8	13.9	0.4		79.7	16.6	1.5	2.2		0.2	94.4	3.2	2.2		14	20.2	65.8	0		
PHF	.824	.888	.920	.600	.905	.925	.882	.500	.450	.902	.250	.905	.679	.750	.917	.865	.774	.815	.000	.875	.944

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File Name : PM_Fort Weaver - Geiger
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Groups Printed- Unshifted - Bank 1

	FORT WEAVER From North					GEIGER From East					FORT WEAVER From South					GEIGER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	60	265	66	0	391	32	24	6	1	63	4	170	39	6	219	23	37	60	9	129	802
03:15 PM	42	269	90	0	401	34	47	5	1	87	3	215	47	20	285	25	38	50	24	137	910
03:30 PM	42	289	97	0	428	33	48	3	2	86	6	254	33	8	301	47	61	70	6	184	999
03:45 PM	60	301	98	0	459	41	53	6	0	100	5	183	42	9	239	31	59	47	6	143	941
Total	204	1124	351	0	1679	140	172	20	4	336	18	822	161	43	1044	126	195	227	45	593	3652
04:00 PM	56	342	74	0	472	35	40	8	3	86	6	216	30	10	262	42	69	49	5	165	985
04:15 PM	56	351	93	0	500	30	50	1	0	81	10	251	46	16	323	54	37	42	13	146	1050
04:30 PM	61	265	95	0	421	31	52	4	1	88	6	217	29	13	265	36	75	54	9	174	948
04:45 PM	64	332	92	0	488	43	53	6	2	104	3	184	45	27	259	32	61	62	4	159	1010
Total	237	1290	354	0	1881	139	195	19	6	359	25	868	150	66	1109	164	242	207	31	644	3993
05:00 PM	66	350	82	0	498	36	31	5	2	74	8	217	38	15	278	27	52	41	12	132	982
05:15 PM	64	325	88	0	477	23	46	6	5	80	4	206	41	1	252	32	38	35	4	109	918
05:30 PM	49	306	64	0	419	21	29	3	2	55	1	145	29	5	180	31	53	41	0	125	779
Grand Total	620	3395	939	0	4954	359	473	53	19	904	56	2258	419	130	2863	380	580	551	92	1603	10324
Apprch %	12.5	68.5	19	0		39.7	52.3	5.9	2.1		2	78.9	14.6	4.5		23.7	36.2	34.4	5.7		
Total %	6	32.9	9.1	0	48	3.5	4.6	0.5	0.2	8.8	0.5	21.9	4.1	1.3	27.7	3.7	5.6	5.3	0.9	15.5	
Unshifted	620	3395	939	0	4954	359	473	53	19	904	56	2258	419	130	2863	380	580	551	92	1603	10324
% Unshifted	100	100	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : PM_Fort Weaver - Geiger
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	FORT WEAVER From North					GEIGER From East					FORT WEAVER From South					GEIGER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	60	301	**98**	0	459	**41**	**53**	6	0	**100**	5	183	42	9	239	31	59	47	6	143	941
04:00 PM	56	342	74	0	472	35	40	**8**	**3**	86	6	216	30	10	262	42	69	49	5	165	985
04:15 PM	56	**351**	93	0	**500**	30	50	1	0	81	**10**	**251**	**46**	**16**	**323**	**54**	37	42	**13**	146	**1050**
04:30 PM	**61**	265	95	0	421	31	52	4	1	88	6	217	29	13	265	36	**75**	**54**	9	**174**	948
Total Volume	233	1259	360	0	1852	137	195	19	4	355	27	867	147	48	1089	163	240	192	33	628	3924
% App. Total	12.6	68	19.4	0		38.6	54.9	5.4	1.1		2.5	79.6	13.5	4.4		26	38.2	30.6	5.3		
PHF	.955	.897	.918	.000	.926	.835	.920	.594	.333	.888	.675	.864	.799	.750	.843	.755	.800	.889	.635	.902	.934

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File Name : PM_Farrington - Old Fort Weaver (West)
Site Code : 00000000
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Groups Printed- Unshifted

	OLD FORT WEAVER From North					FARRINGTON From East					OLD FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	0	0	0	0	0	78	3	0	81	7	0	7	0	14	12	70	0	0	82	177
03:30 PM	0	0	0	0	0	0	79	0	0	79	2	0	5	0	7	14	92	0	0	106	192
03:45 PM	0	0	0	0	0	0	90	1	0	91	3	0	7	0	10	5	76	0	0	81	182
Total	0	0	0	0	0	0	247	4	0	251	12	0	19	0	31	31	238	0	0	269	551
04:00 PM	0	0	0	0	0	0	96	1	0	97	2	0	5	0	7	3	56	0	0	59	163
04:15 PM	0	0	0	0	0	0	88	1	0	89	1	0	7	0	8	8	48	0	0	56	153
04:30 PM	0	0	0	0	0	0	101	4	0	105	2	0	12	0	14	9	49	0	0	58	177
04:45 PM	0	0	0	0	0	0	76	0	0	76	0	0	6	0	6	9	80	0	0	89	171
Total	0	0	0	0	0	0	361	6	0	367	5	0	30	0	35	29	233	0	0	262	664
05:00 PM	0	0	0	0	0	0	110	0	0	110	4	0	7	0	11	6	68	0	0	74	195
05:15 PM	0	0	0	0	0	0	94	1	0	95	1	0	5	0	6	7	47	0	0	54	155
05:30 PM	0	0	0	0	0	0	72	1	0	73	1	0	6	0	7	6	54	0	0	60	140
05:45 PM	0	0	0	0	0	0	56	1	0	57	1	0	4	0	5	7	44	0	0	51	113
Total	0	0	0	0	0	0	332	3	0	335	7	0	22	0	29	26	213	0	0	239	603
Grand Total	0	0	0	0	0	0	940	13	0	953	24	0	71	0	95	86	684	0	0	770	1818
Apprch %	0	0	0	0		0	98.6	1.4	0		25.3	0	74.7	0		11.2	88.8	0	0		
Total %	0	0	0	0	0	0	51.7	0.7	0	52.4	1.3	0	3.9	0	5.2	4.7	37.6	0	0	42.4	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
Honolulu, HI 96817
(808) 533-3646

File Name : PM_Farrington - Old Fort Weaver (West)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	OLD FORT WEAVER From North					FARRINGTON From East					OLD FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	0	0	0	90	1	0	91	**3**	0	7	0	10	5	**76**	0	0	**81**	**182**
04:00 PM	0	0	0	0	0	0	96	1	0	97	2	0	5	0	7	3	56	0	0	59	163
04:15 PM	0	0	0	0	0	0	88	1	0	89	1	0	7	0	8	8	48	0	0	56	153
04:30 PM	0	0	0	0	0	0	**101**	**4**	0	**105**	2	0	**12**	0	**14**	**9**	49	0	0	58	177
Total Volume	0	0	0	0	0	0	375	7	0	382	8	0	31	0	39	25	229	0	0	254	675
% App. Total	0	0	0	0		0	98.2	1.8	0		20.5	0	79.5	0		9.8	90.2	0	0		
PHF	.000	.000	.000	.000	.000	.000	.928	.438	.000	.910	.667	.000	.646	.000	.696	.694	.753	.000	.000	.784	.927

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501 Sumner St. Ste. 521
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(808) 533-3646

File Name : PM_Farrington - Weaver (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	OLD FORT WEAVER From North					FARRINGTON From East					OLD FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	0	0	0	0	0	78	31	0	109	8	0	0	0	8	0	75	0	0	75	192
03:30 PM	0	0	0	0	0	0	75	40	0	115	9	0	0	0	9	0	86	0	0	86	210
03:45 PM	0	0	0	0	0	0	92	29	5	126	13	0	0	0	13	0	84	0	0	84	223
Total	0	0	0	0	0	0	245	100	5	350	30	0	0	0	30	0	245	0	0	245	625
04:00 PM	0	0	0	0	0	0	90	50	2	142	7	0	0	0	7	0	60	0	0	60	209
04:15 PM	0	0	0	0	0	0	98	42	2	142	12	0	0	0	12	0	52	0	0	52	206
04:30 PM	0	0	0	0	0	0	88	36	1	125	12	0	0	0	12	0	52	0	0	52	189
04:45 PM	0	0	0	0	0	0	79	37	2	118	8	0	0	0	8	0	82	0	0	82	208
Total	0	0	0	0	0	0	355	165	7	527	39	0	0	0	39	0	246	0	0	246	812
05:00 PM	0	0	0	0	0	0	102	38	1	141	11	0	0	0	11	0	70	0	0	70	222
05:15 PM	0	0	0	0	0	0	93	39	0	132	13	0	0	0	13	0	51	0	0	51	196
05:30 PM	0	0	0	0	0	0	70	40	1	111	3	0	0	0	3	0	50	0	0	50	164
05:45 PM	0	0	0	0	0	0	60	43	0	103	10	0	0	0	10	0	53	0	0	53	166
Total	0	0	0	0	0	0	325	160	2	487	37	0	0	0	37	0	224	0	0	224	748
Grand Total	0	0	0	0	0	0	925	425	14	1364	106	0	0	0	106	0	715	0	0	715	2185
Apprch %	0	0	0	0		0	67.8	31.2	1		100	0	0	0		0	100	0	0		
Total %	0	0	0	0	0	0	42.3	19.5	0.6	62.4	4.9	0	0	0	4.9	0	32.7	0	0	32.7	

Austin Tsutsumi & Asscociates

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File Name : PM_Farrington - Weaver (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	OLD FORT WEAVER From North					FARRINGTON From East					OLD FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	0	0	0	92	29	**5**	126	**13**	0	0	0	**13**	0	**84**	0	0	**84**	**223**
04:00 PM	0	0	0	0	0	0	90	**50**	2	**142**	7	0	0	0	7	0	60	0	0	60	209
04:15 PM	0	0	0	0	0	0	**98**	42	2	142	12	0	0	0	12	0	52	0	0	52	206
04:30 PM	0	0	0	0	0	0	88	36	1	125	12	0	0	0	12	0	52	0	0	52	189
Total Volume	0	0	0	0	0	0	368	157	10	535	44	0	0	0	44	0	248	0	0	248	827
% App. Total	0	0	0	0		0	68.8	29.3	1.9		100	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.939	.785	.500	.942	.846	.000	.000	.000	.846	.000	.738	.000	.000	.738	.927

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File Name : PM_Weaver (E) - Old Fort Weaver (W) Q.ANH
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	OLD FORT WEAVER From North					WEAVER From East					OLD FORT WEAVER From South					WEAVER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	1	10	1	0	12	2	0	25	0	27	3	5	0	0	8	0	0	0	0	0	47
03:30 PM	1	15	2	0	18	3	2	38	0	43	11	3	0	0	14	0	0	0	0	0	75
03:45 PM	0	8	4	0	12	0	0	27	0	27	8	5	0	0	13	0	0	0	0	0	52
Total	2	33	7	0	42	5	2	90	0	97	22	13	0	0	35	0	0	0	0	0	174
04:00 PM	1	2	0	0	3	0	0	51	0	51	6	7	0	0	13	0	0	0	0	0	67
04:15 PM	0	17	1	0	18	2	0	38	0	40	7	5	0	0	12	0	0	0	0	0	70
04:30 PM	0	11	1	0	12	3	0	38	0	41	6	9	1	0	16	0	0	0	0	0	69
04:45 PM	0	13	1	0	14	2	0	39	0	41	8	3	0	0	11	0	0	0	0	0	66
Total	1	43	3	0	47	7	0	166	0	173	27	24	1	0	52	0	0	0	0	0	272
05:00 PM	0	8	1	0	9	0	0	38	0	38	12	6	0	0	18	0	0	0	0	0	65
05:15 PM	0	8	1	0	9	3	0	34	0	37	7	4	0	0	11	0	0	0	0	0	57
05:30 PM	1	5	0	0	6	0	0	42	0	42	3	5	0	0	8	0	0	0	0	0	56
05:45 PM	0	6	1	0	7	0	1	40	0	41	15	5	0	0	20	0	0	0	0	0	68
Total	1	27	3	0	31	3	1	154	0	158	37	20	0	0	57	0	0	0	0	0	246
Grand Total	4	103	13	0	120	15	3	410	0	428	86	57	1	0	144	0	0	0	0	0	692
Apprch %	3.3	85.8	10.8	0		3.5	0.7	95.8	0		59.7	39.6	0.7	0		0	0	0	0		
Total %	0.6	14.9	1.9	0	17.3	2.2	0.4	59.2	0	61.8	12.4	8.2	0.1	0	20.8	0	0	0	0	0	

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File Name : PM_Weaver (E) - Old Fort Weaver (W) Q.ANH
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	OLD FORT WEAVER From North					WEAVER From East					OLD FORT WEAVER From South					WEAVER From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	8	**4**	0	12	0	0	27	0	27	**8**	5	0	0	13	0	0	0	0	0	52
04:00 PM	**1**	2	0	0	3	0	0	**51**	0	**51**	6	7	0	0	13	0	0	0	0	0	67
04:15 PM	0	**17**	1	0	**18**	2	0	38	0	40	7	5	0	0	12	0	0	0	0	0	**70**
04:30 PM	0	11	1	0	12	**3**	0	38	0	41	6	**9**	**1**	0	**16**	0	0	0	0	0	69
Total Volume	1	38	6	0	45	5	0	154	0	159	27	26	1	0	54	0	0	0	0	0	258
% App. Total	2.2	84.4	13.3	0		3.1	0	96.9	0		50	48.1	1.9	0		0	0	0	0		
PHF	.250	.559	.375	.000	.625	.417	.000	.755	.000	.779	.844	.722	.250	.000	.844	.000	.000	.000	.000	.000	.921

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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File Name : PM - Fort Weaver Ramps (East) PHUONG recounted
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted - Bank 1

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	24	0	0	0	24	0	83	191	0	274	189	0	0	0	189	6	72	0	0	78	565
03:30 PM	25	0	0	0	25	0	93	176	0	269	170	0	0	0	170	5	94	0	0	99	563
03:45 PM	24	0	0	0	24	0	101	173	0	274	177	0	0	0	177	6	102	0	0	108	583
Total	73	0	0	0	73	0	277	540	0	817	536	0	0	0	536	17	268	0	0	285	1711
04:00 PM	24	0	0	0	24	0	120	156	0	276	166	0	0	0	166	0	64	0	0	64	530
04:15 PM	36	0	0	0	36	0	108	162	0	270	163	0	0	0	163	5	56	0	0	61	530
04:30 PM	28	0	0	0	28	0	103	143	0	246	138	0	0	0	138	1	73	0	0	74	486
04:45 PM	32	0	0	0	32	0	89	161	0	250	157	0	0	0	157	7	87	0	0	94	533
Total	120	0	0	0	120	0	420	622	0	1042	624	0	0	0	624	13	280	0	0	293	2079
05:00 PM	27	0	0	0	27	0	111	137	0	248	139	0	0	0	139	5	71	0	0	76	490
05:15 PM	23	0	0	0	23	0	111	186	0	297	131	0	0	0	131	6	61	0	0	67	518
05:30 PM	28	0	0	0	28	0	90	197	0	287	135	0	0	0	135	2	49	0	0	51	501
05:45 PM	23	0	0	0	23	0	79	188	0	267	130	0	0	0	130	2	61	0	0	63	483
Total	101	0	0	0	101	0	391	708	0	1099	535	0	0	0	535	15	242	0	0	257	1992
Grand Total	294	0	0	0	294	0	1088	1870	0	2958	1695	0	0	0	1695	45	790	0	0	835	5782
Apprch %	100	0	0	0		0	36.8	63.2	0		100	0	0	0		5.4	94.6	0	0		
Total %	5.1	0	0	0	5.1	0	18.8	32.3	0	51.2	29.3	0	0	0	29.3	0.8	13.7	0	0	14.4	
Unshifted	294	0	0	0	294	0	1088	1870	0	2958	1695	0	0	0	1695	45	790	0	0	835	5782
% Unshifted	100	0	0	0	100	0	100	100	0	100	100	0	0	0	100	100	100	0	0	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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File Name : PM - Fort Weaver Ramps (East) PHUONG recounted
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	24	0	0	0	24	0	101	**173**	0	274	**177**	0	0	0	**177**	**6**	**102**	0	0	**108**	**583**
04:00 PM	24	0	0	0	24	0	**120**	156	0	**276**	166	0	0	0	166	0	64	0	0	64	530
04:15 PM	**36**	0	0	0	**36**	0	108	162	0	270	163	0	0	0	163	5	56	0	0	61	530
04:30 PM	28	0	0	0	28	0	103	143	0	246	138	0	0	0	138	1	73	0	0	74	486
Total Volume	112	0	0	0	112	0	432	634	0	1066	644	0	0	0	644	12	295	0	0	307	2129
% App. Total	100	0	0	0		0	40.5	59.5	0		100	0	0	0		3.9	96.1	0	0		
PHF	.778	.000	.000	.000	.778	.000	.900	.916	.000	.966	.910	.000	.000	.000	.910	.500	.723	.000	.000	.711	.913

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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(808) 533-3646

File Name : PM_ Fort Weaver Ramps (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 1

Groups Printed- Unshifted

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	0	0	0	0	108	246	0	0	354	117	0	0	0	117	0	229	48	0	277	748
03:30 PM	0	0	0	0	0	111	258	0	0	369	132	0	0	0	132	0	211	60	0	271	772
03:45 PM	0	0	0	0	0	112	272	0	0	384	111	0	0	0	111	0	217	59	0	276	771
Total	0	0	0	0	0	331	776	0	0	1107	360	0	0	0	360	0	657	167	0	824	2291
04:00 PM	0	0	0	0	0	135	303	0	0	438	100	0	0	0	100	0	169	58	0	227	765
04:15 PM	0	0	0	0	0	109	284	0	0	393	99	0	0	0	99	0	163	54	0	217	709
04:30 PM	0	0	0	0	0	125	271	0	0	396	97	0	0	0	97	0	165	50	0	215	708
04:45 PM	0	0	0	0	0	98	257	0	0	355	96	0	0	0	96	0	183	59	0	242	693
Total	0	0	0	0	0	467	1115	0	0	1582	392	0	0	0	392	0	680	221	0	901	2875
05:00 PM	0	0	0	0	0	134	292	0	0	426	102	0	0	0	102	0	140	68	0	208	736
05:15 PM	0	0	0	0	0	106	291	0	0	397	106	0	0	0	106	0	157	50	0	207	710
05:30 PM	0	0	0	0	0	105	261	0	0	366	101	0	0	0	101	0	143	48	0	191	658
05:45 PM	0	0	0	0	0	72	252	0	0	324	116	0	0	0	116	0	150	43	0	193	633
Total	0	0	0	0	0	417	1096	0	0	1513	425	0	0	0	425	0	590	209	0	799	2737
Grand Total	0	0	0	0	0	1215	2987	0	0	4202	1177	0	0	0	1177	0	1927	597	0	2524	7903
Apprch %	0	0	0	0		28.9	71.1	0	0		100	0	0	0		0	76.3	23.7	0		
Total %	0	0	0	0	0	15.4	37.8	0	0	53.2	14.9	0	0	0	14.9	0	24.4	7.6	0	31.9	

Austin Tsutsumi & Asscociates

501 Sumner St. Ste. 521
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(808) 533-3646

File Name : PM_ Fort Weaver Ramps (East)
Site Code : 00000000
Start Date : 2/15/2012
Page No : 2

	KUNIA From North					FARRINGTON From East					FORT WEAVER From South					FARRINGTON From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	0	0	112	272	0	0	384	**111**	0	0	0	**111**	0	**217**	**59**	0	**276**	**771**
04:00 PM	0	0	0	0	0	**135**	**303**	0	0	**438**	100	0	0	0	100	0	169	58	0	227	765
04:15 PM	0	0	0	0	0	109	284	0	0	393	99	0	0	0	99	0	163	54	0	217	709
04:30 PM	0	0	0	0	0	125	271	0	0	396	97	0	0	0	97	0	165	50	0	215	708
Total Volume	0	0	0	0	0	481	1130	0	0	1611	407	0	0	0	407	0	714	221	0	935	2953
% App. Total	0	0	0	0		29.9	70.1	0	0		100	0	0	0		0	76.4	23.6	0		
PHF	.000	.000	.000	.000	.000	.891	.932	.000	.000	.920	.917	.000	.000	.000	.917	.000	.823	.936	.000	.847	.958

Austin, Tsutsumi & Associates

501 Sumner Street Suite 521
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File Name : PM_Paiwa Interchange (North)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	140	90	0	0	230	126	0	119	3	248	0	121	70	0	191	0	0	0	0	0	669
03:30 PM	153	110	0	0	263	120	0	121	5	246	0	107	61	0	168	0	0	0	0	0	677
03:45 PM	136	101	0	0	237	132	0	118	1	251	0	139	60	0	199	0	0	0	0	0	687
Total	429	301	0	0	730	378	0	358	9	745	0	367	191	0	558	0	0	0	0	0	2033
04:00 PM	136	98	0	0	234	117	0	121	7	245	0	104	76	0	180	0	0	0	0	0	659
04:15 PM	143	81	0	1	225	137	0	124	3	264	0	114	68	0	182	0	0	0	1	1	672
04:30 PM	146	96	0	1	243	124	0	86	1	211	0	116	81	0	197	0	0	0	1	1	652
04:45 PM	151	85	0	0	236	124	0	121	13	258	0	119	72	0	191	0	0	0	1	1	686
Total	576	360	0	2	938	502	0	452	24	978	0	453	297	0	750	0	0	0	3	3	2669
05:00 PM	166	111	0	1	278	116	0	108	8	232	0	129	84	0	213	0	0	0	0	0	723
Grand Total	1171	772	0	3	1946	996	0	918	41	1955	0	949	572	0	1521	0	0	0	3	3	5425
Apprch %	60.2	39.7	0	0.2		50.9	0	47	2.1		0	62.4	37.6	0		0	0	0	100		
Total %	21.6	14.2	0	0.1	35.9	18.4	0	16.9	0.8	36	0	17.5	10.5	0	28	0	0	0	0.1	0.1	

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File Name : PM_Paiwa Interchange (North)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	136	**101**	0	0	237	132	0	118	1	251	0	**139**	60	0	**199**	0	0	0	0	0	**687**
04:00 PM	136	98	0	0	234	117	0	121	**7**	245	0	104	76	0	180	0	0	0	0	0	659
04:15 PM	143	81	0	**1**	225	**137**	0	**124**	3	**264**	0	114	68	0	182	0	0	0	**1**	**1**	672
04:30 PM	**146**	96	0	1	**243**	124	0	86	1	211	0	116	**81**	0	197	0	0	0	1	1	652
Total Volume	561	376	0	2	939	510	0	449	12	971	0	473	285	0	758	0	0	0	2	2	2670
% App. Total	59.7	40	0	0.2		52.5	0	46.2	1.2		0	62.4	37.6	0		0	0	0	100		
PHF	.961	.931	.000	.500	.966	.931	.000	.905	.429	.920	.000	.851	.880	.000	.952	.000	.000	.000	.500	.500	.972

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File Name : PM_Paiwa Interchange (South)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	152	69	0	221	0	0	0	3	3	72	107	0	0	179	76	0	79	0	155	558
03:30 PM	0	158	63	0	221	0	0	0	5	5	87	118	0	0	205	110	2	83	0	195	626
03:45 PM	0	153	71	0	224	0	0	0	1	1	89	108	0	0	197	104	1	106	0	211	633
Total	0	463	203	0	666	0	0	0	9	9	248	333	0	0	581	290	3	268	0	561	1817
04:00 PM	0	145	72	0	217	0	0	0	5	5	52	124	0	0	176	91	0	84	0	175	573
04:15 PM	0	154	46	0	200	0	0	0	3	3	80	118	0	0	198	98	2	69	0	169	570
04:30 PM	0	140	64	0	204	0	0	0	0	0	70	115	0	0	185	99	1	82	1	183	572
04:45 PM	0	143	58	0	201	0	0	0	11	11	57	138	0	0	195	85	0	88	0	173	580
Total	0	582	240	0	822	0	0	0	19	19	259	495	0	0	754	373	3	323	1	700	2295
05:00 PM	0	152	75	0	227	0	0	0	5	5	75	118	0	0	193	69	1	92	1	163	588
Grand Total	0	1197	518	0	1715	0	0	0	33	33	582	946	0	0	1528	732	7	683	2	1424	4700
Apprch %	0	69.8	30.2	0		0	0	0	100		38.1	61.9	0	0		51.4	0.5	48	0.1		
Total %	0	25.5	11	0	36.5	0	0	0	0.7	0.7	12.4	20.1	0	0	32.5	15.6	0.1	14.5	0	30.3	

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File Name : PM_Paiwa Interchange (South)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	PAIWA From North					H1 From East					PAIWA From South					H1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	153	71	0	**224**	0	0	0	1	1	**89**	108	0	0	197	**104**	1	**106**	0	**211**	**633**
04:00 PM	0	145	**72**	0	217	0	0	0	**5**	**5**	52	**124**	0	0	176	91	0	84	0	175	573
04:15 PM	0	**154**	46	0	200	0	0	0	3	3	80	118	0	0	**198**	98	**2**	69	0	169	570
04:30 PM	0	140	64	0	204	0	0	0	0	0	70	115	0	0	185	99	1	82	**1**	183	572
Total Volume	0	592	253	0	845	0	0	0	9	9	291	465	0	0	756	392	4	341	1	738	2348
% App. Total	0	70.1	29.9	0		0	0	0	100		38.5	61.5	0	0		53.1	0.5	46.2	0.1		
PHF	.000	.961	.878	.000	.943	.000	.000	.000	.450	.450	.817	.938	.000	.000	.955	.942	.500	.804	.250	.874	.927

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File Name : PM_H-2 SB to H-1 WB & H-1 EB Zipper Lane
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	H-2 SB TO H-1 WB ON RAMP From North					H-1 WB From East					ZIPPER LANE EB From South					A From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	78	0	0	78	0	657	0	0	657	0	0	0	0	0	0	0	0	0	0	735
03:30 PM	0	227	0	0	227	0	1547	0	0	1547	0	0	0	0	0	0	0	0	0	0	1774
03:45 PM	0	259	0	0	259	0	1611	0	0	1611	0	0	0	0	0	0	0	0	0	0	1870
Total	0	564	0	0	564	0	3815	0	0	3815	0	0	0	0	0	0	0	0	0	0	4379
04:00 PM	0	261	0	0	261	0	1545	0	0	1545	0	0	0	0	0	0	0	0	0	0	1806
04:15 PM	0	254	0	0	254	0	1535	0	0	1535	0	0	0	0	0	0	0	0	0	0	1789
04:30 PM	0	229	0	0	229	0	1524	0	0	1524	0	0	0	0	0	0	0	0	0	0	1753
04:45 PM	0	220	0	0	220	0	1559	0	0	1559	0	0	0	0	0	0	0	0	0	0	1779
Total	0	964	0	0	964	0	6163	0	0	6163	0	0	0	0	0	0	0	0	0	0	7127
05:00 PM	0	255	0	0	255	0	1498	0	0	1498	0	0	0	0	0	0	0	0	0	0	1753
Grand Total	0	1783	0	0	1783	0	11476	0	0	11476	0	0	0	0	0	0	0	0	0	0	13259
Apprch %	0	100	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
Total %	0	13.4	0	0	13.4	0	86.6	0	0	86.6	0	0	0	0	0	0	0	0	0	0	

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File Name : PM_H-2 SB to H-1 WB & H-1 EB Zipper Lane
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	H-2 SB TO H-1 WB ON RAMP From North					H-1 WB From East					ZIPPER LANE EB From South					A From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	259	0	0	259	0	**1611**	0	0	**1611**	0	0	0	0	0	0	0	0	0	0	**1870**
04:00 PM	0	**261**	0	0	**261**	0	1545	0	0	1545	0	0	0	0	0	0	0	0	0	0	1806
04:15 PM	0	254	0	0	254	0	1535	0	0	1535	0	0	0	0	0	0	0	0	0	0	1789
04:30 PM	0	229	0	0	229	0	1524	0	0	1524	0	0	0	0	0	0	0	0	0	0	1753
Total Volume	0	1003	0	0	1003	0	6215	0	0	6215	0	0	0	0	0	0	0	0	0	0	7218
% App. Total	0	100	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.961	.000	.000	.961	.000	.964	.000	.000	.964	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.965

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File Name : PM_H-1 EB to Kamehameha SB (Farrington)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	A From North					H-1 From East					Farrington Hwy From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	0	0	0	147	147
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	0	0	0	146	146
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163	0	0	0	163	163
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	456	0	0	0	456	456
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	164	0	0	0	164	164
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	170	0	0	0	170	170
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154	0	0	0	154	154
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	141	0	0	0	141	141
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	629	0	0	0	629	629
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	0	0	0	145	145
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1230	0	0	0	1230	1230
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		100	0	0	0		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100	

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File Name : PM_H-1 EB to Kamehameha SB (Farrington)
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	A From North					H-1 From East					Farrington Hwy From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163	0	0	0	163	163
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	164	0	0	0	164	164
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**170**	0	0	0	**170**	**170**
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154	0	0	0	154	154
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	651	0	0	0	651	651
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.957	.000	.000	.000	.957	.957

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File Name : PM_H-1 EB to Kamehameha NB Lp & H-1 EB to H-2 NB
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	H-2 From North					H-1 From East					Kamehameha NB Lp From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207	0	64	0	271	271
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	248	0	86	0	334	334
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	286	0	100	0	386	386
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	741	0	250	0	991	991
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207	0	74	0	281	281
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	266	0	79	0	345	345
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	256	0	91	0	347	347
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	267	0	86	0	353	353
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	996	0	330	0	1326	1326
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	178	0	58	0	236	236
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1915	0	638	0	2553	2553
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		75	0	25	0		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	0	25	0	100	

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File Name : PM_H-1 EB to Kamehameha NB Lp & H-1 EB to H-2 NB
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	H-2 From North					H-1 From East					Kamehameha NB Lp From South					H-1 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**286**	0	**100**	0	**386**	**386**
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	207	0	74	0	281	281
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	266	0	79	0	345	345
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	256	0	91	0	347	347
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1015	0	344	0	1359	1359
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		74.7	0	25.3	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.887	.000	.860	.000	.880	.880

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File Name : PM_WB Kamehameha to H-1 WB On Ramp
Site Code : 00000000
Start Date : 4/3/2012
Page No : 1

Groups Printed- Unshifted

	H1 From North					KAMEHAMEHA From East					H1 From South					KAMEHAMEHA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:15 PM	0	0	0	0	0	0	270	0	0	270	0	0	0	0	0	0	0	0	0	0	270
03:30 PM	0	0	0	0	0	0	272	0	0	272	0	0	0	0	0	0	0	0	0	0	272
03:45 PM	0	0	0	0	0	0	260	0	0	260	0	0	0	0	0	0	0	0	0	0	260
Total	0	0	0	0	0	0	802	0	0	802	0	0	0	0	0	0	0	0	0	0	802
04:00 PM	0	0	0	0	0	0	255	0	0	255	0	0	0	0	0	0	0	0	0	0	255
04:15 PM	0	0	0	0	0	0	260	0	0	260	0	0	0	0	0	0	0	0	0	0	260
04:30 PM	0	0	0	0	0	0	281	0	0	281	0	0	0	0	0	0	0	0	0	0	281
04:45 PM	0	0	0	0	0	0	306	0	0	306	0	0	0	0	0	0	0	0	0	0	306
Total	0	0	0	0	0	0	1102	0	0	1102	0	0	0	0	0	0	0	0	0	0	1102
05:00 PM	0	0	0	0	0	0	309	0	0	309	0	0	0	0	0	0	0	0	0	0	309
Grand Total	0	0	0	0	0	0	2213	0	0	2213	0	0	0	0	0	0	0	0	0	0	2213
Apprch %	0	0	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
Total %	0	0	0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	

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File Name : PM_WB Kamehameha to H-1 WB On Ramp
Site Code : 00000000
Start Date : 4/3/2012
Page No : 2

	H1 From North					KAMEHAMEHA From East					H1 From South					KAMEHAMEHA From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:45 PM to 04:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:45 PM																					
03:45 PM	0	0	0	0	0	0	260	0	0	260	0	0	0	0	0	0	0	0	0	0	260
04:00 PM	0	0	0	0	0	0	255	0	0	255	0	0	0	0	0	0	0	0	0	0	255
04:15 PM	0	0	0	0	0	0	260	0	0	260	0	0	0	0	0	0	0	0	0	0	260
04:30 PM	0	0	0	0	0	0	**281**	0	0	**281**	0	0	0	0	0	0	0	0	0	0	**281**
Total Volume	0	0	0	0	0	0	1056	0	0	1056	0	0	0	0	0	0	0	0	0	0	1056
% App. Total	0	0	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.940	.000	.000	.940	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.940

APPENDIX A

TRAFFIC COUNT DATA

- 2009 HDOT COUNTS

Traffic Data Service

Traffic Station Sketch

Meter #	File Name	GPS
1. U120001354	D0316003_B72000100125	21.35018, -158.06879
2.	D0316004_B72000100125	21.35018, -158.06879

Station Description: H-1 : Makakilo Drive off ramp (WB) to North-South Road off ramp (EB)		
Survey Beginning Date/Time: 3/16/2009 @ 0000		Survey Ending Date/Time: 3/17/2009 @ 2400

Survey Method:	Data Type:	Volume
Survey Crew:	LM	Wavetronix
Sketch Updated:	By:	LM
Remarks:		

FACILITY NAME	JURI	FUNC CLASS	AREA TYPE	ROUTE NO.	ROUTE MILE
H-1		11		0001	

D1= Direction to End — D1: North-South Road off ramp (EB) / Ainakoa Ave.
D2= Direction to Begin — D2: Makakilo Drive off ramp (WB) / Palailai IC

Run Date: 2010/07/30

Hawaii Department of Transportation
Highways Division — Highways Planning Survey Section
2009 Program Count - Summary

Site ID: B72000100125 **Town:** Oahu **Final AADT:** 68200
Functional Class: URBAN:PRINCIPAL ARTERIAL - INTERSTATE **Count Type:** VOLUME **Route No:** H-1
Location: **Counter Type:** Tube **DIR 1:** +MP **DIR 2:** -MP

TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 03/16/2009															
12:00-12:15	94	119	213	06:00-06:15	1387	568	1955	12:00-12:15	745	634	1379	06:00-06:15	796	958	1754
12:15-12:30	86	114	200	06:15-06:30	1210	625	1835	12:15-12:30	879	642	1521	06:15-06:30	702	933	1635
12:30-12:45	99	94	193	06:30-06:45	1211	682	1893	12:30-12:45	829	640	1469	06:30-06:45	635	888	1523
12:45-01:00	78	84	162	06:45-07:00	1142	828	1970	12:45-01:00	825	678	1503	06:45-07:00	597	901	1498
01:00-01:15	91	74	165	07:00-07:15	1183	854	2037	01:00-01:15	791	635	1426	07:00-07:15	538	816	1354
01:15-01:30	67	68	135	07:15-07:30	1234	780	2014	01:15-01:30	820	654	1474	07:15-07:30	539	779	1318
01:30-01:45	74	56	130	07:30-07:45	1186	880	2066	01:30-01:45	807	679	1486	07:30-07:45	443	641	1084
01:45-02:00	50	44	94	07:45-08:00	1119	826	1945	01:45-02:00	857	698	1555	07:45-08:00	364	548	912
02:00-02:15	56	44	100	08:00-08:15	1136	735	1871	02:00-02:15	801	694	1495	08:00-08:15	373	532	905
02:15-02:30	53	45	98	08:15-08:30	1132	713	1845	02:15-02:30	889	738	1627	08:15-08:30	327	433	760
02:30-02:45	53	49	102	08:30-08:45	1123	619	1742	02:30-02:45	965	799	1764	08:30-08:45	350	457	807
02:45-03:00	62	42	104	08:45-09:00	1108	548	1656	02:45-03:00	1009	788	1797	08:45-09:00	347	385	732
03:00-03:15	76	29	105	09:00-09:15	950	574	1524	03:00-03:15	883	898	1781	09:00-09:15	376	370	746
03:15-03:30	86	53	139	09:15-09:30	949	505	1454	03:15-03:30	1038	974	2012	09:15-09:30	369	369	738
03:30-03:45	163	49	212	09:30-09:45	996	522	1518	03:30-03:45	1275	1033	2308	09:30-09:45	367	370	737
03:45-04:00	187	67	254	09:45-10:00	1016	531	1547	03:45-04:00	1228	1082	2310	09:45-10:00	299	388	687
04:00-04:15	222	74	296	10:00-10:15	908	537	1445	04:00-04:15	1207	1159	2366	10:00-10:15	237	349	586
04:15-04:30	344	110	454	10:15-10:30	914	529	1443	04:15-04:30	1137	1189	2326	10:15-10:30	266	282	548
04:30-04:45	461	140	601	10:30-10:45	952	563	1515	04:30-04:45	1131	1043	2174	10:30-10:45	225	278	503
04:45-05:00	672	196	868	10:45-11:00	883	550	1433	04:45-05:00	1081	1119	2200	10:45-11:00	213	266	479
05:00-05:15	905	219	1124	11:00-11:15	875	566	1441	05:00-05:15	1046	871	1917	11:00-11:15	164	217	381
05:15-05:30	1226	286	1512	11:15-11:30	827	591	1418	05:15-05:30	1014	788	1802	11:15-11:30	159	165	324
05:30-05:45	1511	365	1876	11:30-11:45	937	588	1525	05:30-05:45	1009	733	1742	11:30-11:45	121	177	298
05:45-06:00	1423	411	1834	11:45-12:00	842	651	1493	05:45-06:00	877	931	1808	11:45-12:00	94	149	243

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 AM to 07:45 AM		
AM - PEAK HR VOLUME	4745	3342	8087
AM - K FACTOR (%)			7.01
AM - D (%)	58.67	41.33	100.00
DIRECTIONAL PEAK			
AM - PEAK HR TIME	05:15 AM to 06:15 AM	06:45 AM to 07:45 AM	
AM - PEAK HR VOLUME	5547	3342	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:30 PM to 04:30 PM		
PM - PEAK HR VOLUME	4847	4463	9310
PM - K FACTOR (%)			8.07
PM - D (%)	52.06	47.94	100.00
DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:30 PM to 04:30 PM	04:00 PM to 05:00 PM	
PM - PEAK HR VOLUME	4847	4510	

AM PERIOD (00:00-12:00)			
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	06:45 AM to 07:45 AM		
AM - PEAK HR VOLUME	4745	3342	8087
AM - K FACTOR (%)			7.01
AM - D (%)	58.67	41.33	100.00

PM PERIOD (12:00-24:00)			
TWO DIRECTIONAL PEAK			
PM - PEAK HR TIME	03:30 PM to 04:30 PM		
PM - PEAK HR VOLUME	4847	4463	9310
PM - K FACTOR (%)			8.07
PM - D (%)	52.06	47.94	100.00

NON-COMMUTER PERIOD (09:00-15:00)			
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:00 PM to 03:00 PM		
PEAK HR VOLUME	3664	3019	6683
DIRECTIONAL PEAK			
PEAK HR TIME	09:00 AM to 10:00 AM	02:00 PM to 03:00 PM	
PEAK HR VOLUME	3911	3019	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
AM 6-HR PERIOD (06:00-12:00)	25,220	15,365	40,585
AM 12-HR PERIOD (00:00-12:00)	33,359	18,197	51,556
PM 6-HR PERIOD (12:00-18:00)	23,143	20,099	43,242
PM 12-HR PERIOD (12:00-24:00)	32,044	31,750	63,794
24 HOUR PERIOD	65,403	49,947	115,350
D (%)	56.70	43.30	100.00

APPENDIX B

LEVEL OF SERVICE CRITERIA

APPENDIX B – LEVEL OF SERVICE (LOS) CRITERIA

LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS (HCM 2000)

Level of service for signalized intersections is directly related to delay values and is assigned on that basis. Level of Service is a measure of the acceptability of delay values to motorists at a given intersection. The criteria are given in table below.

Level-of Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec./veh.)
A	< 10.0
B	>10.0 and ≤ 20.0
C	>20.0 and ≤ 35.0
D	>35.0 and ≤ 55.0
E	>55.0 and ≤ 80.0
F	> 80.0

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 2000)

The level of service criteria for unsignalized intersections is defined as the average control delay, in seconds per vehicle.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for Two-Way Stop-Controlled Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing Conditions AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Volume (vph)	322	0	9	190	17	18
Turn Type	Prot	NA	Free	Prot	NA	NA
Protected Phases	1	6		3	8	4
Permitted Phases			Free			
Detector Phase	1	6		3	8	4
Switch Phase						
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0	28.0		10.0	20.0	18.0
Total Split (s)	36.0	36.0		17.0	35.0	18.0
Total Split (%)	50.7%	50.7%		23.9%	49.3%	25.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0
Lead/Lag				Lead		Lag
Lead-Lag Optimize?						
Recall Mode	None	Min		None	None	None

Intersection Summary
Cycle Length: 71
Actuated Cycle Length: 64.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	322	0	9	190	17	0	0	18	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	4.0	6.0	6.0			6.0	
Lane Util. Factor				0.95	0.95	1.00	1.00	1.00			1.00	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1681	1681	1583	1770	1863			1863	
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	
Satd. Flow (perm)				1681	1681	1583	1770	1863			1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.92	0.28	0.77	0.42	0.92	0.92	0.41	0.92
Adj. Flow (vph)	0	0	0	362	0	32	247	40	0	0	44	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	181	181	32	247	40	0	0	44	0
Turn Type				Prot	NA	Free	Prot	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases						Free						4
Actuated Green, G (s)				33.0	33.0	66.7	11.1	21.7			4.6	
Effective Green, g (s)				33.0	33.0	66.7	11.1	21.7			4.6	
Actuated g/C Ratio				0.49	0.49	1.00	0.17	0.33			0.07	
Clearance Time (s)				6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				831	831	1583	294	606			128	
v/s Ratio Prot				c0.11	0.11		c0.14	0.02			c0.02	
v/s Ratio Perm						0.02						
v/c Ratio				0.22	0.22	0.02	0.84	0.07			0.34	
Uniform Delay, d1				9.5	9.5	0.0	26.9	15.5			29.6	
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2				0.1	0.1	0.0	18.9	0.0			1.6	
Delay (s)				9.7	9.7	0.0	45.9	15.6			31.2	
Level of Service				A	A	A	D	B			C	
Approach Delay (s)		0.0			8.9			41.7			31.2	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	66.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	2	239	200	419	11	328
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	10.0		28.0		10.0	28.0
Total Split (s)	17.0		86.0		17.0	103.0
Total Split (%)	14.2%		71.7%		14.2%	85.8%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		6.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		None		None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 18.7
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	2	239	0	0	0	0	200	419	11	328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1786	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1786	1583					3539	2787	1770	3539	
Peak-hour factor, PHF	0.38	0.50	0.84	0.92	0.92	0.92	0.92	0.77	0.90	0.46	0.88	0.92
Adj. Flow (vph)	24	4	285	0	0	0	0	260	466	24	373	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	28	285	0	0	0	0	260	466	24	373	0
Turn Type	Perm	NA	Free					NA	Free	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		Free						Free			
Actuated Green, G (s)		0.6	26.4					7.2	26.4	0.6	13.8	
Effective Green, g (s)		0.6	26.4					7.2	26.4	0.6	13.8	
Actuated g/C Ratio		0.02	1.00					0.27	1.00	0.02	0.52	
Clearance Time (s)		6.0						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		40	1583					965	2787	40	1849	
v/s Ratio Prot								0.07		0.01	0.11	
v/s Ratio Perm		0.02	c0.18						0.17			
v/c Ratio		0.70	0.18					0.27	0.17	0.60	0.20	
Uniform Delay, d1		12.8	0.0					7.5	0.0	12.8	3.4	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		42.0	0.2					0.2	0.1	21.9	0.1	
Delay (s)		54.8	0.2					7.7	0.1	34.7	3.4	
Level of Service		D	A					A	A	C	A	
Approach Delay (s)		5.1			0.0			2.8			5.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	26.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	371	28	33	105	57	16	385	171	134	310	103
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0
Total Split (s)	41.0	66.0	66.0	16.0	41.0	41.0	16.0	36.0	36.0	34.0	54.0	54.0
Total Split (%)	27.0%	43.4%	43.4%	10.5%	27.0%	27.0%	10.5%	23.7%	23.7%	22.4%	35.5%	35.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 152
Actuated Cycle Length: 94.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	371	28	33	105	57	16	385	171	134	310	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.85	0.82	0.58	0.69	0.88	0.75	0.67	0.83	0.89	0.80	0.82	0.61
Adj. Flow (vph)	227	452	48	48	119	76	24	464	192	168	378	169
RTOR Reduction (vph)	0	0	32	0	0	60	0	0	152	0	0	112
Lane Group Flow (vph)	227	452	16	48	119	16	24	464	40	168	378	57
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	18.6	32.4	32.4	6.5	20.3	20.3	2.8	20.8	20.8	15.3	33.3	33.3
Effective Green, g (s)	18.6	32.4	32.4	6.5	20.3	20.3	2.8	20.8	20.8	15.3	33.3	33.3
Actuated g/C Ratio	0.19	0.33	0.33	0.07	0.21	0.21	0.03	0.21	0.21	0.15	0.34	0.34
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	332	609	518	116	382	324	50	1068	332	273	1710	532
v/s Ratio Prot	c0.13	c0.24		0.03	0.06		0.01	c0.09		c0.09	0.07	
v/s Ratio Perm			0.01			0.01			0.03			0.04
v/c Ratio	0.68	0.74	0.03	0.41	0.31	0.05	0.48	0.43	0.12	0.62	0.22	0.11
Uniform Delay, d1	37.5	29.6	22.6	44.4	33.4	31.6	47.4	34.0	31.7	39.1	23.6	22.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	4.9	0.0	2.4	0.5	0.1	7.1	0.3	0.2	4.1	0.1	0.1
Delay (s)	43.2	34.5	22.7	46.8	33.9	31.7	54.5	34.3	31.9	43.2	23.6	22.7
Level of Service	D	C	C	D	C	C	D	C	C	D	C	C
Approach Delay (s)		36.4			35.7			34.3			28.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

4/17/2013

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	349	171	302	185	164	174
Turn Type	Prot	NA	NA	Over	NA	Perm
Protected Phases	5	2	6	4	4	
Permitted Phases						4
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	34.0	45.0	45.0	45.0
Total Split (s)	33.0	85.0	52.0	45.0	45.0	45.0
Total Split (%)	25.4%	65.4%	40.0%	34.6%	34.6%	34.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 54
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

4/17/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	349	171	302	185	164	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.91	0.91	0.88	0.97	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	2787	3433	2749
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	2787	3433	2749
Peak-hour factor, PHF	0.89	0.78	0.80	0.84	0.73	0.79
Adj. Flow (vph)	392	219	378	220	225	220
RTOR Reduction (vph)	0	0	0	0	0	176
Lane Group Flow (vph)	392	219	378	220	225	44
Confl. Peds. (#/hr)						4
Turn Type	Prot	NA	NA	Over	NA	Perm
Protected Phases	5	2	6	4	4	
Permitted Phases						4
Actuated Green, G (s)	12.1	30.6	12.5	10.8	10.8	10.8
Effective Green, g (s)	12.1	30.6	12.5	10.8	10.8	10.8
Actuated g/C Ratio	0.23	0.57	0.23	0.20	0.20	0.20
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	777	2913	1190	563	694	555
v/s Ratio Prot	c0.11	0.04	c0.07	c0.08	0.07	
v/s Ratio Perm						0.02
v/c Ratio	0.50	0.08	0.32	0.39	0.32	0.08
Uniform Delay, d1	18.0	5.1	16.9	18.5	18.2	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0	0.2	0.5	0.3	0.1
Delay (s)	18.5	5.1	17.1	18.9	18.5	17.3
Level of Service	B	A	B	B	B	B
Approach Delay (s)		13.7	17.7		17.9	
Approach LOS		B	B		B	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	53.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

4/17/2013

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	267	2	53	6	1063	37	611
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	35.0	35.0	35.0	10.0	36.0	10.0	10.0
Total Split (s)	10.0	24.0	24.0	24.0	10.0	64.0	12.0	66.0
Total Split (%)	9.1%	21.8%	21.8%	21.8%	9.1%	58.2%	10.9%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 8 (7%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	267	2	53	6	1063	187	37	611	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1686	1583	1770	3460		1770	3538	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1686	1583	1770	3460		1770	3538	
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	0	1	290	2	58	7	1155	203	40	664	1
RTOR Reduction (vph)	0	1	0	0	0	50	0	11	0	0	0	0
Lane Group Flow (vph)	0	0	0	145	147	8	7	1347	0	40	665	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		14.5	14.5	14.5	0.8	66.1		4.6	69.9	
Effective Green, g (s)		0.8		14.5	14.5	14.5	0.8	66.1		4.6	69.9	
Actuated g/C Ratio		0.01		0.13	0.13	0.13	0.01	0.60		0.04	0.64	
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		221	222	208	12	2079		74	2248	
v/s Ratio Prot		c0.00		0.09	c0.09		0.00	c0.39		c0.02	c0.19	
v/s Ratio Perm						0.00						
v/c Ratio		0.00		0.66	0.66	0.04	0.58	0.65		0.54	0.30	
Uniform Delay, d1		54.2		45.4	45.4	41.7	54.4	14.3		51.7	9.0	
Progression Factor		1.00		1.00	1.00	1.00	1.43	0.47		1.00	1.00	
Incremental Delay, d2		0.0		6.8	7.2	0.1	49.2	1.3		7.8	0.3	
Delay (s)		54.2		52.2	52.6	41.7	127.2	8.0		59.5	9.3	
Level of Service		D		D	D	D	F	A		E	A	
Approach Delay (s)		54.2			50.7			8.7			12.2	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

4/17/2013

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	506	25	1258	362	892
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	28.0	28.0	82.0	82.0	82.0
Total Split (%)	25.5%	25.5%	74.5%	74.5%	74.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

4/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	506	25	1258	362	0	892
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	550	27	1367	393	0	970
RTOR Reduction (vph)	0	22	0	118	0	0
Lane Group Flow (vph)	550	5	1367	275	0	970
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	20.9	20.9	77.1	77.1		77.1
Effective Green, g (s)	20.9	20.9	77.1	77.1		77.1
Actuated g/C Ratio	0.19	0.19	0.70	0.70		0.70
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	652	300	2480	1109		2480
v/s Ratio Prot	c0.16		c0.39			0.27
v/s Ratio Perm		0.00		0.17		
v/c Ratio	0.84	0.02	0.55	0.25		0.39
Uniform Delay, d1	43.0	36.2	8.0	6.0		6.8
Progression Factor	1.00	1.00	1.00	0.99		0.90
Incremental Delay, d2	9.7	0.0	0.9	0.5		0.4
Delay (s)	52.7	36.2	8.9	6.4		6.6
Level of Service	D	D	A	A		A
Approach Delay (s)	51.9		8.3			6.6
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

4/17/2013

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1538	1129	327	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.88	0.95	0.84	0.92	0.92
Hourly flow rate (vph)	0	1748	1188	389	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		878	418			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	1578				1966	789
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1394				1832	503
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	431				60	455

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	583	583	583	792	785
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	389
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.34	0.34	0.47	0.46
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

4/17/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	158	1538	1129	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.81	0.88	0.95	0.92
Hourly flow rate (vph)	0	0	195	1748	1188	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				649	647	
pX, platoon unblocked	0.96	0.93	0.93			
vC, conflicting volume	2161	594	1188			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1808	420	1057			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	68			
cM capacity (veh/h)	46	543	610			

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2
Volume Total	195	583	583	583	594	594
Volume Left	195	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	610	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.34	0.34	0.34	0.35	0.35
Queue Length 95th (ft)	34	0	0	0	0	0
Control Delay (s)	13.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	1.4				0.0	
Approach LOS						

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/17/2013

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	420	187	778	788	1654
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	38.0		68.0	66.0	134.0
Total Split (%)	22.1%		39.5%	38.4%	77.9%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 172
Actuated Cycle Length: 129.3
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	420	0	187	0	0	0	0	778	0	788	1654	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
Peak-hour factor, PHF	0.83	0.92	0.73	0.92	0.92	0.92	0.92	0.91	0.92	0.83	0.91	0.92
Adj. Flow (vph)	506	0	256	0	0	0	0	855	0	949	1818	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	506	0	256	0	0	0	0	855	0	949	1818	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	25.2		128.8					41.0		44.6	91.6	
Effective Green, g (s)	25.2		128.8					41.0		44.6	91.6	
Actuated g/C Ratio	0.20		1.00					0.32		0.35	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	671		1583					1126		1188	3616	
v/s Ratio Prot	c0.15							c0.24		c0.28	0.36	
v/s Ratio Perm			0.16									
v/c Ratio	0.75		0.16					0.76		0.80	0.50	
Uniform Delay, d1	48.9		0.0					39.5		38.0	8.4	
Progression Factor	1.00		1.00					1.00		0.95	0.99	
Incremental Delay, d2	4.8		0.2					3.0		3.8	0.1	
Delay (s)	53.7		0.2					42.5		40.1	8.4	
Level of Service	D		A					D		D	A	
Approach Delay (s)		35.7			0.0			42.5			19.2	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	128.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

4/17/2013

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2654	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 130
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

4/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2654	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2765	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2765	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.78			
v/s Ratio Perm						
v/c Ratio			0.87			
Uniform Delay, d1			3.5			
Progression Factor			1.00			
Incremental Delay, d2			3.6			
Delay (s)			7.1			
Level of Service			A			
Approach Delay (s)	0.0		7.1			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

4/17/2013

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	778	2654	0	1841	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.96	0.92	0.91	0.92	0.92
Hourly flow rate (vph)	855	2765	0	2023	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.84	
vC, conflicting volume			3620		1529	427
vC1, stage 1 conf vol					855	
vC2, stage 2 conf vol					674	
vCu, unblocked vol			3620		958	427
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			63		314	576

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	570	1207	1843	674	674	674
Volume Left	0	0	0	0	0	0
Volume Right	0	922	1843	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.71	1.08	0.40	0.40	0.40
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		112.9%	ICU Level of Service H
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

4/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	126	3491	103	0	1841
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.70	0.95	0.78	0.92	0.91
Hourly flow rate (vph)	0	180	3675	132	0	2023
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.84					
vC, conflicting volume	4351	1227			3677	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4323	1227			3677	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	0			100	
cM capacity (veh/h)	1	170			60	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	180	1225	1225	1225	132	674	674	674
Volume Left	0	0	0	0	0	0	0	0
Volume Right	180	0	0	0	132	0	0	0
cSH	170	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	1.06	0.72	0.72	0.72	0.08	0.40	0.40	0.40
Queue Length 95th (ft)	222	0	0	0	0	0	0	0
Control Delay (s)	141.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F							
Approach Delay (s)	141.1	0.0				0.0		
Approach LOS	F							

Intersection Summary			
Average Delay		4.2	
Intersection Capacity Utilization		81.9%	ICU Level of Service D
Analysis Period (min)		15	

Timings
45: Ft Weaver Rd & Laulaunui St

4/17/2013

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	21	19	81	4	176	24	3356	38	48	1399	98
Turn Type	Perm	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8			2			6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0	51.0	10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0	51.0	12.0	168.0	168.0	21.0	177.0	177.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	21.3%	5.0%	70.0%	70.0%	8.8%	73.8%	73.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	19	10	81	4	176	24	3356	38	48	1399	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1714		1743	1863	1583	1770	5085	1583	1770	5085	1525
Flt Permitted	0.75	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1397	1714		1336	1863	1583	1770	5085	1583	1770	5085	1525
Peak-hour factor, PHF	0.75	0.79	0.50	0.81	0.33	0.85	0.86	0.94	0.68	0.67	0.91	0.88
Adj. Flow (vph)	28	24	20	100	12	207	28	3570	56	72	1537	111
RTOR Reduction (vph)	0	13	0	0	0	64	0	0	15	0	0	26
Lane Group Flow (vph)	28	31	0	100	12	143	28	3570	41	72	1537	85
Confl. Peds. (#/hr)			10	10								3
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	30.8	30.8		30.8	30.8	30.8	5.9	176.6	176.6	13.6	184.3	184.3
Effective Green, g (s)	30.8	30.8		30.8	30.8	30.8	5.9	176.6	176.6	13.6	184.3	184.3
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.02	0.74	0.74	0.06	0.77	0.77
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	219		171	239	203	43	3741	1164	100	3904	1171
v/s Ratio Prot		0.02			0.01		0.02	c0.70		c0.04	0.30	
v/s Ratio Perm	0.02			0.07		c0.09			0.03			0.06
v/c Ratio	0.16	0.14		0.58	0.05	0.71	0.65	0.95	0.04	0.72	0.39	0.07
Uniform Delay, d1	93.0	92.9		98.6	91.8	100.3	116.0	28.1	8.6	111.3	9.3	6.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.20	0.28	0.13	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.3		5.0	0.1	10.7	14.0	3.6	0.0	21.9	0.3	0.1
Delay (s)	93.5	93.2		103.6	91.9	110.9	152.8	11.5	1.2	133.2	9.6	7.0
Level of Service	F	F		F	F	F	F	B	A	F	A	A
Approach Delay (s)		93.3			107.9			12.4			14.6	
Approach LOS		F			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	10	46	115	13	158	45	3252	41	40	1451	1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	31.0	184.0	184.0	17.0	170.0	170.0
Total Split (%)	16.3%	16.3%	16.3%	16.3%	16.3%	16.3%	12.9%	76.7%	76.7%	7.1%	70.8%	70.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	-2.0		0.0	0.0	-1.0	-3.0	0.0	0.0	-3.0	-2.0
Total Lost Time (s)		6.0	4.0		6.0	6.0	5.0	4.0	7.0	6.0	4.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 168 (70%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 165
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	10	46	115	13	158	45	3252	41	40	1451	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0		6.0	6.0	5.0	4.0	7.0	6.0	4.0	5.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.96		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1840	1522		1743	1583	1770	5085	1583	1770	5085	1583
Flt Permitted		0.93	1.00		0.74	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1734	1522		1348	1583	1770	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.25	0.83	0.72	0.80	0.65	0.88	0.62	0.93	0.51	0.67	0.87	0.25
Adj. Flow (vph)	4	12	64	144	20	180	73	3497	80	60	1668	4
RTOR Reduction (vph)	0	0	55	0	0	63	0	0	20	0	0	1
Lane Group Flow (vph)	0	16	9	0	164	117	73	3497	60	60	1668	3
Confl. Peds. (#/hr)			12	12								
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		31.5	31.5		31.5	31.5	15.2	178.8	178.8	10.7	174.3	174.3
Effective Green, g (s)		31.5	33.5		31.5	31.5	16.2	181.8	178.8	10.7	177.3	176.3
Actuated g/C Ratio		0.13	0.14		0.13	0.13	0.07	0.76	0.75	0.04	0.74	0.73
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		227	212		176	207	119	3851	1179	78	3756	1162
v/s Ratio Prot							c0.04	c0.69		0.03	0.33	
v/s Ratio Perm		0.01	0.01		c0.12	0.07			0.04			0.00
v/c Ratio		0.07	0.04		0.93	0.56	0.61	0.91	0.05	0.77	0.44	0.00
Uniform Delay, d1		91.4	89.4		103.2	97.8	108.9	22.6	8.1	113.4	12.2	8.5
Progression Factor		1.00	1.00		1.00	1.00	0.96	0.71	1.36	0.92	1.02	1.00
Incremental Delay, d2		0.1	0.1		48.2	3.5	5.3	2.5	0.0	34.1	0.4	0.0
Delay (s)		91.5	89.4		151.4	101.3	109.7	18.5	11.1	138.9	12.8	8.5
Level of Service		F	F		F	F	F	B	B	F	B	A
Approach Delay (s)		89.9			125.2			20.1			17.2	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/17/2013

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3431	1603	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 103 (86%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/17/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3431	1603	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	3729	1742	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3729	1742	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				100.2	100.2	
Effective Green, g (s)				100.2	100.2	
Actuated g/C Ratio				0.84	0.84	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				4245	4245	
v/s Ratio Prot				c0.73	0.34	
v/s Ratio Perm						
v/c Ratio				0.88	0.41	
Uniform Delay, d1				6.1	2.5	
Progression Factor				1.35	0.42	
Incremental Delay, d2				0.7	0.3	
Delay (s)				9.0	1.3	
Level of Service				A	A	
Approach Delay (s)	0.0			9.0	1.3	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

4/17/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	5	121	7	4	174	3112	11	50	1361	232
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4		3			2			6
Detector Phase	4	4	4	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0	41.0	11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0	43.0	14.0	14.0	30.0	160.0	160.0	23.0	153.0	153.0
Total Split (%)	17.9%	17.9%	17.9%	5.8%	5.8%	12.5%	66.7%	66.7%	9.6%	63.8%	63.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-2.0	0.0	-2.0	-1.0	-2.0	-2.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	4.0	6.0	5.0	6.0	4.0	5.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 112 (47%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	5	121	6	7	4	174	3112	11	50	1361	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	4.0	6.0	5.0	6.0	4.0	5.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.81	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1691	1427		1832	1583	1770	5085	1289	1770	5085	1532
Flt Permitted	0.95	0.96	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1691	1427		1832	1583	1770	5085	1289	1770	5085	1532
Peak-hour factor, PHF	0.85	0.31	0.66	0.75	0.44	0.33	0.67	0.90	0.69	0.75	0.91	0.92
Adj. Flow (vph)	476	16	183	8	16	12	260	3458	16	67	1496	252
RTOR Reduction (vph)	0	0	85	0	0	12	0	0	5	0	0	100
Lane Group Flow (vph)	248	244	99	0	24	0	260	3458	11	67	1496	152
Confl. Peds. (#/hr)			43						31			2
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4			3			2			6
Actuated Green, G (s)	37.2	37.2	37.2		6.0	6.0	27.0	158.7	158.7	13.1	144.8	144.8
Effective Green, g (s)	37.2	37.2	37.2		6.0	8.0	27.0	160.7	159.7	15.1	146.8	144.8
Actuated g/C Ratio	0.16	0.16	0.16		0.02	0.03	0.11	0.67	0.67	0.06	0.61	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	260	262	221		45	52	199	3404	857	111	3110	924
v/s Ratio Prot	c0.15	0.14			c0.01		c0.15	c0.68		0.04	0.29	
v/s Ratio Perm			0.07			0.00			0.01			0.10
v/c Ratio	0.95	0.93	0.45		0.53	0.01	1.31	1.02	0.01	0.60	0.48	0.16
Uniform Delay, d1	100.5	100.1	92.0		115.6	112.2	106.5	39.7	13.5	109.5	25.6	21.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.02	0.57	1.00	1.05	0.87	2.06
Incremental Delay, d2	42.9	37.4	1.4		6.0	0.0	156.7	15.7	0.0	5.9	0.5	0.4
Delay (s)	143.5	137.6	93.5		121.6	112.2	265.3	38.4	13.6	120.8	22.7	43.6
Level of Service	F	F	F		F	F	F	D	B	F	C	D
Approach Delay (s)		127.8			118.4			54.1			29.2	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	554	47	50	13	78	490	31	2053	1	229	1158	44
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Detector Phase	3	3	3	4	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	15.0	15.0	15.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	69.0	69.0	69.0	33.0	33.0	33.0	22.0	116.0	116.0	22.0	116.0	116.0
Total Split (%)	28.8%	28.8%	28.8%	13.8%	13.8%	13.8%	9.2%	48.3%	48.3%	9.2%	48.3%	48.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-2.0	-3.0	-1.0	-2.0	-3.0	-1.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 64 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	554	47	50	13	78	490	31	2053	1	229	1158	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.89	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1698	1583	1770	1576	1504	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1698	1583	1770	1576	1504	1770	5085	1583	3433	5085	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)	602	51	54	14	85	533	34	2232	1	249	1259	48
RTOR Reduction (vph)	0	0	42	0	38	93	0	0	1	0	0	25
Lane Group Flow (vph)	325	328	12	14	276	211	34	2232	0	249	1259	23
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	52.2	52.2	52.2	37.8	37.8	37.8	8.8	109.0	109.0	16.0	116.2	116.2
Effective Green, g (s)	54.2	54.2	53.2	39.8	39.8	39.8	10.8	112.0	110.0	18.0	119.2	117.2
Actuated g/C Ratio	0.23	0.23	0.22	0.17	0.17	0.17	0.05	0.47	0.46	0.08	0.50	0.49
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	379	383	350	293	261	249	79	2373	725	257	2525	773
v/s Ratio Prot	c0.19	0.19		0.01	c0.17		0.02	c0.44		c0.07	0.25	
v/s Ratio Perm			0.01			0.14			0.00			0.01
v/c Ratio	0.86	0.86	0.03	0.05	1.06	0.85	0.43	0.94	0.00	0.97	0.50	0.03
Uniform Delay, d1	89.2	89.2	73.3	84.2	100.1	97.1	111.6	60.8	35.2	110.7	40.4	31.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.28	0.80	1.00	0.97	0.67	1.89
Incremental Delay, d2	17.1	16.9	0.0	0.1	71.2	22.3	3.4	8.3	0.0	43.8	0.6	0.1
Delay (s)	106.3	106.1	73.3	84.2	171.3	119.4	146.1	56.9	35.2	151.4	27.9	60.2
Level of Service	F	F	E	F	F	F	F	E	D	F	C	E
Approach Delay (s)		103.7			144.4			58.2			48.6	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	72.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	133	142	89	220	265	142	1467	34	143	933	110
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Detector Phase	3	3	3	4	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	9.0	9.0	9.0	3.0	20.0	20.0	3.0	20.0	20.0
Minimum Split (s)	65.0	65.0	65.0	15.0	15.0	15.0	9.0	46.0	46.0	9.0	46.0	46.0
Total Split (s)	56.0	56.0	56.0	47.0	47.0	47.0	30.0	107.0	107.0	30.0	107.0	107.0
Total Split (%)	23.3%	23.3%	23.3%	19.6%	19.6%	19.6%	12.5%	44.6%	44.6%	12.5%	44.6%	44.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-3.0	-1.0	-2.0	-3.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 40 (17%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	133	142	89	220	265	142	1467	34	143	933	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	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)	245	145	154	97	239	288	154	1595	37	155	1014	120
RTOR Reduction (vph)	0	0	65	0	0	204	0	0	15	0	0	48
Lane Group Flow (vph)	127	263	89	97	239	84	154	1595	22	155	1014	72
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	24.2	24.2	24.2	35.2	35.2	35.2	15.1	140.4	140.4	15.2	140.5	140.5
Effective Green, g (s)	26.2	26.2	26.2	37.2	37.2	37.2	17.1	143.4	141.4	17.2	143.5	141.5
Actuated g/C Ratio	0.11	0.11	0.11	0.16	0.16	0.16	0.07	0.60	0.59	0.07	0.60	0.59
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	175	361	172	274	288	431	244	3038	932	246	3040	933
v/s Ratio Prot	0.08	c0.08		0.05	c0.13		0.04	c0.31		c0.05	0.20	
v/s Ratio Perm			0.06			0.03			0.01			0.05
v/c Ratio	0.73	0.73	0.52	0.35	0.83	0.19	0.63	0.53	0.02	0.63	0.33	0.08
Uniform Delay, d1	103.4	103.5	100.9	90.7	98.3	88.3	108.4	28.3	20.5	108.3	24.2	21.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.66	1.34	4.50
Incremental Delay, d2	11.9	6.1	1.1	0.3	16.9	0.1	3.9	0.7	0.0	3.4	0.3	0.1
Delay (s)	115.3	109.6	102.0	90.9	115.2	88.4	112.3	29.0	20.6	74.4	32.7	95.4
Level of Service	F	F	F	F	F	F	F	C	C	E	C	F
Approach Delay (s)		108.8			99.1			36.0			43.6	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	56.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	486	31	6	220	25	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.78	0.38	0.86	0.62	0.50
Hourly flow rate (vph)	546	40	16	256	40	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			586		853	566
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			586		853	566
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		88	98
cM capacity (veh/h)			989		324	524

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	586	272	48
Volume Left	0	16	40
Volume Right	40	0	8
cSH	1700	989	346
Volume to Capacity	0.34	0.02	0.14
Queue Length 95th (ft)	0	1	12
Control Delay (s)	0.0	0.7	17.1
Lane LOS		A	C
Approach Delay (s)	0.0	0.7	17.1
Approach LOS			C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	487	0	45	235	0	37
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.92	0.75	0.84	0.92	0.51
Hourly flow rate (vph)	594	0	60	280	0	73
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				847		
pX, platoon unblocked						
vC, conflicting volume			594		994	594
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			594		994	594
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		100	86
cM capacity (veh/h)			982		255	505

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	594	60	280	73
Volume Left	0	60	0	0
Volume Right	0	0	0	73
cSH	1700	982	1700	505
Volume to Capacity	0.35	0.06	0.16	0.14
Queue Length 95th (ft)	0	5	0	12
Control Delay (s)	0.0	8.9	0.0	13.3
Lane LOS		A		B
Approach Delay (s)	0.0	1.6		13.3
Approach LOS				B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	21	33	9	24	28
Peak Hour Factor	0.75	0.88	0.75	0.75	0.55	0.70
Hourly flow rate (vph)	20	24	44	12	44	40

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	44	56	84
Volume Left (vph)	0	44	44
Volume Right (vph)	24	0	40
Hadj (s)	-0.29	0.19	-0.15
Departure Headway (s)	3.8	4.3	4.0
Degree Utilization, x	0.05	0.07	0.09
Capacity (veh/h)	909	814	877
Control Delay (s)	7.0	7.6	7.4
Approach Delay (s)	7.0	7.6	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay		7.4	
Level of Service		A	
Intersection Capacity Utilization		19.0%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	501	15	0	232	0	0	0	0	0	0	38
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.87	0.54	0.92	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.73
Hourly flow rate (vph)	0	576	28	0	276	0	0	0	0	0	0	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					321							
pX, platoon unblocked												
vC, conflicting volume	276			604			780	866	302	564	880	138
vC1, stage 1 conf vol							590	590		276	276	
vC2, stage 2 conf vol							190	276		288	604	
vCu, unblocked vol	276			604			780	866	302	564	880	138
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	94
cM capacity (veh/h)	1284			970			370	387	694	506	382	885

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	384	220	138	138	52
Volume Left	0	0	0	0	0
Volume Right	0	28	0	0	52
cSH	1700	1700	1700	1700	885
Volume to Capacity	0.23	0.13	0.08	0.08	0.06
Queue Length 95th (ft)	0	0	0	0	5
Control Delay (s)	0.0	0.0	0.0	0.0	9.3
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.3
Approach LOS					A

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		17.7%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/17/2013

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	501	276	232
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0
Total Split (s)	39.0	53.0	92.0
Total Split (%)	42.4%	57.6%	100.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 92
Actuated Cycle Length: 37.9
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	501	0	276	232	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.87	0.92	0.85	0.84	0.92	0.92
Adj. Flow (vph)	576	0	325	276	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	576	0	325	276	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	12.6		13.1	37.7		
Effective Green, g (s)	12.6		13.1	37.7		
Actuated g/C Ratio	0.33		0.35	1.00		
Clearance Time (s)	6.0		6.0	6.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1182		615	3539		
v/s Ratio Prot	c0.16		c0.18	0.08		
v/s Ratio Perm						
v/c Ratio	0.49		0.53	0.08		
Uniform Delay, d1	10.0		9.8	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.3		0.8	0.0		
Delay (s)	10.3		10.7	0.0		
Level of Service	B		B	A		
Approach Delay (s)	10.3			5.8	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/17/2013

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	240	821	529	147
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	
Total Split (s)	23.0	70.0	47.0	
Total Split (%)	32.9%	100.0%	67.1%	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 34.8
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/17/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	240	821	529	147	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.88	0.94	0.93	0.85	0.92	0.92
Adj. Flow (vph)	273	873	569	173	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	273	873	569	173	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	10.6	34.6	12.0	34.6		
Effective Green, g (s)	10.6	34.6	12.0	34.6		
Actuated g/C Ratio	0.31	1.00	0.35	1.00		
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	542	3539	1227	1583		
v/s Ratio Prot	c0.15	0.25	c0.16			
v/s Ratio Perm				0.11		
v/c Ratio	0.50	0.25	0.46	0.11		
Uniform Delay, d1	9.8	0.0	8.8	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.7	0.0	0.3	0.1		
Delay (s)	10.6	0.0	9.1	0.1		
Level of Service	B	A	A	A		
Approach Delay (s)		2.5	7.0		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	310	0	174	276	597	332	615
Turn Type	Perm	NA	Perm	Prot	NA	NA	Perm
Protected Phases		8		5	2	6	
Permitted Phases	8		8				6
Detector Phase	8	8	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	20.0
Total Split (s)	38.0	38.0	38.0	33.0	88.0	55.0	55.0
Total Split (%)	30.2%	30.2%	30.2%	26.2%	69.8%	43.7%	43.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 126
Actuated Cycle Length: 76.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	310	0	174	276	597	0	0	332	615
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1549	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1549	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.84	0.92	0.81	0.97	0.97	0.92	0.92	0.90	0.88
Adj. Flow (vph)	0	0	0	369	0	215	285	615	0	0	369	699
RTOR Reduction (vph)	0	0	0	0	0	169	0	0	0	0	0	420
Lane Group Flow (vph)	0	0	0	184	185	46	285	615	0	0	369	279
Confl. Peds. (#/hr)						14						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				16.3	16.3	16.3	18.4	47.2			22.8	22.8
Effective Green, g (s)				16.3	16.3	16.3	18.4	47.2			22.8	22.8
Actuated g/C Ratio				0.22	0.22	0.22	0.24	0.63			0.30	0.30
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				362	362	334	431	2212			1068	478
v/s Ratio Prot							c0.16	0.17			0.10	
v/s Ratio Perm				0.11	0.11	0.03						c0.18
v/c Ratio				0.51	0.51	0.14	0.66	0.28			0.35	0.58
Uniform Delay, d1				26.1	26.1	23.9	25.7	6.4			20.5	22.3
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.1	1.2	0.2	3.8	0.1			0.2	1.8
Delay (s)				27.2	27.3	24.1	29.5	6.5			20.7	24.1
Level of Service				C	C	C	C	A			C	C
Approach Delay (s)		0.0			26.1			13.8			23.0	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	75.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	80	461	472	245	408
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	42.0	42.0	71.0	53.0	124.0
Total Split (%)	25.3%	25.3%	42.8%	31.9%	74.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 125.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	488	80	461	0	0	0	0	472	346	245	408	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.98		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1788	1563					3225		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1788	1563					3225		1770	3539	
Peak-hour factor, PHF	0.93	0.80	0.83	0.92	0.92	0.92	0.92	0.87	0.75	0.85	0.88	0.92
Adj. Flow (vph)	525	100	555	0	0	0	0	543	461	288	464	0
RTOR Reduction (vph)	0	0	295	0	0	0	0	99	0	0	0	0
Lane Group Flow (vph)	0	625	260	0	0	0	0	905	0	288	464	0
Confl. Peds. (#/hr)			1						18			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		36.8	36.8					43.9		26.5	76.4	
Effective Green, g (s)		36.8	36.8					43.9		26.5	76.4	
Actuated g/C Ratio		0.29	0.29					0.35		0.21	0.61	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		525	459					1130		374	2159	
v/s Ratio Prot								c0.28		c0.16	0.13	
v/s Ratio Perm		0.35	0.17									
v/c Ratio		1.19	0.57					0.80		0.77	0.21	
Uniform Delay, d1		44.2	37.4					36.7		46.5	10.9	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		103.5	1.6					4.2		9.4	0.1	
Delay (s)		147.7	39.0					40.9		55.9	11.0	
Level of Service		F	D					D		E	B	
Approach Delay (s)		96.6			0.0			40.9			28.2	
Approach LOS		F			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	60.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	125.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing Conditions PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Lane Group	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	623	2	293	3	7	5
Turn Type	Prot	NA	Prot	NA	NA	Perm
Protected Phases	1	6	3	8	4	
Permitted Phases						4
Detector Phase	1	6	3	8	4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	10.0	20.0	18.0	18.0
Total Split (s)	34.0	34.0	18.0	36.0	18.0	18.0
Total Split (%)	48.6%	48.6%	25.7%	51.4%	25.7%	25.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	Min	None	None	None	None

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 58
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	623	2	0	293	3	0	0	7	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0		6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95		1.00	1.00			1.00	1.00
Frt				1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95		0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686		1770	1863			1863	1583
Flt Permitted				0.95	0.95		0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686		1770	1863			1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.92	0.92	0.86	0.38	0.92	0.92	0.35	0.42
Adj. Flow (vph)	0	0	0	663	2	0	341	8	0	0	20	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	12
Lane Group Flow (vph)	0	0	0	331	334	0	341	8	0	0	20	0
Turn Type				Prot	NA	Free	Prot	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases						Free						4
Actuated Green, G (s)				29.1	29.1		12.1	20.6			2.5	2.5
Effective Green, g (s)				29.1	29.1		12.1	20.6			2.5	2.5
Actuated g/C Ratio				0.47	0.47		0.20	0.33			0.04	0.04
Clearance Time (s)				6.0	6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				792	795		347	622			75	64
v/s Ratio Prot				0.20	c0.20		c0.19	0.00			c0.01	
v/s Ratio Perm												0.00
v/c Ratio				0.42	0.42		0.98	0.01			0.27	0.01
Uniform Delay, d1				10.7	10.7		24.7	13.7			28.7	28.4
Progression Factor				1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2				0.4	0.4		43.4	0.0			1.9	0.0
Delay (s)				11.1	11.1		68.1	13.8			30.6	28.5
Level of Service				B	B		E	B			C	C
Approach Delay (s)		0.0			11.1			66.8			29.8	
Approach LOS		A			B			E			C	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	61.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	2	146	267	501	15	655
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	10.0		28.0		10.0	28.0
Total Split (s)	17.0		86.0		17.0	103.0
Total Split (%)	14.2%		71.7%		14.2%	85.8%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		6.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		None		None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 26
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	2	146	0	0	0	0	267	501	15	655	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1779	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1779	1583					3539	2787	1770	3539	
Peak-hour factor, PHF	0.77	0.50	0.87	0.92	0.92	0.92	0.92	0.86	0.79	0.42	0.94	0.92
Adj. Flow (vph)	60	4	168	0	0	0	0	310	634	36	697	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	64	168	0	0	0	0	310	634	36	697	0
Turn Type	Perm	NA	Free					NA	Free	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		Free						Free			
Actuated Green, G (s)		2.1	34.5					13.5	34.5	0.9	20.4	
Effective Green, g (s)		2.1	34.5					13.5	34.5	0.9	20.4	
Actuated g/C Ratio		0.06	1.00					0.39	1.00	0.03	0.59	
Clearance Time (s)		6.0						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		108	1583					1384	2787	46	2092	
v/s Ratio Prot								0.09		0.02	c0.20	
v/s Ratio Perm		0.04	0.11						c0.23			
v/c Ratio		0.59	0.11					0.22	0.23	0.78	0.33	
Uniform Delay, d1		15.8	0.0					7.0	0.0	16.7	3.6	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		8.4	0.1					0.1	0.2	57.8	0.1	
Delay (s)		24.2	0.1					7.1	0.2	74.5	3.7	
Level of Service		C	A					A	A	E	A	
Approach Delay (s)		6.8			0.0			2.5			7.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	172	24	66	222	102	15	399	55	34	483	279
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0
Total Split (s)	27.0	66.0	66.0	19.0	58.0	58.0	11.0	49.0	49.0	18.0	56.0	56.0
Total Split (%)	17.8%	43.4%	43.4%	12.5%	38.2%	38.2%	7.2%	32.2%	32.2%	11.8%	36.8%	36.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 152
Actuated Cycle Length: 81.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	172	24	66	222	102	15	399	55	34	483	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.83	0.75	0.75	0.87	0.79	0.85	0.54	0.92	0.92	0.85	0.92	0.82
Adj. Flow (vph)	289	229	32	76	281	120	28	434	60	40	525	340
RTOR Reduction (vph)	0	0	19	0	0	92	0	0	49	0	0	272
Lane Group Flow (vph)	289	229	13	76	281	28	28	434	11	40	525	68
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	21.8	34.3	34.3	7.7	20.2	20.2	2.6	15.1	15.1	4.6	17.1	17.1
Effective Green, g (s)	21.8	34.3	34.3	7.7	20.2	20.2	2.6	15.1	15.1	4.6	17.1	17.1
Actuated g/C Ratio	0.25	0.40	0.40	0.09	0.24	0.24	0.03	0.18	0.18	0.05	0.20	0.20
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	450	745	633	159	439	373	53	895	278	95	1014	315
v/s Ratio Prot	c0.16	0.12		0.04	c0.15		0.02	0.09		c0.02	c0.10	
v/s Ratio Perm			0.01			0.02			0.01			0.04
v/c Ratio	0.64	0.31	0.02	0.48	0.64	0.08	0.53	0.48	0.04	0.42	0.52	0.22
Uniform Delay, d1	28.5	17.6	15.5	37.1	29.5	25.5	40.9	31.8	29.3	39.3	30.6	28.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.2	0.0	2.3	3.2	0.1	9.2	0.4	0.1	3.0	0.4	0.3
Delay (s)	31.6	17.8	15.6	39.3	32.7	25.6	50.1	32.2	29.3	42.3	31.1	29.0
Level of Service	C	B	B	D	C	C	D	C	C	D	C	C
Approach Delay (s)		24.9			31.9			32.8			30.8	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	24.0	
Intersection Capacity Utilization	57.6%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
8: Kapolei Pkwy & Kualakai Pkwy

4/17/2013

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	286	304	255	153	224	310
Turn Type	Prot	NA	NA	Over	NA	Perm
Protected Phases	5	2	6	4	4	
Permitted Phases						4
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	34.0	45.0	45.0	45.0
Total Split (s)	31.0	65.0	34.0	45.0	45.0	45.0
Total Split (%)	28.2%	59.1%	30.9%	40.9%	40.9%	40.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 56.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

4/17/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	286	304	255	153	224	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.91	0.91	0.88	0.97	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	5085	5085	2787	3433	2749
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	5085	5085	2787	3433	2749
Peak-hour factor, PHF	0.87	0.85	0.90	0.78	0.86	0.91
Adj. Flow (vph)	329	358	283	196	260	341
RTOR Reduction (vph)	0	0	0	0	0	257
Lane Group Flow (vph)	329	358	283	196	260	84
Confl. Peds. (#/hr)						4
Turn Type	Prot	NA	NA	Over	NA	Perm
Protected Phases	5	2	6	4	4	
Permitted Phases						4
Actuated Green, G (s)	11.7	29.4	11.7	13.5	13.5	13.5
Effective Green, g (s)	11.7	29.4	11.7	13.5	13.5	13.5
Actuated g/C Ratio	0.21	0.54	0.21	0.25	0.25	0.25
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	731	2723	1083	685	844	675
v/s Ratio Prot	c0.10	0.07	c0.06	0.07	c0.08	
v/s Ratio Perm						0.03
v/c Ratio	0.45	0.13	0.26	0.29	0.31	0.12
Uniform Delay, d1	18.8	6.4	18.0	16.8	16.9	16.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.0	0.1	0.2	0.2	0.1
Delay (s)	19.2	6.4	18.1	17.0	17.1	16.2
Level of Service	B	A	B	B	B	B
Approach Delay (s)		12.5	17.7		16.6	
Approach LOS		B	B		B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

4/17/2013

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	522	0	42	5	644	114	1080
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	35.0	35.0	35.0	10.0	36.0	10.0	10.0
Total Split (s)	10.0	33.0	33.0	33.0	10.0	55.0	12.0	57.0
Total Split (%)	9.1%	30.0%	30.0%	30.0%	9.1%	50.0%	10.9%	51.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 95
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	8	522	0	42	5	644	447	114	1080	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3322		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3322		1770	3539	
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	0	9	567	0	46	5	700	486	124	1174	0
RTOR Reduction (vph)	0	9	0	0	0	36	0	118	0	0	0	0
Lane Group Flow (vph)	0	0	0	283	284	10	5	1068	0	124	1174	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		23.3	23.3	23.3	0.8	46.8		15.1	61.1	
Effective Green, g (s)		0.8		23.3	23.3	23.3	0.8	46.8		15.1	61.1	
Actuated g/C Ratio		0.01		0.21	0.21	0.21	0.01	0.43		0.14	0.56	
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		356	356	335	12	1413		242	1965	
v/s Ratio Prot		c0.00		0.17	c0.17		0.00	c0.32		c0.07	c0.33	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.79	0.80	0.03	0.42	0.76		0.51	0.60	
Uniform Delay, d1		54.2		41.1	41.1	34.4	54.4	26.8		44.0	16.3	
Progression Factor		1.00		1.00	1.00	1.00	1.45	0.65		1.00	1.00	
Incremental Delay, d2		0.2		11.6	11.8	0.0	19.7	3.4		1.8	1.3	
Delay (s)		54.4		52.7	52.9	34.4	98.6	21.0		45.9	17.6	
Level of Service		D		D	D	C	F	C		D	B	
Approach Delay (s)		54.4			51.4			21.3			20.3	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

4/17/2013

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	390	20	1117	910	1648
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	30.0	30.0	80.0	80.0	80.0
Total Split (%)	27.3%	27.3%	72.7%	72.7%	72.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

4/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	390	20	1117	910	0	1648
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	424	22	1214	989	0	1791
RTOR Reduction (vph)	0	18	0	276	0	0
Lane Group Flow (vph)	424	4	1214	713	0	1791
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	18.7	18.7	79.3	79.3		79.3
Effective Green, g (s)	18.7	18.7	79.3	79.3		79.3
Actuated g/C Ratio	0.17	0.17	0.72	0.72		0.72
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	583	269	2551	1141		2551
v/s Ratio Prot	c0.12		0.34			c0.51
v/s Ratio Perm		0.00		0.45		
v/c Ratio	0.73	0.01	0.48	0.62		0.70
Uniform Delay, d1	43.2	38.0	6.5	7.8		8.7
Progression Factor	1.00	1.00	0.99	0.90		0.92
Incremental Delay, d2	4.5	0.0	0.6	2.6		1.4
Delay (s)	47.7	38.0	7.1	9.6		9.3
Level of Service	D	D	A	A		A
Approach Delay (s)	47.3		8.2			9.3
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

10/10/2013

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1929	1306	568	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.93	0.87	0.92	0.92
Hourly flow rate (vph)	0	2097	1404	653	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		878	418			
pX, platoon unblocked	0.70				0.70	0.70
vC, conflicting volume	2057				2430	1029
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1645				2180	166
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	271				27	590

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	699	699	699	936	1121
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	653
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.41	0.41	0.41	0.55	0.66
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

10/10/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	245	1929	1306	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.89	0.92	0.93	0.92
Hourly flow rate (vph)	0	0	275	2097	1404	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				649	647	
pX, platoon unblocked	0.80	0.80	0.80			
vC, conflicting volume	2654	702	1404			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2566	121	1001			
tC, single (s)	6.8	6.9	*6.7			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	100	0			
cM capacity (veh/h)	0	724	269			

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2
Volume Total	275	699	699	699	702	702
Volume Left	275	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	269	1700	1700	1700	1700	1700
Volume to Capacity	1.02	0.41	0.41	0.41	0.41	0.41
Queue Length 95th (ft)	263	0	0	0	0	0
Control Delay (s)	101.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F					
Approach Delay (s)	11.8				0.0	
Approach LOS						

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/17/2013

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	345	239	809	556	3102
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	31.0		66.0	64.0	130.0
Total Split (%)	19.3%		41.0%	39.8%	80.7%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 161
Actuated Cycle Length: 156.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	345	0	239	0	0	0	0	809	0	556	3102	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
Peak-hour factor, PHF	0.91	0.92	0.88	0.92	0.92	0.92	0.92	0.92	0.92	0.83	0.97	0.92
Adj. Flow (vph)	379	0	272	0	0	0	0	879	0	670	3198	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	379	0	272	0	0	0	0	879	0	670	3198	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	21.8		156.6					79.0		37.8	122.8	
Effective Green, g (s)	21.8		156.6					79.0		37.8	122.8	
Actuated g/C Ratio	0.14		1.00					0.50		0.24	0.78	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	477		1583					1785		828	3987	
v/s Ratio Prot	c0.11							0.25		0.20	c0.63	
v/s Ratio Perm			0.17									
v/c Ratio	0.79		0.17					0.49		0.81	0.80	
Uniform Delay, d1	65.2		0.0					25.6		56.0	9.8	
Progression Factor	1.00		1.00					1.00		0.97	0.94	
Incremental Delay, d2	8.9		0.2					0.2		5.9	1.2	
Delay (s)	74.1		0.2					25.8		60.4	10.5	
Level of Service	E		A					C		E	B	
Approach Delay (s)		43.2			0.0			25.8			19.1	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	156.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

4/17/2013

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1772	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

4/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1772	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.91	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1947	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1947	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.55			
v/s Ratio Perm						
v/c Ratio			0.61			
Uniform Delay, d1			1.7			
Progression Factor			1.00			
Incremental Delay, d2			0.9			
Delay (s)			2.6			
Level of Service			A			
Approach Delay (s)	0.0		2.6			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

4/17/2013

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	809	1772	0	3341	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.91	0.92	0.97	0.92	0.92
Hourly flow rate (vph)	879	1947	0	3444	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.23	
vC, conflicting volume			2827		2027	440
vC1, stage 1 conf vol					879	
vC2, stage 2 conf vol					1148	
vCu, unblocked vol			2827		0	440
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			133		239	565

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	586	942	1298	1148	1148	1148
Volume Left	0	0	0	0	0	0
Volume Right	0	649	1298	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.55	0.76	0.68	0.68	0.68
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

4/17/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	96	2576	56	0	3341
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.84	0.94	0.78	0.92	0.97
Hourly flow rate (vph)	0	114	2740	72	0	3444
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.25					
vC, conflicting volume	3891	915			2742	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2097	915			2742	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	58			100	
cM capacity (veh/h)	11	274			143	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	114	913	913	913	72	1148	1148	1148
Volume Left	0	0	0	0	0	0	0	0
Volume Right	114	0	0	0	72	0	0	0
cSH	274	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.42	0.54	0.54	0.54	0.04	0.68	0.68	0.68
Queue Length 95th (ft)	49	0	0	0	0	0	0	0
Control Delay (s)	27.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D							
Approach Delay (s)	27.2	0.0				0.0		
Approach LOS	D							

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

4/17/2013

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	108	64	38	100	25	1837	37	124	2996	129
Turn Type	Perm	NA	Perm	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			5	2		1	6	
Permitted Phases	4		8	8			2			6
Detector Phase	4	4	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0	10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0	15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 160
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	108	64	31	38	0	100	25	1837	37	124	2996	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0		6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00		1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1744		1737		1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.76	1.00		0.47		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1410	1744		854		1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.71	0.70	0.65	0.63	0.92	0.93	0.78	0.84	0.84	0.72	0.98	0.90
Adj. Flow (vph)	152	91	48	60	0	108	32	2187	44	172	3057	143
RTOR Reduction (vph)	0	8	0	0	0	92	0	0	15	0	0	21
Lane Group Flow (vph)	152	131	0	60	0	16	32	2187	172	172	3057	122
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	36.6	36.6		36.6		36.6	7.0	158.8	158.8	25.6	177.4	177.4
Effective Green, g (s)	36.6	36.6		36.6		36.6	7.0	158.8	158.8	25.6	177.4	177.4
Actuated g/C Ratio	0.15	0.15		0.15		0.15	0.03	0.66	0.66	0.11	0.74	0.74
Clearance Time (s)	6.0	6.0		6.0		6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	265		130		241	51	3364	1020	188	3758	1107
v/s Ratio Prot		0.07					0.02	0.43		c0.10	c0.60	
v/s Ratio Perm	c0.11			0.07		0.01			0.02			0.08
v/c Ratio	0.71	0.49		0.46		0.07	0.63	0.65	0.03	0.91	0.81	0.11
Uniform Delay, d1	96.6	93.2		92.7		87.1	115.2	24.1	14.0	106.1	20.5	8.9
Progression Factor	1.00	1.00		1.00		1.00	0.88	0.76	1.72	1.00	1.00	1.00
Incremental Delay, d2	10.1	1.4		2.6		0.1	18.6	0.8	0.0	42.0	2.0	0.2
Delay (s)	106.7	94.6		95.3		87.2	119.5	19.2	24.1	148.1	22.5	9.1
Level of Service	F	F		F		F	F	B	C	F	C	A
Approach Delay (s)		101.0			90.1			20.7			28.4	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	59	86	32	8	92	43	1770	49	157	2925	4
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	38.0	38.0	38.0	38.0	38.0	38.0	16.0	156.0	156.0	46.0	186.0	186.0
Total Split (%)	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	6.7%	65.0%	65.0%	19.2%	77.5%	77.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	-2.0		0.0	0.0	-1.0	-3.0	0.0	0.0	-3.0	-2.0
Total Lost Time (s)		6.0	4.0		6.0	6.0	5.0	4.0	7.0	6.0	4.0	5.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 232 (97%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	59	86	32	8	92	43	1770	49	157	2925	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0		6.0	6.0	5.0	4.0	7.0	6.0	4.0	5.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1858	1533		1767	1583	1770	5085	1551	1770	5085	1545
Flt Permitted		0.99	1.00		0.57	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1837	1533		1055	1583	1770	5085	1551	1770	5085	1545
Peak-hour factor, PHF	0.50	0.78	0.83	0.67	0.67	0.79	0.79	0.85	0.72	0.79	0.95	0.50
Adj. Flow (vph)	4	76	104	48	12	116	54	2082	68	199	3079	8
RTOR Reduction (vph)	0	0	66	0	0	106	0	0	20	0	0	2
Lane Group Flow (vph)	0	80	38	0	60	10	54	2082	48	199	3079	6
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		21.2	21.2		21.2	21.2	10.4	167.9	167.9	31.9	189.4	189.4
Effective Green, g (s)		21.2	23.2		21.2	21.2	11.4	170.9	167.9	31.9	192.4	191.4
Actuated g/C Ratio		0.09	0.10		0.09	0.09	0.05	0.71	0.70	0.13	0.80	0.80
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		162	148		93	139	84	3620	1085	235	4076	1232
v/s Ratio Prot							0.03	0.41		c0.11	c0.61	
v/s Ratio Perm		0.04	0.02		c0.06	0.01			0.03			0.00
v/c Ratio		0.49	0.26		0.65	0.07	0.64	0.58	0.04	0.85	0.76	0.01
Uniform Delay, d1		104.3	100.4		105.8	100.4	112.3	16.8	11.2	101.7	12.0	4.9
Progression Factor		1.00	1.00		1.00	1.00	1.17	1.13	2.14	0.83	1.10	1.00
Incremental Delay, d2		2.4	0.9		14.3	0.2	14.4	0.6	0.1	15.9	0.8	0.0
Delay (s)		106.6	101.3		120.1	100.6	146.1	19.6	24.0	100.0	14.0	4.9
Level of Service		F	F		F	F	F	B	C	F	B	A
Approach Delay (s)		103.6			107.3			22.8			19.1	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/17/2013

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	1837	3176	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/17/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	1837	3176	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.86	0.92
Adj. Flow (vph)	0	0	0	2019	3693	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2019	3693	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.40	c0.73	
v/s Ratio Perm						
v/c Ratio				0.52	0.94	
Uniform Delay, d1				5.3	11.6	
Progression Factor				0.70	0.98	
Incremental Delay, d2				0.4	4.9	
Delay (s)				4.1	16.2	
Level of Service				A	B	
Approach Delay (s)	0.0			4.1	16.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

4/17/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	299	16	145	12	16	156	1471	33	69	2520	336
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4		3			2			6
Detector Phase	4	4	4	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0	41.0	11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0	43.0	14.0	14.0	35.0	153.0	153.0	30.0	148.0	148.0
Total Split (%)	17.9%	17.9%	17.9%	5.8%	5.8%	14.6%	63.8%	63.8%	12.5%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-2.0	0.0	-2.0	-1.0	-2.0	-2.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	4.0	6.0	5.0	6.0	4.0	5.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	299	16	145	25	12	16	156	1471	33	69	2520	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	4.0	6.0	5.0	6.0	4.0	5.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1692	1430		1812	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1692	1430		1812	1583	1770	5085	1391	1770	5085	1346
Peak-hour factor, PHF	0.66	0.80	0.91	0.69	0.43	0.57	0.85	0.93	0.52	0.43	0.86	0.84
Adj. Flow (vph)	453	20	159	36	28	28	184	1582	63	160	2930	400
RTOR Reduction (vph)	0	0	62	0	0	27	0	0	24	0	0	160
Lane Group Flow (vph)	236	237	97	0	64	1	184	1582	39	160	2930	240
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4			3			2			6
Actuated Green, G (s)	35.8	35.8	35.8		8.0	8.0	27.2	148.3	148.3	22.9	144.0	144.0
Effective Green, g (s)	35.8	35.8	35.8		8.0	10.0	27.2	150.3	149.3	24.9	146.0	144.0
Actuated g/C Ratio	0.15	0.15	0.15		0.03	0.04	0.11	0.63	0.62	0.10	0.61	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	250	252	213		60	65	200	3184	865	183	3093	807
v/s Ratio Prot	c0.14	0.14			c0.04		c0.10	c0.31		0.09	c0.58	
v/s Ratio Perm			0.07			0.00			0.03			0.18
v/c Ratio	0.94	0.94	0.45		1.07	0.02	0.92	0.50	0.05	0.87	0.95	0.30
Uniform Delay, d1	101.1	101.0	93.2		116.0	110.3	105.3	24.3	17.6	106.0	43.4	23.4
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.84	0.95	2.25	0.96	0.66	3.11
Incremental Delay, d2	41.5	40.6	1.5		135.9	0.0	38.0	0.5	0.1	18.1	4.1	0.4
Delay (s)	142.6	141.6	94.7		251.9	110.3	126.5	23.6	39.7	119.7	32.6	73.1
Level of Service	F	F	F		F	F	F	C	D	F	C	E
Approach Delay (s)		130.2			208.8			34.5			41.2	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	105.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	212	65	45	6	67	322	38	1133	2	401	2010	455
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Detector Phase	3	3	3	4	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	15.0	15.0	15.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	49.0	49.0	49.0	35.0	35.0	35.0	40.0	116.0	116.0	40.0	116.0	116.0
Total Split (%)	20.4%	20.4%	20.4%	14.6%	14.6%	14.6%	16.7%	48.3%	48.3%	16.7%	48.3%	48.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-1.0	-2.0	-2.0	-2.0	-2.0	-3.0	-1.0	-2.0	-3.0	-1.0
Total Lost Time (s)	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 165
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	212	65	45	6	67	322	38	1133	2	401	2010	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.90	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583	1770	1593	1504	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583	1770	1593	1504	1770	5085	1583	3433	5085	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)	230	71	49	7	73	350	41	1232	2	436	2185	495
RTOR Reduction (vph)	0	0	43	0	29	175	0	0	1	0	0	156
Lane Group Flow (vph)	149	152	6	7	188	31	41	1232	1	436	2185	339
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	26.6	26.6	26.6	34.3	34.3	34.3	9.6	120.5	120.5	33.6	144.5	144.5
Effective Green, g (s)	28.6	28.6	27.6	36.3	36.3	36.3	11.6	123.5	121.5	35.6	147.5	145.5
Actuated g/C Ratio	0.12	0.12	0.12	0.15	0.15	0.15	0.05	0.51	0.51	0.15	0.61	0.61
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	200	205	182	267	240	227	85	2616	801	509	3125	959
v/s Ratio Prot	c0.09	0.09		0.00	c0.12		0.02	0.24		c0.13	c0.43	
v/s Ratio Perm			0.00			0.02			0.00			0.21
v/c Ratio	0.74	0.74	0.03	0.03	0.78	0.14	0.48	0.47	0.00	0.86	0.70	0.35
Uniform Delay, d1	102.2	102.1	94.3	86.8	98.1	88.3	111.3	37.3	29.3	99.7	31.3	23.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.81	1.00	1.38	0.21	0.04
Incremental Delay, d2	14.0	13.5	0.1	0.0	15.3	0.3	4.0	0.6	0.0	5.4	0.5	0.4
Delay (s)	116.1	115.6	94.4	86.8	113.4	88.6	112.6	30.9	29.3	142.9	7.1	1.3
Level of Service	F	F	F	F	F	F	F	C	C	F	A	A
Approach Delay (s)		112.9			101.1			33.6			25.2	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/17/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	192	240	163	19	195	137	147	867	27	360	1409	233
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Detector Phase	3	3	3	4	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	9.0	9.0	9.0	3.0	20.0	20.0	3.0	20.0	20.0
Minimum Split (s)	65.0	65.0	65.0	15.0	15.0	15.0	9.0	46.0	46.0	9.0	46.0	46.0
Total Split (s)	47.0	47.0	47.0	31.0	31.0	31.0	29.0	133.0	133.0	29.0	133.0	133.0
Total Split (%)	19.6%	19.6%	19.6%	12.9%	12.9%	12.9%	12.1%	55.4%	55.4%	12.1%	55.4%	55.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-3.0	-1.0	-2.0	-3.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 176 (73%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	192	240	163	19	195	137	147	867	27	360	1409	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3361	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3361	1583	1770	1863	2787	3433	5085	1583	3433	5085	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)	209	261	177	21	212	149	160	942	29	391	1532	253
RTOR Reduction (vph)	0	0	64	0	0	112	0	0	14	0	0	85
Lane Group Flow (vph)	153	317	113	21	212	37	160	942	15	391	1532	168
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	28.1	28.1	28.1	33.6	33.6	33.6	15.6	126.0	126.0	27.3	137.7	137.7
Effective Green, g (s)	30.1	30.1	30.1	35.6	35.6	35.6	17.6	129.0	127.0	29.3	140.7	138.7
Actuated g/C Ratio	0.13	0.13	0.13	0.15	0.15	0.15	0.07	0.54	0.53	0.12	0.59	0.58
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	201	421	198	262	276	413	251	2733	837	419	2981	914
v/s Ratio Prot	c0.10	0.09		0.01	c0.11		0.05	0.19		c0.11	c0.30	
v/s Ratio Perm			0.07			0.01			0.01			0.11
v/c Ratio	0.76	0.75	0.57	0.08	0.77	0.09	0.64	0.34	0.02	0.93	0.51	0.18
Uniform Delay, d1	101.5	101.4	98.9	88.1	98.2	88.2	108.1	31.5	26.9	104.4	29.4	23.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.40	0.32	0.20
Incremental Delay, d2	14.1	6.6	2.5	0.0	10.9	0.0	3.9	0.3	0.0	21.9	0.5	0.3
Delay (s)	115.6	108.0	101.3	88.1	109.2	88.3	112.0	31.9	26.9	168.2	9.9	5.2
Level of Service	F	F	F	F	F	F	F	C	C	F	A	A
Approach Delay (s)		108.0			99.9			43.1			37.8	
Approach LOS		F			F			D			D	

Intersection Summary				
HCM 2000 Control Delay	55.1	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	63.2%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	229	25	7	375	31	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.69	0.44	0.93	0.65	0.67
Hourly flow rate (vph)	305	36	16	403	48	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			342		758	323
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			342		758	323
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		87	98
cM capacity (veh/h)			1218		370	718

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	342	419	60
Volume Left	0	16	48
Volume Right	36	0	12
cSH	1700	1218	409
Volume to Capacity	0.20	0.01	0.15
Queue Length 95th (ft)	0	1	13
Control Delay (s)	0.0	0.4	15.3
Lane LOS		A	C
Approach Delay (s)	0.0	0.4	15.3
Approach LOS			C

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization		35.3%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	248	0	157	368	0	44
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.92	0.79	0.94	0.92	0.85
Hourly flow rate (vph)	335	0	199	391	0	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				847		
pX, platoon unblocked						
vC, conflicting volume			335		1124	335
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			335		1124	335
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		100	93
cM capacity (veh/h)			1224		190	707

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	335	199	391	52
Volume Left	0	199	0	0
Volume Right	0	0	0	52
cSH	1700	1224	1700	707
Volume to Capacity	0.20	0.16	0.23	0.07
Queue Length 95th (ft)	0	14	0	6
Control Delay (s)	0.0	8.5	0.0	10.5
Lane LOS		A		B
Approach Delay (s)	0.0	2.9		10.5
Approach LOS				B

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization		28.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	6	38	154	5	26	27
Peak Hour Factor	0.38	0.56	0.76	0.42	0.72	0.84
Hourly flow rate (vph)	16	68	203	12	36	32

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	84	215	68
Volume Left (vph)	0	203	36
Volume Right (vph)	68	0	32
Hadj (s)	-0.45	0.22	-0.14
Departure Headway (s)	3.8	4.4	4.4
Degree Utilization, x	0.09	0.26	0.08
Capacity (veh/h)	909	810	761
Control Delay (s)	7.2	8.9	7.8
Approach Delay (s)	7.2	8.9	7.8
Approach LOS	A	A	A

Intersection Summary			
Delay		8.3	
Level of Service		A	
Intersection Capacity Utilization		25.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	295	12	0	432	0	0	0	0	0	0	112
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.72	0.50	0.92	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.78
Hourly flow rate (vph)	0	410	24	0	480	0	0	0	0	0	0	144
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					321							
pX, platoon unblocked												
vC, conflicting volume	480			434			805	902	217	685	914	240
vC1, stage 1 conf vol							422	422		480	480	
vC2, stage 2 conf vol							384	480		205	434	
vCu, unblocked vol	480			434			805	902	217	685	914	240
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	81
cM capacity (veh/h)	1079			1122			344	386	788	432	382	761

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	273	161	240	240	144
Volume Left	0	0	0	0	0
Volume Right	0	24	0	0	144
cSH	1700	1700	1700	1700	761
Volume to Capacity	0.16	0.09	0.14	0.14	0.19
Queue Length 95th (ft)	0	0	0	0	17
Control Delay (s)	0.0	0.0	0.0	0.0	10.8
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.8
Approach LOS					B

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		25.5%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/17/2013

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	295	634	432
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0
Total Split (s)	33.0	66.0	99.0
Total Split (%)	33.3%	66.7%	100.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 50.9
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/17/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	295	0	634	432	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.72	0.92	0.92	0.90	0.92	0.92
Adj. Flow (vph)	410	0	689	480	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	410	0	689	480	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	12.6		25.9	50.5		
Effective Green, g (s)	12.6		25.9	50.5		
Actuated g/C Ratio	0.25		0.51	1.00		
Clearance Time (s)	6.0		6.0	6.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	882		907	3539		
v/s Ratio Prot	c0.12		c0.39	0.14		
v/s Ratio Perm						
v/c Ratio	0.46		0.76	0.14		
Uniform Delay, d1	16.1		9.8	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.4		3.7	0.0		
Delay (s)	16.5		13.5	0.0		
Level of Service	B		B	A		
Approach Delay (s)	16.5			8.0	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	221	714	1130	481
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	
Total Split (s)	25.0	90.0	65.0	
Total Split (%)	27.8%	100.0%	72.2%	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 52.9
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/17/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	221	714	1130	481	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.94	0.82	0.93	0.89	0.92	0.92
Adj. Flow (vph)	235	871	1215	540	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	235	871	1215	540	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	12.5	52.6	28.1	52.6		
Effective Green, g (s)	12.5	52.6	28.1	52.6		
Actuated g/C Ratio	0.24	1.00	0.53	1.00		
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	420	3539	1890	1583		
v/s Ratio Prot	c0.13	0.25	c0.34			
v/s Ratio Perm				0.34		
v/c Ratio	0.56	0.25	0.64	0.34		
Uniform Delay, d1	17.6	0.0	8.7	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.6	0.0	0.8	0.6		
Delay (s)	19.2	0.0	9.4	0.6		
Level of Service	B	A	A	A		
Approach Delay (s)		4.1	6.7		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	52.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	449	0	510	285	473	376	561
Turn Type	Perm	NA	Perm	Prot	NA	NA	Perm
Protected Phases		8		5	2	6	
Permitted Phases	8		8				6
Detector Phase	8	8	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	20.0
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	20.0
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	20.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 74.5
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	449	0	510	285	473	0	0	376	561
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1551	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1551	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.92	0.93	0.88	0.85	0.92	0.92	0.93	0.96
Adj. Flow (vph)	0	0	0	493	0	548	324	556	0	0	404	584
RTOR Reduction (vph)	0	0	0	0	0	207	0	0	0	0	0	472
Lane Group Flow (vph)	0	0	0	246	247	341	324	556	0	0	404	112
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				22.5	22.5	22.5	19.2	39.4			14.2	14.2
Effective Green, g (s)				22.5	22.5	22.5	19.2	39.4			14.2	14.2
Actuated g/C Ratio				0.30	0.30	0.30	0.26	0.53			0.19	0.19
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				511	511	472	459	1886			680	304
v/s Ratio Prot							c0.18	0.16			c0.11	
v/s Ratio Perm				0.15	0.15	c0.22						0.07
v/c Ratio				0.48	0.48	0.72	0.71	0.29			0.59	0.37
Uniform Delay, d1				20.9	21.0	22.9	24.8	9.6			27.2	26.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.7	0.7	5.4	4.9	0.1			1.4	0.8
Delay (s)				21.7	21.7	28.4	29.7	9.6			28.6	26.7
Level of Service				C	C	C	C	A			C	C
Approach Delay (s)		0.0			25.2			17.0			27.5	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	73.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	4	392	465	253	592
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 106.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/17/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	341	4	392	0	0	0	0	465	291	253	592	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.94		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3280		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3280		1770	3539	
Peak-hour factor, PHF	0.80	0.50	0.94	0.92	0.92	0.92	0.92	0.94	0.82	0.88	0.96	0.92
Adj. Flow (vph)	426	8	417	0	0	0	0	495	355	288	617	0
RTOR Reduction (vph)	0	0	245	0	0	0	0	98	0	0	0	0
Lane Group Flow (vph)	0	434	172	0	0	0	0	752	0	288	617	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.6	32.6					32.6		23.0	61.6	
Effective Green, g (s)		32.6	32.6					32.6		23.0	61.6	
Actuated g/C Ratio		0.31	0.31					0.31		0.22	0.58	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		545	479					1006		383	2052	
v/s Ratio Prot								c0.23		c0.16	0.17	
v/s Ratio Perm		0.24	0.11									
v/c Ratio		0.80	0.36					0.75		0.75	0.30	
Uniform Delay, d1		33.8	28.7					33.1		38.9	11.3	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		7.9	0.5					3.1		8.1	0.1	
Delay (s)		41.7	29.1					36.2		47.0	11.4	
Level of Service		D	C					D		D	B	
Approach Delay (s)		35.5			0.0			36.2			22.8	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	106.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2023 AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	490	0	40	340	40	260	10
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	10.0	10.0	20.0	18.0	18.0
Total Split (s)	44.0	44.0	44.0	51.0	76.0	25.0	25.0
Total Split (%)	36.7%	36.7%	36.7%	42.5%	63.3%	20.8%	20.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 111 (93%), Referenced to phase 4:WBL and 8:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	490	0	40	340	40	0	0	260	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	1770	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	1770	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	533	0	43	370	43	0	0	283	11
RTOR Reduction (vph)	0	0	0	0	0	23	0	0	0	0	0	10
Lane Group Flow (vph)	0	0	0	266	267	20	370	43	0	0	283	1
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				56.3	56.3	56.3	30.9	51.7			14.8	14.8
Effective Green, g (s)				56.3	56.3	56.3	30.9	51.7			14.8	14.8
Actuated g/C Ratio				0.47	0.47	0.47	0.26	0.43			0.12	0.12
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				788	788	742	455	802			436	195
v/s Ratio Prot				0.16	c0.16		c0.21	0.02			c0.08	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.34	0.34	0.03	0.81	0.05			0.65	0.01
Uniform Delay, d1				20.1	20.1	17.1	41.8	19.9			50.1	46.2
Progression Factor				1.00	1.00	1.00	1.36	1.02			1.00	1.00
Incremental Delay, d2				1.2	1.2	0.1	10.6	0.0			3.3	0.0
Delay (s)				21.2	21.3	17.2	67.4	20.3			53.4	46.2
Level of Service				C	C	B	E	C			D	D
Approach Delay (s)		0.0			21.0			62.5			53.2	
Approach LOS		A			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	41.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	340	405	710	115	755
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	10.0		28.0		10.0	28.0
Total Split (s)	21.0		57.0		42.0	99.0
Total Split (%)	17.5%		47.5%		35.0%	82.5%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		6.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 111 (93%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	340	0	0	0	0	405	710	115	755	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1794	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1794	1583					3539	2787	1770	3539	
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)	16	5	370	0	0	0	0	440	772	125	821	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	370	0	0	0	0	440	772	125	821	0
Turn Type	Perm	NA	Free					NA	Free	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		Free						Free			
Actuated Green, G (s)		3.3	120.0					84.9	120.0	13.8	104.7	
Effective Green, g (s)		3.3	120.0					84.9	120.0	13.8	104.7	
Actuated g/C Ratio		0.03	1.00					0.71	1.00	0.12	0.87	
Clearance Time (s)		6.0						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		49	1583					2503	2787	203	3087	
v/s Ratio Prot								0.12		c0.07	0.23	
v/s Ratio Perm		0.01	0.23						c0.28			
v/c Ratio		0.43	0.23					0.18	0.28	0.62	0.27	
Uniform Delay, d1		57.4	0.0					5.9	0.0	50.6	1.3	
Progression Factor		1.00	1.00					1.00	1.00	1.04	0.58	
Incremental Delay, d2		5.9	0.3					0.2	0.2	5.2	0.2	
Delay (s)		63.3	0.3					6.0	0.2	57.6	0.9	
Level of Service		E	A					A	A	E	A	
Approach Delay (s)		3.7			0.0			2.3			8.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	480	35	65	145	60	50	1045	240	205	925	160
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0
Total Split (s)	37.0	49.0	49.0	20.0	32.0	32.0	14.0	60.0	60.0	21.0	67.0	67.0
Total Split (%)	24.7%	32.7%	32.7%	13.3%	21.3%	21.3%	9.3%	40.0%	40.0%	14.0%	44.7%	44.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 115.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	480	35	65	145	60	50	1045	240	205	925	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	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)	304	522	38	71	158	65	54	1136	261	223	1005	174
RTOR Reduction (vph)	0	0	29	0	0	58	0	0	171	0	0	100
Lane Group Flow (vph)	304	522	9	71	158	7	54	1136	90	223	1005	74
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	25.3	29.4	29.4	8.5	12.6	12.6	6.1	40.9	40.9	15.4	50.2	50.2
Effective Green, g (s)	25.3	29.4	29.4	8.5	12.6	12.6	6.1	40.9	40.9	15.4	50.2	50.2
Actuated g/C Ratio	0.21	0.25	0.25	0.07	0.11	0.11	0.05	0.35	0.35	0.13	0.42	0.42
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	378	880	393	127	377	168	91	1759	547	230	2159	672
v/s Ratio Prot	c0.17	c0.15		0.04	0.04		0.03	c0.22		c0.13	0.20	
v/s Ratio Perm			0.01			0.00			0.06			0.05
v/c Ratio	0.80	0.59	0.02	0.56	0.42	0.04	0.59	0.65	0.17	0.97	0.47	0.11
Uniform Delay, d1	44.1	39.1	33.6	53.0	49.4	47.4	54.8	32.6	26.8	51.2	24.4	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	1.1	0.0	5.3	0.8	0.1	10.0	0.8	0.1	50.1	0.2	0.1
Delay (s)	55.8	40.2	33.6	58.3	50.1	47.5	64.8	33.4	27.0	101.3	24.5	20.6
Level of Service	E	D	C	E	D	D	E	C	C	F	C	C
Approach Delay (s)		45.4			51.5			33.4			36.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	118.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

4/23/2013

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	215	255	245	1245	745	355
Turn Type	custom	custom	Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4				6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	30.0	30.0	30.0
Minimum Split (s)	44.0	44.0	10.0	36.0	36.0	36.0
Total Split (s)	44.0	44.0	20.0	56.0	36.0	36.0
Total Split (%)	44.0%	44.0%	20.0%	56.0%	36.0%	36.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 93.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	0	255	0	0	0	245	1245	0	0	745	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0				5.0	6.0			6.0	6.0
Lane Util. Factor	0.97		1.00				1.00	0.91			0.91	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433		1583				1770	5085			5085	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		1583				1770	5085			5085	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)	234	0	277	0	0	0	266	1353	0	0	810	386
RTOR Reduction (vph)	0	0	187	0	0	0	0	0	0	0	0	259
Lane Group Flow (vph)	234	0	90	0	0	0	266	1353	0	0	810	127
Turn Type	custom		custom				Prot	NA			NA	Perm
Protected Phases							5	2			6	
Permitted Phases	4		4									6
Actuated Green, G (s)	30.6		30.6				15.3	51.1			30.8	30.8
Effective Green, g (s)	30.6		30.6				15.3	51.1			30.8	30.8
Actuated g/C Ratio	0.33		0.33				0.16	0.55			0.33	0.33
Clearance Time (s)	6.0		6.0				5.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	1121		516				289	2773			1671	520
v/s Ratio Prot							c0.15	c0.27			0.16	
v/s Ratio Perm	c0.07		0.06									0.08
v/c Ratio	0.21		0.18				0.92	0.49			0.48	0.24
Uniform Delay, d1	22.8		22.5				38.6	13.2			25.1	23.0
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1		0.2				32.8	0.1			0.2	0.2
Delay (s)	22.9		22.7				71.4	13.3			25.3	23.2
Level of Service	C		C				E	B			C	C
Approach Delay (s)		22.8			0.0			22.9			24.6	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	93.7	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

4/23/2013

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	40	550	1105	5	190	730	125
Turn Type	custom	custom	NA	Perm	Prot	NA	Perm
Protected Phases			2		1	6	
Permitted Phases	4	8		2			6
Detector Phase	4	8	2	2	1	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	30.0	30.0	4.0	30.0	30.0
Minimum Split (s)	43.0	43.0	37.0	37.0	10.0	37.0	37.0
Total Split (s)	44.0	44.0	39.0	39.0	17.0	56.0	56.0
Total Split (%)	44.0%	44.0%	39.0%	39.0%	17.0%	56.0%	56.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 93.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	0	0	550	0	1105	5	190	730	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			6.0		6.0	6.0	5.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	1770	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	0	0	598	0	1201	5	207	793	136
RTOR Reduction (vph)	0	0	29	0	0	197	0	0	3	0	0	63
Lane Group Flow (vph)	0	0	14	0	0	401	0	1201	2	207	793	73
Turn Type			custom			custom		NA	Perm	Prot	NA	Perm
Protected Phases								2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)			31.1			31.1		32.6	32.6	12.2	49.8	49.8
Effective Green, g (s)			31.1			31.1		32.6	32.6	12.2	49.8	49.8
Actuated g/C Ratio			0.33			0.33		0.35	0.35	0.13	0.54	0.54
Clearance Time (s)			6.0			6.0		6.0	6.0	5.0	6.0	6.0
Vehicle Extension (s)			3.0			3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			539			539		1784	555	232	2725	848
v/s Ratio Prot								c0.24		c0.12	0.16	
v/s Ratio Perm			0.01			c0.25			0.00			0.05
v/c Ratio			0.03			0.74		0.67	0.00	0.89	0.29	0.09
Uniform Delay, d1			20.7			27.4		25.6	19.6	39.7	11.8	10.5
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0			5.5		1.0	0.0	31.9	0.1	0.0
Delay (s)			20.8			32.9		26.6	19.6	71.6	11.9	10.5
Level of Service			C			C		C	B	E	B	B
Approach Delay (s)		20.8			32.9			26.6			22.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	92.9	Sum of lost time (s)	17.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	130	215	495	185	520	185	480	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	10.0	47.0		10.0	47.0		10.0	36.0	10.0	36.0	
Total Split (s)	25.0	52.0		26.0	53.0		20.0	42.0	20.0	42.0	
Total Split (%)	17.9%	37.1%		18.6%	37.9%		14.3%	30.0%	14.3%	30.0%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 116.9
Natural Cycle: 105
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	130	215	495	185	520	10	185	480	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5071		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5071		3433	5085	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)	228	304	185	141	234	538	201	565	11	201	522	174
RTOR Reduction (vph)	0	0	86	0	0	43	0	1	0	0	0	99
Lane Group Flow (vph)	228	304	99	141	234	495	201	575	0	201	522	75
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.1	36.9	54.9	14.6	38.4	56.8	12.0	30.6		12.4	31.0	50.1
Effective Green, g (s)	13.1	36.9	54.9	14.6	38.4	56.8	12.0	30.6		12.4	31.0	50.1
Actuated g/C Ratio	0.11	0.32	0.47	0.13	0.33	0.49	0.10	0.26		0.11	0.27	0.43
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	386	590	745	221	614	771	353	1331		365	1353	680
v/s Ratio Prot	0.07	0.16		c0.08	0.13		0.06	c0.11		0.06	0.10	
v/s Ratio Perm			0.06			c0.31						0.05
v/c Ratio	0.59	0.52	0.13	0.64	0.38	0.64	0.57	0.43		0.55	0.39	0.11
Uniform Delay, d1	49.2	32.5	17.4	48.4	29.9	22.3	49.8	35.7		49.4	35.0	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	0.8	0.1	5.9	0.4	1.8	2.1	0.2		1.8	0.2	0.1
Delay (s)	51.6	33.3	17.5	54.4	30.3	24.1	51.9	35.9		51.2	35.1	19.9
Level of Service	D	C	B	D	C	C	D	D		D	D	B
Approach Delay (s)		35.0			30.4			40.1			35.8	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	116.5	Sum of lost time (s)	22.0	
Intersection Capacity Utilization	75.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	375	175	180	535	200	20	85	295	105	300
Turn Type	Prot	NA	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4	3	8	8	5	2	1	6	6
Permitted Phases					1					3
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	34.0	9.0	34.0	34.0	10.0	44.0	9.0	44.0	44.0
Total Split (s)	27.0	44.0	17.0	34.0	34.0	11.0	44.0	25.0	58.0	58.0
Total Split (%)	20.8%	33.8%	13.1%	26.2%	26.2%	8.5%	33.8%	19.2%	44.6%	44.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 108.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	175	35	180	535	200	20	85	35	295	105	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	0.91		0.97	0.91	0.88	1.00	0.95		0.97	1.00	0.88
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4958		3433	5085	2787	1770	3384		3433	1863	2778
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4958		3433	5085	2787	1770	3384		3433	1863	2778
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)	408	190	38	196	582	217	22	92	38	321	114	326
RTOR Reduction (vph)	0	24	0	0	0	0	0	27	0	0	0	160
Lane Group Flow (vph)	408	204	0	196	582	217	22	103	0	321	114	166
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA		Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8	8	5	2		1	6	6
Permitted Phases						1						3
Actuated Green, G (s)	18.2	28.5		11.1	21.4	37.1	2.6	32.8		15.7	44.9	56.0
Effective Green, g (s)	18.2	28.5		11.1	21.4	37.1	2.6	32.8		15.7	44.9	56.0
Actuated g/C Ratio	0.17	0.26		0.10	0.19	0.34	0.02	0.30		0.14	0.41	0.51
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	567	1283		346	988	1091	41	1008		489	759	1564
v/s Ratio Prot	c0.12	0.04		0.06	c0.11	0.04	0.01	0.03		c0.09	c0.06	0.04
v/s Ratio Perm						0.04						0.02
v/c Ratio	0.72	0.16		0.57	0.59	0.20	0.54	0.10		0.66	0.15	0.11
Uniform Delay, d1	43.5	31.5		47.2	40.3	25.9	53.2	28.0		44.6	20.6	14.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.4	0.1		2.1	0.9	0.1	12.8	0.0		3.2	0.1	0.0
Delay (s)	47.9	31.6		49.3	41.3	26.0	66.0	28.0		47.8	20.7	14.1
Level of Service	D	C		D	D	C	E	C		D	C	B
Approach Delay (s)		42.1			39.5			33.5			29.3	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	110.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

4/23/2013

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	315	5	65	10	1260	40	725
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	35.0	35.0	35.0	10.0	36.0	10.0	10.0
Total Split (s)	10.0	35.0	35.0	35.0	10.0	55.0	10.0	55.0
Total Split (%)	9.1%	31.8%	31.8%	31.8%	9.1%	50.0%	9.1%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 2 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	315	5	65	10	1260	195	40	725	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1688	1583	1770	3468		1770	3536	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1688	1583	1770	3468		1770	3536	
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	0	5	342	5	71	11	1370	212	43	788	5
RTOR Reduction (vph)	0	5	0	0	0	60	0	9	0	0	0	0
Lane Group Flow (vph)	0	0	0	174	173	11	11	1573	0	43	793	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		1.1		17.2	17.2	17.2	1.4	61.2		6.5	66.3	
Effective Green, g (s)		1.1		17.2	17.2	17.2	1.4	61.2		6.5	66.3	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.01	0.56		0.06	0.60	
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		16		262	263	247	22	1929		104	2131	
v/s Ratio Prot		c0.00		c0.10	0.10		0.01	c0.45		c0.02	c0.22	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.66	0.66	0.04	0.50	0.82		0.41	0.37	
Uniform Delay, d1		53.9		43.7	43.6	39.4	54.0	19.8		49.9	11.2	
Progression Factor		1.00		1.00	1.00	1.00	1.40	0.44		1.00	1.00	
Incremental Delay, d2		0.1		6.2	5.8	0.1	12.9	3.0		2.7	0.5	
Delay (s)		54.0		49.9	49.5	39.5	88.2	11.7		52.6	11.7	
Level of Service		D		D	D	D	F	B		D	B	
Approach Delay (s)		54.0			47.9			12.2			13.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

4/23/2013

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	505	25	1470	380	1055
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	33.0	33.0	77.0	77.0	77.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	505	25	1470	380	0	1055
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	27	1598	413	0	1147
RTOR Reduction (vph)	0	21	0	130	0	0
Lane Group Flow (vph)	549	6	1598	283	0	1147
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.5	22.5	75.5	75.5		75.5
Effective Green, g (s)	22.5	22.5	75.5	75.5		75.5
Actuated g/C Ratio	0.20	0.20	0.69	0.69		0.69
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	702	323	2429	1086		2429
v/s Ratio Prot	c0.16		c0.45			0.32
v/s Ratio Perm		0.00		0.18		
v/c Ratio	0.78	0.02	0.66	0.26		0.47
Uniform Delay, d1	41.4	34.9	9.9	6.6		8.0
Progression Factor	1.00	1.00	1.00	1.00		1.03
Incremental Delay, d2	5.7	0.0	1.4	0.6		0.6
Delay (s)	47.1	34.9	11.3	7.2		8.9
Level of Service	D	C	B	A		A
Approach Delay (s)	46.5		10.4			8.9
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

4/23/2013

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1730	1205	420	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1880	1310	457	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		878	418			
pX, platoon unblocked	0.84				0.88	0.84
vC, conflicting volume	1766				2165	883
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1538				1509	492
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	361				98	441

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	627	627	627	873	893
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	457
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.51	0.53
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	165	1730	1205	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	179	1880	1310	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				649	647	
pX, platoon unblocked	0.93	0.89	0.89			
vC, conflicting volume	2295	655	1310			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1546	377	1110			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	68			
cM capacity (veh/h)	67	555	559			

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2
Volume Total	179	627	627	627	655	655
Volume Left	179	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	559	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.37	0.37	0.37	0.39	0.39
Queue Length 95th (ft)	34	0	0	0	0	0
Control Delay (s)	14.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	1.3				0.0	
Approach LOS						

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	475	170	870	710	1845
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	43.0		69.0	58.0	127.0
Total Split (%)	25.3%		40.6%	34.1%	74.7%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 124.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	475	0	170	0	0	0	0	870	0	710	1845	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	516	0	185	0	0	0	0	946	0	772	2005	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	516	0	185	0	0	0	0	946	0	772	2005	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	25.7		123.9					43.6		36.6	86.2	
Effective Green, g (s)	25.7		123.9					43.6		36.6	86.2	
Actuated g/C Ratio	0.21		1.00					0.35		0.30	0.70	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	712		1583					1245		1014	3537	
v/s Ratio Prot	c0.15							c0.27		c0.22	0.39	
v/s Ratio Perm			0.12									
v/c Ratio	0.72		0.12					0.76		0.76	0.57	
Uniform Delay, d1	45.8		0.0					35.5		39.7	9.5	
Progression Factor	1.00		1.00					1.00		0.99	1.00	
Incremental Delay, d2	3.7		0.2					2.7		3.4	0.2	
Delay (s)	49.5		0.2					38.2		42.8	9.7	
Level of Service	D		A					D		D	A	
Approach Delay (s)		36.5			0.0			38.2			18.9	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	123.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2485	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2485	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2701	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2701	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.76			
v/s Ratio Perm						
v/c Ratio			0.85			
Uniform Delay, d1			3.3			
Progression Factor			1.00			
Incremental Delay, d2			3.1			
Delay (s)			6.3			
Level of Service			A			
Approach Delay (s)	0.0		6.3			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	870	2485	0	2015	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	946	2701	0	2190	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.80	
vC, conflicting volume			3647		1676	473
vC1, stage 1 conf vol					946	
vC2, stage 2 conf vol					730	
vCu, unblocked vol			3647		951	473
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			62		287	538

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	630	1216	1801	730	730	730
Volume Left	0	0	0	0	0	0
Volume Right	0	900	1801	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.72	1.06	0.43	0.43	0.43
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	135	3245	115	0	2020
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	147	3527	125	0	2196
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.79					
vC, conflicting volume	4261	1178			3529	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4198	1178			3529	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	20			100	
cM capacity (veh/h)	1	183			69	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	147	1176	1176	1176	125	732	732	732
Volume Left	0	0	0	0	0	0	0	0
Volume Right	147	0	0	0	125	0	0	0
cSH	183	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.80	0.69	0.69	0.69	0.07	0.43	0.43	0.43
Queue Length 95th (ft)	137	0	0	0	0	0	0	0
Control Delay (s)	75.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F							
Approach Delay (s)	75.1	0.0				0.0		
Approach LOS	F							

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	25	30	105	5	175	40	3220	35	45	1565	100
Turn Type	Perm	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8			2			6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0	51.0	10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0	51.0	18.0	176.0	176.0	13.0	171.0	171.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	21.3%	7.5%	73.3%	73.3%	5.4%	71.3%	71.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	30	15	105	5	175	40	3220	35	45	1565	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1755		1743	1863	1583	1770	5085	1583	1770	5085	1525
Flt Permitted	0.75	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1755		1330	1863	1583	1770	5085	1583	1770	5085	1525
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	33	16	114	5	190	43	3500	38	49	1701	109
RTOR Reduction (vph)	0	8	0	0	0	40	0	0	10	0	0	27
Lane Group Flow (vph)	27	41	0	114	5	150	43	3500	28	49	1701	82
Confl. Peds. (#/hr)			10	10								3
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	31.7	31.7		31.7	31.7	31.7	8.9	178.9	178.9	10.4	180.4	180.4
Effective Green, g (s)	31.7	31.7		31.7	31.7	31.7	8.9	178.9	178.9	10.4	180.4	180.4
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.04	0.75	0.75	0.04	0.75	0.75
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	185	231		175	246	209	65	3790	1179	76	3822	1146
v/s Ratio Prot		0.02			0.00		0.02	c0.69		c0.03	0.33	
v/s Ratio Perm	0.02			0.09		c0.09			0.02			0.05
v/c Ratio	0.15	0.18		0.65	0.02	0.72	0.66	0.92	0.02	0.64	0.45	0.07
Uniform Delay, d1	92.2	92.6		98.9	90.6	99.9	114.1	25.0	7.9	113.0	11.1	7.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.21	0.16	0.01	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.4		8.4	0.0	11.2	9.9	2.2	0.0	17.2	0.4	0.1
Delay (s)	92.5	92.9		107.3	90.7	111.0	148.0	6.3	0.1	130.2	11.5	7.9
Level of Service	F	F		F	F	F	F	A	A	F	B	A
Approach Delay (s)		92.8			109.3			7.9			14.4	
Approach LOS		F			F			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	18.0	178.0	178.0	15.0	175.0	175.0
Total Split (%)	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	7.5%	74.2%	74.2%	6.3%	72.9%	72.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 172 (72%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 165
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.96		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1853	1522		1741	1583	1770	5085	1583	1770	5085	1583
Flt Permitted		0.97	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1801	1522		1293	1583	1770	5085	1583	1770	5085	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)	5	43	65	163	16	168	49	3418	49	49	1761	5
RTOR Reduction (vph)	0	0	55	0	0	48	0	0	13	0	0	1
Lane Group Flow (vph)	0	48	10	0	179	120	49	3418	36	49	1761	4
Confl. Peds. (#/hr)			12	12								
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		36.7	36.7		36.7	36.7	10.7	174.8	174.8	9.5	173.6	173.6
Effective Green, g (s)		36.7	36.7		36.7	36.7	10.7	174.8	174.8	9.5	173.6	173.6
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.04	0.73	0.73	0.04	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		275	232		197	242	78	3703	1152	70	3678	1145
v/s Ratio Prot							c0.03	c0.67		0.03	0.35	
v/s Ratio Perm		0.03	0.01		c0.14	0.08			0.02			0.00
v/c Ratio		0.17	0.04		0.91	0.49	0.63	0.92	0.03	0.70	0.48	0.00
Uniform Delay, d1		88.5	86.7		100.0	93.2	112.7	27.0	9.1	113.8	14.1	9.2
Progression Factor		1.00	1.00		1.00	1.00	1.08	0.52	0.47	0.91	1.32	1.00
Incremental Delay, d2		0.3	0.1		39.1	1.6	9.0	3.1	0.0	24.4	0.4	0.0
Delay (s)		88.8	86.8		139.1	94.7	130.5	17.2	4.3	127.6	18.9	9.2
Level of Service		F	F		F	F	F	B	A	F	B	A
Approach Delay (s)		87.6			117.6			18.6			21.8	
Approach LOS		F			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3380	1795	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 117 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3380	1795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	3674	1951	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3674	1951	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				100.2	100.2	
Effective Green, g (s)				100.2	100.2	
Actuated g/C Ratio				0.84	0.84	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				4245	4245	
v/s Ratio Prot				c0.72	0.38	
v/s Ratio Perm						
v/c Ratio				0.87	0.46	
Uniform Delay, d1				5.9	2.7	
Progression Factor				1.52	0.37	
Incremental Delay, d2				1.3	0.3	
Delay (s)				10.2	1.3	
Level of Service				B	A	
Approach Delay (s)	0.0			10.2	1.3	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	160	10	5	250	3065	15	5	1525	330
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4		3			2			6
Detector Phase	4	4	4	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0	41.0	11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	45.0	45.0	45.0	11.0	11.0	57.0	173.0	173.0	11.0	127.0	127.0
Total Split (%)	18.8%	18.8%	18.8%	4.6%	4.6%	23.8%	72.1%	72.1%	4.6%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 127 (53%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	160	10	10	5	250	3065	15	5	1525	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.81	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1427		1817	1583	1770	5085	1289	1770	5085	1532
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1427		1817	1583	1770	5085	1289	1770	5085	1532
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)	440	11	174	11	11	5	272	3332	16	5	1658	359
RTOR Reduction (vph)	0	0	85	0	0	5	0	0	0	0	0	159
Lane Group Flow (vph)	224	227	89	0	22	0	272	3332	16	5	1658	200
Confl. Peds. (#/hr)			43						31			2
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4			3			2			6
Actuated Green, G (s)	36.0	36.0	36.0		4.0	4.0	41.1	174.0	174.0	1.0	133.9	133.9
Effective Green, g (s)	36.0	36.0	36.0		4.0	4.0	41.1	174.0	174.0	1.0	133.9	133.9
Actuated g/C Ratio	0.15	0.15	0.15		0.02	0.02	0.17	0.72	0.72	0.00	0.56	0.56
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	252	253	214		30	26	303	3686	934	7	2837	854
v/s Ratio Prot	0.13	c0.13			c0.01		c0.15	c0.66		0.00	0.33	
v/s Ratio Perm			0.06			0.00			0.01			0.13
v/c Ratio	0.89	0.90	0.42		0.73	0.00	0.90	0.90	0.02	0.71	0.58	0.23
Uniform Delay, d1	100.0	100.2	92.5		117.5	116.0	97.4	26.3	9.2	119.4	34.8	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.96	1.11	0.63	0.97	0.95	2.45
Incremental Delay, d2	29.2	30.7	1.3		56.2	0.0	13.8	1.9	0.0	134.6	0.8	0.6
Delay (s)	129.2	130.9	93.8		173.7	116.1	106.9	31.2	5.8	250.2	34.0	66.7
Level of Service	F	F	F		F	F	F	C	A	F	C	E
Approach Delay (s)		120.0			163.0			36.8			40.4	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	50	50	15	85	505	40	2095	5	285	1295	60
Turn Type	Split	NA	custom	Split	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases			3 5						2			6
Detector Phase	3	3	3 5	4	4	4 1	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0		15.0	15.0		10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	60.0	60.0		38.0	38.0		15.0	115.0	115.0	27.0	127.0	127.0
Total Split (%)	25.0%	25.0%		15.8%	15.8%		6.3%	47.9%	47.9%	11.3%	52.9%	52.9%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 221 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	50	50	15	85	505	40	2095	5	285	1295	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.89	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583	1770	1579	1504	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1583	1770	1579	1504	1770	5085	1583	3433	5085	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)	565	54	54	16	92	549	43	2277	5	310	1408	65
RTOR Reduction (vph)	0	0	41	0	37	33	0	0	3	0	0	0
Lane Group Flow (vph)	311	308	13	16	291	280	43	2277	2	310	1408	65
Turn Type	Split	NA	custom	Split	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases			3 5						2			6
Actuated Green, G (s)	48.6	48.6	57.2	37.4	37.4	64.4	8.6	108.0	108.0	21.0	120.4	120.4
Effective Green, g (s)	48.6	48.6	57.2	37.4	37.4	64.4	8.6	108.0	108.0	21.0	120.4	120.4
Actuated g/C Ratio	0.20	0.20	0.24	0.16	0.16	0.27	0.04	0.45	0.45	0.09	0.50	0.50
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	340	344	377	275	246	403	63	2288	712	300	2550	794
v/s Ratio Prot	c0.18	0.18		0.01	c0.18	0.19	0.02	c0.45		c0.09	0.28	
v/s Ratio Perm			0.01						0.00			0.04
v/c Ratio	0.91	0.90	0.03	0.06	1.18	0.69	0.68	1.00	0.00	1.03	0.55	0.08
Uniform Delay, d1	93.7	93.2	70.2	86.3	101.3	79.0	114.4	65.7	36.4	109.5	41.2	31.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.79	1.00	0.83	0.85	0.67
Incremental Delay, d2	28.1	24.3	0.0	0.1	115.7	5.1	23.1	16.4	0.0	56.1	0.7	0.2
Delay (s)	121.7	117.5	70.2	86.4	217.0	84.1	133.3	68.3	36.4	146.6	35.8	20.9
Level of Service	F	F	E	F	F	F	F	E	D	F	D	C
Approach Delay (s)		115.7			150.5			69.4			54.5	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	80.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Detector Phase	3	3	3	4	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	9.0	9.0	9.0	3.0	20.0	20.0	3.0	20.0	20.0
Minimum Split (s)	65.0	65.0	65.0	15.0	15.0	15.0	9.0	46.0	46.0	9.0	46.0	46.0
Total Split (s)	65.0	65.0	65.0	53.0	53.0	53.0	22.0	98.0	98.0	24.0	100.0	100.0
Total Split (%)	27.1%	27.1%	27.1%	22.1%	22.1%	22.1%	9.2%	40.8%	40.8%	10.0%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 224 (93%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 165
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	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)	293	174	185	114	272	326	168	1630	54	196	1136	152
RTOR Reduction (vph)	0	0	64	0	0	205	0	0	25	0	0	57
Lane Group Flow (vph)	152	315	121	114	272	121	168	1630	29	196	1136	95
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	28.3	28.3	28.3	39.7	39.7	39.7	16.2	128.8	128.8	18.2	130.8	130.8
Effective Green, g (s)	28.3	28.3	28.3	39.7	39.7	39.7	16.2	128.8	128.8	18.2	130.8	130.8
Actuated g/C Ratio	0.12	0.12	0.12	0.17	0.17	0.17	0.07	0.54	0.54	0.08	0.55	0.55
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	189	391	186	292	308	461	231	2728	849	260	2771	862
v/s Ratio Prot	0.09	c0.09		0.06	c0.15		0.05	c0.32		c0.06	0.22	
v/s Ratio Perm			0.08			0.04			0.02			0.06
v/c Ratio	0.80	0.81	0.65	0.39	0.88	0.26	0.73	0.60	0.03	0.75	0.41	0.11
Uniform Delay, d1	103.2	103.2	101.1	89.4	97.9	87.4	109.7	37.9	26.2	108.7	32.0	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.17	0.32	0.05
Incremental Delay, d2	20.3	10.9	5.7	0.3	23.8	0.1	9.3	1.0	0.1	9.1	0.4	0.2
Delay (s)	123.5	114.0	106.8	89.7	121.7	87.5	119.0	38.9	26.3	136.4	10.6	1.6
Level of Service	F	F	F	F	F	F	F	D	C	F	B	A
Approach Delay (s)		114.2			100.9			45.8			26.3	
Approach LOS		F			F			D			C	

Intersection Summary				
HCM 2000 Control Delay	57.5	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	76.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	680	40	10	315	30	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	739	43	11	342	33	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			783		954	391
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			783		954	391
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		87	99
cM capacity (veh/h)			831		253	608

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	493	290	125	228	38
Volume Left	0	0	11	0	33
Volume Right	0	43	0	0	5
cSH	1700	1700	831	1700	276
Volume to Capacity	0.29	0.17	0.01	0.13	0.14
Queue Length 95th (ft)	0	0	1	0	12
Control Delay (s)	0.0	0.0	0.9	0.0	20.1
Lane LOS			A		C
Approach Delay (s)	0.0		0.3		20.1
Approach LOS					C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	645	0	55	335	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	701	0	60	364	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				847		
pX, platoon unblocked						
vC, conflicting volume			701		1003	351
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			701		1003	351
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		100	93
cM capacity (veh/h)			892		223	646

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	351	351	181	243	43
Volume Left	0	0	60	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	892	1700	646
Volume to Capacity	0.21	0.21	0.07	0.14	0.07
Queue Length 95th (ft)	0	0	5	0	5
Control Delay (s)	0.0	0.0	3.5	0.0	11.0
Lane LOS			A		B
Approach Delay (s)	0.0		1.5		11.0
Approach LOS					B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.2		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	645	20	0	340	0	0	0	0	0	0	35
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	701	22	0	370	0	0	0	0	0	0	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					321							
pX, platoon unblocked												
vC, conflicting volume	370			723			935	1082	361	720	1092	185
vC1, stage 1 conf vol							712	712		370	370	
vC2, stage 2 conf vol							223	370		351	723	
vCu, unblocked vol	370			723			935	1082	361	720	1092	185
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	95
cM capacity (veh/h)	1186			875			313	326	635	432	323	826

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	467	255	185	185	38
Volume Left	0	0	0	0	0
Volume Right	0	22	0	0	38
cSH	1700	1700	1700	1700	826
Volume to Capacity	0.27	0.15	0.11	0.11	0.05
Queue Length 95th (ft)	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	9.6
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.6
Approach LOS					A

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization		21.8%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	645	325	340
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0
Total Split (s)	40.0	50.0	90.0
Total Split (%)	44.4%	55.6%	100.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 42.6
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	645	0	325	340	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	701	0	353	370	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	701	0	353	370	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	15.4		14.9	42.3		
Effective Green, g (s)	15.4		14.9	42.3		
Actuated g/C Ratio	0.36		0.35	1.00		
Clearance Time (s)	6.0		6.0	6.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1288		623	3539		
v/s Ratio Prot	c0.20		c0.20	0.10		
v/s Ratio Perm						
v/c Ratio	0.54		0.57	0.10		
Uniform Delay, d1	10.7		11.1	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.5		1.2	0.0		
Delay (s)	11.1		12.3	0.0		
Level of Service	B		B	A		
Approach Delay (s)	11.1			6.0	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	285	995	665	175
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	
Total Split (s)	23.0	70.0	47.0	
Total Split (%)	32.9%	100.0%	67.1%	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 39.5
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	285	995	665	175	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	1082	723	190	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	310	1082	723	190	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	12.3	39.3	15.0	39.3		
Effective Green, g (s)	12.3	39.3	15.0	39.3		
Actuated g/C Ratio	0.31	1.00	0.38	1.00		
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	553	3539	1350	1583		
v/s Ratio Prot	c0.18	0.31	c0.20			
v/s Ratio Perm				0.12		
v/c Ratio	0.56	0.31	0.54	0.12		
Uniform Delay, d1	11.2	0.0	9.4	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.3	0.0	0.4	0.2		
Delay (s)	12.6	0.0	9.9	0.2		
Level of Service	B	A	A	A		
Approach Delay (s)		2.8	7.8		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	425	810	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	462	880	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		797				
pX, platoon unblocked						
vC, conflicting volume	902				1274	451
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	902				1274	451
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				81	95
cM capacity (veh/h)	749				143	556

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	231	231	587	315	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	749	1700	1700	1700	1700	143	556
Volume to Capacity	0.10	0.14	0.14	0.35	0.19	0.19	0.05
Queue Length 95th (ft)	8	0	0	0	0	17	4
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	36.1	11.8
Lane LOS	B					E	B
Approach Delay (s)	1.5			0.0		23.9	
Approach LOS						C	

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	265	15	0	405	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	288	16	0	440	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	440			304			929	899	152	758	908	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440			304			929	899	152	758	908	220
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			77	96	99	100	100	68
cM capacity (veh/h)	1116			1253			143	257	867	269	254	784

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	82	192	112	0	293	147	49	250
Volume Left	82	0	0	0	0	0	33	0
Volume Right	0	0	16	0	0	0	5	250
cSH	1116	1700	1700	1700	1700	1700	177	784
Volume to Capacity	0.07	0.11	0.07	0.00	0.17	0.09	0.28	0.32
Queue Length 95th (ft)	6	0	0	0	0	0	27	34
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	33.0	11.7
Lane LOS	A						D	B
Approach Delay (s)	1.8			0.0			33.0	11.7
Approach LOS							D	B

Intersection Summary				
Average Delay		4.7		
Intersection Capacity Utilization		46.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	145	10	0	240	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	158	11	0	261	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	261			168			690	674	84	598	679	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261			168			690	674	84	598	679	130
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			89	95	100	100	100	84
cM capacity (veh/h)	1301			1407			257	339	958	345	336	895

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	125	105	63	0	174	87	43	147
Volume Left	125	0	0	0	0	0	27	0
Volume Right	0	0	11	0	0	0	0	147
cSH	1301	1700	1700	1700	1700	1700	282	895
Volume to Capacity	0.10	0.06	0.04	0.00	0.10	0.05	0.15	0.16
Queue Length 95th (ft)	8	0	0	0	0	0	13	15
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	20.1	9.8
Lane LOS	A						C	A
Approach Delay (s)	3.4			0.0			20.1	9.8
Approach LOS							C	A

Intersection Summary				
Average Delay		4.5		
Intersection Capacity Utilization		38.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	45	5	0	115	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	49	5	0	125	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	130			54			429	378	27	353	378	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			54			429	378	27	353	378	65
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	98	100	100	100	88
cM capacity (veh/h)	1453			1549			425	515	1042	539	515	985

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	98	33	22	0	83	47	33	120
Volume Left	98	0	0	0	0	0	22	0
Volume Right	0	0	5	0	0	5	0	120
cSH	1453	1700	1700	1700	1700	1700	451	985
Volume to Capacity	0.07	0.02	0.01	0.00	0.05	0.03	0.07	0.12
Queue Length 95th (ft)	5	0	0	0	0	0	6	10
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	13.6	9.2
Lane LOS	A						B	A
Approach Delay (s)	4.9			0.0			13.6	9.2
Approach LOS							B	A

Intersection Summary				
Average Delay		5.3		
Intersection Capacity Utilization		26.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	5	40	50	10	80
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	5	43	54	11	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		182	90	92	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		182	90	92	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	97		94	93	99	92
cM capacity (veh/h)	1623		695	779	776	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	98	98
Volume Left	43	43	0
Volume Right	5	0	87
cSH	1623	739	1039
Volume to Capacity	0.03	0.13	0.09
Queue Length 95th (ft)	2	11	8
Control Delay (s)	6.5	10.6	8.8
Lane LOS	A	B	A
Approach Delay (s)	6.5	10.6	8.8
Approach LOS		B	A

Intersection Summary				
Average Delay		9.1		
Intersection Capacity Utilization		21.5%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	375	0	190	300	660	335	620
Turn Type	Perm	NA	Perm	Prot	NA	NA	Perm
Protected Phases		8		5	2	6	
Permitted Phases	8		8				6
Detector Phase	8	8	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	20.0
Total Split (s)	38.0	38.0	38.0	33.0	88.0	55.0	55.0
Total Split (%)	30.2%	30.2%	30.2%	26.2%	69.8%	43.7%	43.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 126
Actuated Cycle Length: 79.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	375	0	190	300	660	0	0	335	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1548	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1548	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	408	0	207	326	717	0	0	364	674
RTOR Reduction (vph)	0	0	0	0	0	161	0	0	0	0	0	418
Lane Group Flow (vph)	0	0	0	204	204	46	326	717	0	0	364	256
Confl. Peds. (#/hr)						14						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				17.4	17.4	17.4	21.3	49.5			22.2	22.2
Effective Green, g (s)				17.4	17.4	17.4	21.3	49.5			22.2	22.2
Actuated g/C Ratio				0.22	0.22	0.22	0.27	0.63			0.28	0.28
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				370	370	341	477	2220			995	445
v/s Ratio Prot							c0.18	0.20			0.10	
v/s Ratio Perm				c0.12	0.12	0.03						c0.16
v/c Ratio				0.55	0.55	0.13	0.68	0.32			0.37	0.57
Uniform Delay, d1				27.3	27.3	24.7	25.8	6.9			22.7	24.3
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.8	1.8	0.2	4.0	0.1			0.2	1.8
Delay (s)				29.1	29.1	24.9	29.8	7.0			22.9	26.1
Level of Service				C	C	C	C	A			C	C
Approach Delay (s)		0.0			27.7			14.1			25.0	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	80	490	415	245	495
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	66.0	66.0	42.0	32.0	74.0
Total Split (%)	47.1%	47.1%	30.0%	22.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 128.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	540	80	490	0	0	0	0	415	345	245	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.98		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3227		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3227		1770	3539	
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)	587	87	533	0	0	0	0	451	375	266	538	0
RTOR Reduction (vph)	0	0	149	0	0	0	0	107	0	0	0	0
Lane Group Flow (vph)	0	674	384	0	0	0	0	719	0	266	538	0
Confl. Peds. (#/hr)			1						18			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		53.8	53.8					33.1		23.0	62.1	
Effective Green, g (s)		53.8	53.8					33.1		23.0	62.1	
Actuated g/C Ratio		0.42	0.42					0.26		0.18	0.49	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		750	657					835		318	1718	
v/s Ratio Prot								c0.22		c0.15	0.15	
v/s Ratio Perm		0.38	0.25									
v/c Ratio		0.90	0.58					0.86		0.84	0.31	
Uniform Delay, d1		34.5	28.5					45.2		50.6	20.0	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		13.5	1.3					9.1		17.1	0.1	
Delay (s)		48.0	29.8					54.3		67.7	20.1	
Level of Service		D	C					D		E	C	
Approach Delay (s)		40.0			0.0			54.3			35.8	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	127.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2023 PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	850	5	20	385	20	130	30
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	18.0	20.0	18.0	10.0	20.0	18.0	18.0
Total Split (s)	58.0	58.0	58.0	29.0	52.0	23.0	23.0
Total Split (%)	52.7%	52.7%	52.7%	26.4%	47.3%	20.9%	20.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 4:WBL and 8:WBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	850	5	20	385	20	0	0	130	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	1770	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	1770	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	924	5	22	418	22	0	0	141	33
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	0	0	0	30
Lane Group Flow (vph)	0	0	0	462	467	12	418	22	0	0	141	3
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				59.3	59.3	59.3	23.0	38.7			9.7	9.7
Effective Green, g (s)				59.3	59.3	59.3	23.0	38.7			9.7	9.7
Actuated g/C Ratio				0.54	0.54	0.54	0.21	0.35			0.09	0.09
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				906	908	853	370	655			312	139
v/s Ratio Prot				0.27	c0.28		c0.24	0.01			c0.04	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.51	0.51	0.01	1.13	0.03			0.45	0.02
Uniform Delay, d1				16.1	16.2	11.8	43.5	23.4			47.6	45.8
Progression Factor				0.96	0.97	1.00	1.05	1.19			1.00	1.00
Incremental Delay, d2				2.0	2.1	0.0	86.7	0.0			1.0	0.1
Delay (s)				17.6	17.7	11.8	132.2	27.9			48.7	45.9
Level of Service				B	B	B	F	C			D	D
Approach Delay (s)		0.0			17.5			126.9			48.1	
Approach LOS		A			B			F			D	

Intersection Summary			
HCM 2000 Control Delay	51.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	255	340	660	40	1005
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		4.0		4.0	4.0
Minimum Split (s)	10.0		28.0		10.0	28.0
Total Split (s)	20.0		60.0		30.0	90.0
Total Split (%)	18.2%		54.5%		27.3%	81.8%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		6.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 94 (85%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	255	0	0	0	0	340	660	40	1005	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1779	1583					3539	2787	1770	3539	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1779	1583					3539	2787	1770	3539	
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)	87	5	277	0	0	0	0	370	717	43	1092	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	277	0	0	0	0	370	717	43	1092	0
Turn Type	Perm	NA	Free					NA	Free	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		Free						Free			
Actuated Green, G (s)		9.4	110.0					76.9	110.0	5.7	88.6	
Effective Green, g (s)		9.4	110.0					76.9	110.0	5.7	88.6	
Actuated g/C Ratio		0.09	1.00					0.70	1.00	0.05	0.81	
Clearance Time (s)		6.0						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		152	1583					2474	2787	91	2850	
v/s Ratio Prot								0.10		0.02	c0.31	
v/s Ratio Perm		0.05	0.17						0.26			
v/c Ratio		0.61	0.17					0.15	0.26	0.47	0.38	
Uniform Delay, d1		48.5	0.0					5.6	0.0	50.7	3.0	
Progression Factor		1.00	1.00					1.00	1.00	1.33	0.06	
Incremental Delay, d2		6.7	0.2					0.1	0.2	3.5	0.4	
Delay (s)		55.2	0.2					5.7	0.2	70.7	0.5	
Level of Service		E	A					A	A	E	A	
Approach Delay (s)		13.9			0.0			2.1			3.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	215	30	110	300	100	25	795	135	60	1135	320
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0	10.0	28.0	28.0
Total Split (s)	66.0	46.0	46.0	54.0	34.0	34.0	10.0	58.0	58.0	12.0	60.0	60.0
Total Split (%)	38.8%	27.1%	27.1%	31.8%	20.0%	20.0%	5.9%	34.1%	34.1%	7.1%	35.3%	35.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 118.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	215	30	110	300	100	25	795	135	60	1135	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	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)	342	234	33	120	326	109	27	864	147	65	1234	348
RTOR Reduction (vph)	0	0	24	0	0	93	0	0	96	0	0	217
Lane Group Flow (vph)	342	234	9	120	326	16	27	864	51	65	1234	131
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	30.0	33.2	33.2	14.3	17.5	17.5	3.0	41.5	41.5	6.3	44.8	44.8
Effective Green, g (s)	30.0	33.2	33.2	14.3	17.5	17.5	3.0	41.5	41.5	6.3	44.8	44.8
Actuated g/C Ratio	0.25	0.28	0.28	0.12	0.15	0.15	0.03	0.35	0.35	0.05	0.38	0.38
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	445	984	440	212	519	232	44	1768	550	93	1909	594
v/s Ratio Prot	c0.19	0.07		0.07	c0.09		0.02	0.17		c0.04	c0.24	
v/s Ratio Perm			0.01			0.01			0.03			0.08
v/c Ratio	0.77	0.24	0.02	0.57	0.63	0.07	0.61	0.49	0.09	0.70	0.65	0.22
Uniform Delay, d1	41.4	33.3	31.3	49.6	47.8	43.9	57.6	30.6	26.2	55.6	30.7	25.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	0.1	0.0	3.4	2.4	0.1	22.8	0.2	0.1	20.5	0.8	0.2
Delay (s)	49.2	33.4	31.3	53.0	50.2	44.0	80.3	30.8	26.3	76.0	31.5	25.5
Level of Service	D	C	C	D	D	D	F	C	C	E	C	C
Approach Delay (s)		42.2			49.6			31.4			32.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

4/23/2013

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	325	545	305	725	1055	340
Turn Type	custom	custom	Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4				6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	30.0	30.0	30.0
Minimum Split (s)	44.0	44.0	10.0	36.0	36.0	36.0
Total Split (s)	44.0	44.0	15.0	56.0	41.0	41.0
Total Split (%)	44.0%	44.0%	15.0%	56.0%	41.0%	41.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 93.5
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	0	545	0	0	0	305	725	0	0	1055	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0				5.0	6.0			6.0	6.0
Lane Util. Factor	0.97		1.00				1.00	0.91			0.91	1.00
Frt	1.00		0.85				1.00	1.00			1.00	0.85
Flt Protected	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	3433		1583				1770	5085			5085	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	3433		1583				1770	5085			5085	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)	353	0	592	0	0	0	332	788	0	0	1147	370
RTOR Reduction (vph)	0	0	165	0	0	0	0	0	0	0	0	236
Lane Group Flow (vph)	353	0	427	0	0	0	332	788	0	0	1147	134
Turn Type	custom		custom				Prot	NA			NA	Perm
Protected Phases							5	2			6	
Permitted Phases	4		4									6
Actuated Green, G (s)	32.3		32.3				10.2	49.0			33.8	33.8
Effective Green, g (s)	32.3		32.3				10.2	49.0			33.8	33.8
Actuated g/C Ratio	0.35		0.35				0.11	0.53			0.36	0.36
Clearance Time (s)	6.0		6.0				5.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0		3.0				3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	1188		548				193	2670			1842	573
v/s Ratio Prot							c0.19	0.15			c0.23	
v/s Ratio Perm	0.10		c0.27									0.08
v/c Ratio	0.30		0.78				1.72	0.30			0.62	0.23
Uniform Delay, d1	22.2		27.3				41.5	12.4			24.5	20.7
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.1		6.9				345.0	0.1			0.7	0.2
Delay (s)	22.4		34.2				386.6	12.5			25.2	20.9
Level of Service	C		C				F	B			C	C
Approach Delay (s)		29.8			0.0			123.4			24.1	
Approach LOS		C			A			F			C	

Intersection Summary			
HCM 2000 Control Delay	56.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	93.3	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

4/23/2013

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	100	305	775	115	505	1135	105
Turn Type	custom	custom	NA	Perm	Prot	NA	Perm
Protected Phases			2		1	6	
Permitted Phases	4	8		2			6
Detector Phase	4	8	2	2	1	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	30.0	30.0	4.0	30.0	30.0
Minimum Split (s)	28.0	28.0	37.0	37.0	10.0	37.0	37.0
Total Split (s)	28.0	28.0	46.0	46.0	54.0	100.0	100.0
Total Split (%)	21.9%	21.9%	35.9%	35.9%	42.2%	78.1%	78.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lag	Lead		
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 106.4
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	0	0	305	0	775	115	505	1135	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	1770	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	0	0	332	0	842	125	549	1234	114
RTOR Reduction (vph)	0	0	90	0	0	276	0	0	87	0	0	32
Lane Group Flow (vph)	0	0	19	0	0	56	0	842	38	549	1234	82
Turn Type			custom			custom		NA	Perm	Prot	NA	Perm
Protected Phases								2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)			18.0			18.0		32.6	32.6	37.4	76.0	76.0
Effective Green, g (s)			18.0			18.0		32.6	32.6	37.4	76.0	76.0
Actuated g/C Ratio			0.17			0.17		0.31	0.31	0.35	0.72	0.72
Clearance Time (s)			6.0			6.0		6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)			3.0			3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			273			273		1563	486	624	3645	1134
v/s Ratio Prot								c0.17		c0.31	0.24	
v/s Ratio Perm			0.01			c0.03			0.02			0.05
v/c Ratio			0.07			0.21		0.54	0.08	0.88	0.34	0.07
Uniform Delay, d1			37.0			37.9		30.5	26.0	32.2	5.6	4.5
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1			0.4		0.4	0.1	13.4	0.1	0.0
Delay (s)			37.1			38.2		30.8	26.1	45.6	5.7	4.5
Level of Service			D			D		C	C	D	A	A
Approach Delay (s)		37.1			38.2			30.2			17.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	130	280	215	255	445	325	635	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	40.0	9.0	40.0	
Total Split (s)	19.0	40.0		19.0	40.0		20.0	40.0	21.0	41.0	
Total Split (%)	15.8%	33.3%		15.8%	33.3%		16.7%	33.3%	17.5%	34.2%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 113.5
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	130	280	215	255	445	205	325	635	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	4845		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	4845		3433	5085	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)	304	228	310	141	304	234	277	484	223	353	690	359
RTOR Reduction (vph)	0	0	55	0	0	50	0	68	0	0	0	106
Lane Group Flow (vph)	304	228	255	141	304	184	277	639	0	353	690	253
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.3	30.1	49.6	12.6	29.4	50.4	13.5	33.6		15.0	35.1	54.4
Effective Green, g (s)	13.3	30.1	49.6	12.6	29.4	50.4	13.5	33.6		15.0	35.1	54.4
Actuated g/C Ratio	0.12	0.27	0.44	0.11	0.26	0.44	0.12	0.30		0.13	0.31	0.48
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	402	494	692	196	483	704	409	1436		454	1575	760
v/s Ratio Prot	c0.09	0.12		0.08	c0.16		0.08	0.13		c0.10	c0.14	
v/s Ratio Perm			0.16			0.12						0.16
v/c Ratio	0.76	0.46	0.37	0.72	0.63	0.26	0.68	0.44		0.78	0.44	0.33
Uniform Delay, d1	48.4	34.8	21.3	48.6	37.1	19.8	47.8	32.3		47.5	31.2	18.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.9	0.7	0.3	11.9	2.6	0.2	4.4	0.2		8.2	0.2	0.3
Delay (s)	56.3	35.5	21.7	60.6	39.7	20.0	52.2	32.5		55.7	31.4	18.5
Level of Service	E	D	C	E	D	B	D	C		E	C	B
Approach Delay (s)		37.9			37.2			38.1			34.2	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	113.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	325	485	360	355	175	70	345	265	340	385
Turn Type	Prot	NA	Prot	NA	custom	Prot	NA	Prot	NA	Perm
Protected Phases	7	4	3	8	8	5	2	1	6	
Permitted Phases					1					6
Detector Phase	7	4	3	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	44.0	9.0	44.0	44.0	9.0	44.0	9.0	45.0	45.0
Total Split (s)	21.0	44.0	22.0	45.0	45.0	17.0	44.0	20.0	47.0	47.0
Total Split (%)	16.2%	33.8%	16.9%	34.6%	34.6%	13.1%	33.8%	15.4%	36.2%	36.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0	6.0	5.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 117.5
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	485	65	360	355	175	70	345	230	265	340	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	0.91		0.97	0.91	0.88	1.00	0.95		0.97	1.00	0.88
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4995		3433	5085	2787	1770	3327		3433	1863	2743
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4995		3433	5085	2787	1770	3327		3433	1863	2743
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)	353	527	71	391	386	190	76	375	250	288	370	418
RTOR Reduction (vph)	0	14	0	0	0	0	0	88	0	0	0	277
Lane Group Flow (vph)	353	584	0	391	386	190	76	537	0	288	370	141
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA		Prot	NA	custom	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8	8	5	2		1	6	
Permitted Phases						1						6
Actuated Green, G (s)	15.3	31.5		16.4	32.6	46.6	8.0	33.7		14.0	39.7	39.7
Effective Green, g (s)	15.3	31.5		16.4	32.6	46.6	8.0	33.7		14.0	39.7	39.7
Actuated g/C Ratio	0.13	0.27		0.14	0.28	0.40	0.07	0.29		0.12	0.34	0.34
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	446	1337		478	1409	1246	120	953		408	628	925
v/s Ratio Prot	0.10	c0.12		c0.11	0.08	0.04	0.04	0.16		c0.08	c0.20	
v/s Ratio Perm						0.03						0.05
v/c Ratio	0.79	0.44		0.82	0.27	0.15	0.63	0.56		0.71	0.59	0.15
Uniform Delay, d1	49.6	35.7		49.2	33.2	22.8	53.4	35.7		49.8	32.2	27.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.3	0.2		10.4	0.1	0.1	10.4	0.8		5.5	1.4	0.1
Delay (s)	58.9	35.9		59.6	33.3	22.9	63.8	36.5		55.3	33.6	27.3
Level of Service	E	D		E	C	C	E	D		E	C	C
Approach Delay (s)		44.4			41.9			39.4			37.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	22.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

4/23/2013

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	570	0	50	5	765	130	1210
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	35.0	35.0	35.0	10.0	36.0	10.0	10.0
Total Split (s)	10.0	35.0	35.0	35.0	10.0	50.0	15.0	55.0
Total Split (%)	9.1%	31.8%	31.8%	31.8%	9.1%	45.5%	13.6%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 7 (6%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	570	0	50	5	765	505	130	1210	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3328		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3328		1770	3539	
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	0	11	620	0	54	5	832	549	141	1315	0
RTOR Reduction (vph)	0	11	0	0	0	42	0	98	0	0	0	0
Lane Group Flow (vph)	0	0	0	310	310	12	5	1283	0	141	1315	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		25.0	25.0	25.0	0.8	45.9		14.3	59.4	
Effective Green, g (s)		0.8		25.0	25.0	25.0	0.8	45.9		14.3	59.4	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.42		0.13	0.54	
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		382	382	359	12	1388		230	1911	
v/s Ratio Prot		c0.00		c0.18	0.18		0.00	c0.39		c0.08	c0.37	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.81	0.81	0.03	0.42	0.92		0.61	0.69	
Uniform Delay, d1		54.2		40.3	40.3	33.1	54.4	30.4		45.2	18.5	
Progression Factor		1.00		1.00	1.00	1.00	1.16	0.72		1.00	1.00	
Incremental Delay, d2		0.3		12.3	12.3	0.0	19.0	10.5		4.8	2.0	
Delay (s)		54.5		52.6	52.6	33.1	82.3	32.4		50.0	20.6	
Level of Service		D		D	D	C	F	C		D	C	
Approach Delay (s)		54.5			51.0			32.6			23.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

4/23/2013

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	405	25	1260	915	1840
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	25.0	25.0	85.0	85.0	85.0
Total Split (%)	22.7%	22.7%	77.3%	77.3%	77.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	405	25	1260	915	0	1840
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	440	27	1370	995	0	2000
RTOR Reduction (vph)	0	23	0	269	0	0
Lane Group Flow (vph)	440	4	1370	726	0	2000
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	17.7	17.7	80.3	80.3		80.3
Effective Green, g (s)	17.7	17.7	80.3	80.3		80.3
Actuated g/C Ratio	0.16	0.16	0.73	0.73		0.73
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	552	254	2583	1155		2583
v/s Ratio Prot	c0.13		0.39			c0.57
v/s Ratio Perm		0.00		0.46		
v/c Ratio	0.80	0.02	0.53	0.63		0.77
Uniform Delay, d1	44.4	38.8	6.5	7.4		9.2
Progression Factor	1.00	1.00	1.00	1.00		0.89
Incremental Delay, d2	7.9	0.0	0.8	2.6		1.9
Delay (s)	52.3	38.9	7.3	10.0		10.1
Level of Service	D	D	A	B		B
Approach Delay (s)	51.5		8.5			10.1
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

10/10/2013

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2025	1510	645	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2201	1641	701	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		878	418			
pX, platoon unblocked	0.59				0.63	0.59
vC, conflicting volume	2342				2726	1171
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1887				1777	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	185				47	641

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	734	734	734	1094	1248
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	701
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.64	0.73
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

10/10/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	120	2025	1510	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	130	2201	1641	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				649	647	
pX, platoon unblocked	0.76	0.71	0.71			
vC, conflicting volume	2636	821	1641			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1652	0	1080			
tC, single (s)	6.8	6.9	*6.7			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	38			
cM capacity (veh/h)	26	767	211			

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2
Volume Total	130	734	734	734	821	821
Volume Left	130	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	211	1700	1700	1700	1700	1700
Volume to Capacity	0.62	0.43	0.43	0.43	0.48	0.48
Queue Length 95th (ft)	90	0	0	0	0	0
Control Delay (s)	46.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	E					
Approach Delay (s)	2.6				0.0	
Approach LOS						

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	370	190	915	615	3125
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		74.0	46.0	120.0
Total Split (%)	25.0%		46.3%	28.8%	75.0%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 148.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	0	190	0	0	0	0	915	0	615	3125	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	402	0	207	0	0	0	0	995	0	668	3397	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	402	0	207	0	0	0	0	995	0	668	3397	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	22.5		148.6					74.1		34.0	114.1	
Effective Green, g (s)	22.5		148.6					74.1		34.0	114.1	
Actuated g/C Ratio	0.15		1.00					0.50		0.23	0.77	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	519		1583					1764		785	3904	
v/s Ratio Prot	c0.12							0.28		0.19	c0.67	
v/s Ratio Perm			0.13									
v/c Ratio	0.77		0.13					0.56		0.85	0.87	
Uniform Delay, d1	60.6		0.0					26.0		54.9	12.1	
Progression Factor	1.00		1.00					1.00		0.98	0.93	
Incremental Delay, d2	7.1		0.2					0.4		8.8	2.4	
Delay (s)	67.7		0.2					26.4		62.4	13.6	
Level of Service	E		A					C		E	B	
Approach Delay (s)		44.8			0.0			26.4			21.6	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	148.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1695	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1695	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1842	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1842	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.52			
v/s Ratio Perm						
v/c Ratio			0.58			
Uniform Delay, d1			1.6			
Progression Factor			1.00			
Incremental Delay, d2			0.8			
Delay (s)			2.4			
Level of Service			A			
Approach Delay (s)	0.0		2.4			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	915	1695	0	3315	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	995	1842	0	3603	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.25	
vC, conflicting volume			2837		2196	497
vC1, stage 1 conf vol					995	
vC2, stage 2 conf vol					1201	
vCu, unblocked vol			2837		0	497
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			131		255	518

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	663	946	1228	1201	1201	1201
Volume Left	0	0	0	0	0	0
Volume Right	0	614	1228	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.39	0.56	0.72	0.71	0.71	0.71
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	110	2635	65	0	3320
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	120	2864	71	0	3609
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.27					
vC, conflicting volume	4069	957			2866	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2893	957			2866	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	54			100	
cM capacity (veh/h)	3	258			128	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	120	955	955	955	71	1203	1203	1203
Volume Left	0	0	0	0	0	0	0	0
Volume Right	120	0	0	0	71	0	0	0
cSH	258	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.46	0.56	0.56	0.56	0.04	0.71	0.71	0.71
Queue Length 95th (ft)	57	0	0	0	0	0	0	0
Control Delay (s)	30.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D							
Approach Delay (s)	30.5	0.0				0.0		
Approach LOS	D							

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	120	100	40	5	110	35	1955	40	120	2920	130
Turn Type	Perm	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8			2			6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0	51.0	10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0	51.0	15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	21.3%	6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	100	35	40	5	110	35	1955	40	120	2920	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1738	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1773		794	1863	1583	1770	5085	1543	1770	5085	1498
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)	130	109	38	43	5	120	38	2125	43	130	3174	141
RTOR Reduction (vph)	0	5	0	0	0	102	0	0	0	0	0	20
Lane Group Flow (vph)	130	142	0	43	5	18	38	2125	43	130	3174	121
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	35.3	35.3		35.3	35.3	35.3	7.2	164.3	164.3	21.4	178.5	178.5
Effective Green, g (s)	35.3	35.3		35.3	35.3	35.3	7.2	164.3	164.3	21.4	178.5	178.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.03	0.68	0.68	0.09	0.74	0.74
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	260		116	274	232	53	3481	1056	157	3781	1114
v/s Ratio Prot		0.08			0.00		0.02	0.42		c0.07	c0.62	
v/s Ratio Perm	c0.09			0.05		0.01			0.03			0.08
v/c Ratio	0.63	0.55		0.37	0.02	0.08	0.72	0.61	0.04	0.83	0.84	0.11
Uniform Delay, d1	96.2	94.9		92.3	87.5	88.3	115.4	20.5	12.3	107.5	21.0	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.67	1.02	1.00	1.00	1.00
Incremental Delay, d2	6.2	2.3		2.0	0.0	0.1	31.6	0.7	0.1	28.7	2.4	0.2
Delay (s)	102.4	97.2		94.3	87.6	88.4	132.2	14.5	12.6	136.2	23.4	8.8
Level of Service	F	F		F	F	F	F	B	B	F	C	A
Approach Delay (s)		99.7			89.9			16.5			27.0	
Approach LOS		F			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	38.0	38.0	38.0	38.0	38.0	38.0	16.0	156.0	156.0	46.0	186.0	186.0
Total Split (%)	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	6.7%	65.0%	65.0%	19.2%	77.5%	77.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 226 (94%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1858	1533		1771	1583	1770	5085	1551	1770	5085	1545
Flt Permitted		0.99	1.00		0.52	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1835	1533		961	1583	1770	5085	1551	1770	5085	1545
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	87	98	38	11	114	65	2114	54	174	3141	22
RTOR Reduction (vph)	0	0	66	0	0	104	0	0	16	0	0	5
Lane Group Flow (vph)	0	92	32	0	49	10	65	2114	38	174	3141	17
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		21.5	21.5		21.5	21.5	12.2	170.6	170.6	28.9	187.3	187.3
Effective Green, g (s)		21.5	21.5		21.5	21.5	12.2	170.6	170.6	28.9	187.3	187.3
Actuated g/C Ratio		0.09	0.09		0.09	0.09	0.05	0.71	0.71	0.12	0.78	0.78
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		164	137		86	141	89	3614	1102	213	3968	1205
v/s Ratio Prot							0.04	0.42		c0.10	c0.62	
v/s Ratio Perm		0.05	0.02		c0.05	0.01			0.02			0.01
v/c Ratio		0.56	0.23		0.57	0.07	0.73	0.58	0.03	0.82	0.79	0.01
Uniform Delay, d1		104.7	101.6		104.8	100.1	112.3	17.2	10.3	103.0	15.1	5.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	0.84	3.83	0.78	1.21	7.62
Incremental Delay, d2		4.3	0.9		8.4	0.2	23.3	0.6	0.1	12.9	1.0	0.0
Delay (s)		109.1	102.4		113.2	100.3	135.1	15.0	39.4	93.7	19.3	44.6
Level of Service		F	F		F	F	F	B	D	F	B	D
Approach Delay (s)		105.6			104.2			19.1			23.3	
Approach LOS		F			F			B			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2015	3150	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30 (25%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2015	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2190	3424	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2190	3424	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.43	c0.67	
v/s Ratio Perm						
v/c Ratio				0.56	0.87	
Uniform Delay, d1				5.6	9.7	
Progression Factor				1.47	1.06	
Incremental Delay, d2				0.5	2.0	
Delay (s)				8.7	12.4	
Level of Service				A	B	
Approach Delay (s)	0.0			8.7	12.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	25	155	15	20	170	1615	35	40	2495	365
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4		3			2			6
Detector Phase	4	4	4	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0	41.0	11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0	43.0	14.0	14.0	35.0	153.0	153.0	30.0	148.0	148.0
Total Split (%)	17.9%	17.9%	17.9%	5.8%	5.8%	14.6%	63.8%	63.8%	12.5%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 197 (82%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	25	155	25	15	20	170	1615	35	40	2495	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1698	1430		1806	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1698	1430		1806	1583	1770	5085	1391	1770	5085	1346
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)	326	27	168	27	16	22	185	1755	38	43	2712	397
RTOR Reduction (vph)	0	0	87	0	0	21	0	0	0	0	0	154
Lane Group Flow (vph)	176	177	81	0	43	1	185	1755	38	43	2712	243
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4			3			2			6
Actuated Green, G (s)	32.8	32.8	32.8		7.7	7.7	27.9	165.4	165.4	9.1	146.6	146.6
Effective Green, g (s)	32.8	32.8	32.8		7.7	7.7	27.9	165.4	165.4	9.1	146.6	146.6
Actuated g/C Ratio	0.14	0.14	0.14		0.03	0.03	0.12	0.69	0.69	0.04	0.61	0.61
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	229	232	195		57	50	205	3504	958	67	3106	822
v/s Ratio Prot	c0.10	0.10			c0.02		c0.10	0.35		0.02	c0.53	
v/s Ratio Perm			0.06			0.00			0.03			0.18
v/c Ratio	0.77	0.76	0.41		0.75	0.01	0.90	0.50	0.04	0.64	0.87	0.30
Uniform Delay, d1	99.9	99.9	94.8		115.2	112.5	104.7	17.7	11.9	113.8	38.9	22.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.84	2.09	2.07	1.03	0.78	3.70
Incremental Delay, d2	14.3	13.8	1.4		38.8	0.0	32.3	0.4	0.1	8.5	2.1	0.5
Delay (s)	114.3	113.6	96.2		154.0	112.5	120.7	37.5	24.7	125.7	32.6	82.6
Level of Service	F	F	F		F	F	F	D	C	F	C	F
Approach Delay (s)		108.2			139.9			45.0			40.1	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	107.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	70	50	10	80	360	40	1250	5	410	1995	455
Turn Type	Split	NA	custom	Split	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases			3 5						2			6
Detector Phase	3	3	3 5	4	4	4 1	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0		15.0	15.0		10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	60.0	60.0		47.0	47.0		14.0	87.0	87.0	46.0	119.0	119.0
Total Split (%)	25.0%	25.0%		19.6%	19.6%		5.8%	36.3%	36.3%	19.2%	49.6%	49.6%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 4 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	70	50	10	80	360	40	1250	5	410	1995	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.90	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583	1770	1598	1504	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583	1770	1598	1504	1770	5085	1583	3433	5085	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)	245	76	54	11	87	391	43	1359	5	446	2168	495
RTOR Reduction (vph)	0	0	45	0	28	72	0	0	3	0	0	175
Lane Group Flow (vph)	159	162	9	11	219	159	43	1359	2	446	2168	320
Turn Type	Split	NA	custom	Split	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases			3 5						2			6
Actuated Green, G (s)	28.2	28.2	39.9	38.7	38.7	82.0	11.7	110.8	110.8	37.3	136.4	136.4
Effective Green, g (s)	28.2	28.2	39.9	38.7	38.7	82.0	11.7	110.8	110.8	37.3	136.4	136.4
Actuated g/C Ratio	0.12	0.12	0.17	0.16	0.16	0.34	0.05	0.46	0.46	0.16	0.57	0.57
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	197	202	263	285	257	513	86	2347	730	533	2889	899
v/s Ratio Prot	c0.09	0.09		0.01	c0.14	0.11	0.02	0.27		c0.13	c0.43	
v/s Ratio Perm			0.01						0.00			0.20
v/c Ratio	0.81	0.80	0.03	0.04	0.85	0.31	0.50	0.58	0.00	0.84	0.75	0.36
Uniform Delay, d1	103.2	103.2	83.9	84.9	97.9	58.2	111.3	47.5	34.8	98.4	39.0	28.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.76	1.22	1.00	1.24	0.24	0.15
Incremental Delay, d2	20.9	20.0	0.1	0.1	23.0	0.3	4.2	1.0	0.0	6.8	1.1	0.6
Delay (s)	124.2	123.2	83.9	85.0	120.9	58.5	88.5	58.9	34.8	128.7	10.4	4.7
Level of Service	F	F	F	F	F	E	F	E	C	F	B	A
Approach Delay (s)		118.0			90.6			59.7			26.5	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Detector Phase	3	3	3	4	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	9.0	9.0	9.0	3.0	20.0	20.0	3.0	20.0	20.0
Minimum Split (s)	65.0	65.0	65.0	15.0	15.0	15.0	9.0	46.0	46.0	9.0	46.0	46.0
Total Split (s)	65.0	65.0	65.0	55.0	55.0	55.0	24.0	78.0	78.0	42.0	96.0	96.0
Total Split (%)	27.1%	27.1%	27.1%	22.9%	22.9%	22.9%	10.0%	32.5%	32.5%	17.5%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 100 (42%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 165
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	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)	239	293	201	33	283	201	190	1038	38	408	1592	266
RTOR Reduction (vph)	0	0	87	0	0	122	0	0	21	0	0	73
Lane Group Flow (vph)	172	360	114	33	283	79	190	1038	17	408	1592	193
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	31.5	31.5	31.5	40.8	40.8	40.8	17.6	109.9	109.9	32.8	125.1	125.1
Effective Green, g (s)	31.5	31.5	31.5	40.8	40.8	40.8	17.6	109.9	109.9	32.8	125.1	125.1
Actuated g/C Ratio	0.13	0.13	0.13	0.17	0.17	0.17	0.07	0.46	0.46	0.14	0.52	0.52
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	211	440	207	300	316	473	251	2328	724	469	2650	825
v/s Ratio Prot	0.11	c0.11		0.02	c0.15		0.06	0.20		c0.12	c0.31	
v/s Ratio Perm			0.07			0.03			0.01			0.12
v/c Ratio	0.82	0.82	0.55	0.11	0.90	0.17	0.76	0.45	0.02	0.87	0.60	0.23
Uniform Delay, d1	101.4	101.5	97.6	84.2	97.5	85.1	109.1	44.3	35.7	101.5	40.0	31.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.69	0.80
Incremental Delay, d2	20.0	10.7	1.8	0.1	25.4	0.1	11.0	0.6	0.1	11.0	0.7	0.5
Delay (s)	121.4	112.2	99.4	84.3	122.9	85.1	120.1	44.9	35.7	104.0	28.4	25.5
Level of Service	F	F	F	F	F	F	F	D	D	F	C	C
Approach Delay (s)		110.8			105.8			55.9			41.6	
Approach LOS		F			F			E			D	

Intersection Summary				
HCM 2000 Control Delay	63.0	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	77.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	365	30	15	525	40	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	397	33	16	571	43	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			429		731	215
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			429		731	215
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		88	98
cM capacity (veh/h)			1127		352	790

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	264	165	207	380	60
Volume Left	0	0	16	0	43
Volume Right	0	33	0	0	16
cSH	1700	1700	1127	1700	414
Volume to Capacity	0.16	0.10	0.01	0.22	0.14
Queue Length 95th (ft)	0	0	1	0	12
Control Delay (s)	0.0	0.0	0.8	0.0	15.1
Lane LOS			A		C
Approach Delay (s)	0.0		0.3		15.1
Approach LOS					C

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	385	0	170	520	0	55
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	418	0	185	565	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				847		
pX, platoon unblocked						
vC, conflicting volume			418		1071	209
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			418		1071	209
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		100	92
cM capacity (veh/h)			1137		181	797

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	209	209	373	377	60
Volume Left	0	0	185	0	0
Volume Right	0	0	0	0	60
cSH	1700	1700	1137	1700	797
Volume to Capacity	0.12	0.12	0.16	0.22	0.08
Queue Length 95th (ft)	0	0	14	0	6
Control Delay (s)	0.0	0.0	5.2	0.0	9.9
Lane LOS			A		A
Approach Delay (s)	0.0		2.6		9.9
Approach LOS					A

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	440	15	0	565	0	0	0	0	0	0	165
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	478	16	0	614	0	0	0	0	0	0	179
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					321							
pX, platoon unblocked												
vC, conflicting volume	614			495			973	1101	247	853	1109	307
vC1, stage 1 conf vol							486	486		614	614	
vC2, stage 2 conf vol							486	614		239	495	
vCu, unblocked vol	614			495			973	1101	247	853	1109	307
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	74
cM capacity (veh/h)	961			1065			274	329	753	357	328	689

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	319	176	307	307	179
Volume Left	0	0	0	0	0
Volume Right	0	16	0	0	179
cSH	1700	1700	1700	1700	689
Volume to Capacity	0.19	0.10	0.18	0.18	0.26
Queue Length 95th (ft)	0	0	0	0	26
Control Delay (s)	0.0	0.0	0.0	0.0	12.1
Lane LOS					B
Approach Delay (s)	0.0		0.0		12.1
Approach LOS					B

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		32.5%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	440	655	565
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0
Total Split (s)	30.0	70.0	100.0
Total Split (%)	30.0%	70.0%	100.0%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 55.5
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	440	0	655	565	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	478	0	712	614	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	478	0	712	614	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	14.0		29.0	55.0		
Effective Green, g (s)	14.0		29.0	55.0		
Actuated g/C Ratio	0.25		0.53	1.00		
Clearance Time (s)	6.0		6.0	6.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	900		933	3539		
v/s Ratio Prot	c0.14		c0.40	0.17		
v/s Ratio Perm						
v/c Ratio	0.53		0.76	0.17		
Uniform Delay, d1	17.7		10.3	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.6		3.7	0.0		
Delay (s)	18.3		14.0	0.0		
Level of Service	B		B	A		
Approach Delay (s)	18.3			7.5	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	240	825	1220	515
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	
Total Split (s)	25.0	90.0	65.0	
Total Split (%)	27.8%	100.0%	72.2%	
Yellow Time (s)	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 58.5
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	240	825	1220	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	897	1326	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	261	897	1326	560	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	13.8	58.2	32.4	58.2		
Effective Green, g (s)	13.8	58.2	32.4	58.2		
Actuated g/C Ratio	0.24	1.00	0.56	1.00		
Clearance Time (s)	6.0	6.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	419	3539	1970	1583		
v/s Ratio Prot	c0.15	0.25	c0.37			
v/s Ratio Perm				0.35		
v/c Ratio	0.62	0.25	0.67	0.35		
Uniform Delay, d1	19.9	0.0	9.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.9	0.0	0.9	0.6		
Delay (s)	22.7	0.0	10.1	0.6		
Level of Service	C	A	B	A		
Approach Delay (s)		5.2	7.3		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	715	485	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	777	527	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	543				978	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	543				978	272
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	87
cM capacity (veh/h)	1022				241	726

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	389	389	351	192	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	1022	1700	1700	1700	1700	241	726
Volume to Capacity	0.03	0.23	0.23	0.21	0.11	0.09	0.13
Queue Length 95th (ft)	2	0	0	0	0	7	11
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	21.4	10.7
Lane LOS	A					C	B
Approach Delay (s)	0.3			0.0		12.7	
Approach LOS						B	

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	425	45	5	295	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	462	49	5	321	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332			511			957	1035	255	780	1054	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			511			957	1035	255	780	1054	166
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			85	100	99	100	100	89
cM capacity (veh/h)	1225			1051			176	210	744	264	204	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	103	308	203	5	214	118	33	92
Volume Left	103	0	0	5	0	0	27	0
Volume Right	0	0	49	0	0	11	5	92
cSH	1225	1700	1700	1051	1700	1700	202	849
Volume to Capacity	0.08	0.18	0.12	0.01	0.13	0.07	0.16	0.11
Queue Length 95th (ft)	7	0	0	0	0	0	14	9
Control Delay (s)	8.2	0.0	0.0	8.4	0.0	0.0	26.2	9.8
Lane LOS	A			A			D	A
Approach Delay (s)	1.4			0.1			26.2	9.8
Approach LOS							D	A

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization		34.9%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	245	40	5	220	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	266	43	5	239	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	250			310			804	864	155	707	880	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			310			804	864	155	707	880	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			90	98	100	100	100	92
cM capacity (veh/h)	1313			1248			229	254	863	287	249	902

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	158	178	132	5	159	91	27	71
Volume Left	158	0	0	5	0	0	22	0
Volume Right	0	0	43	0	0	11	0	71
cSH	1313	1700	1700	1248	1700	1700	233	902
Volume to Capacity	0.12	0.10	0.08	0.00	0.09	0.05	0.12	0.08
Queue Length 95th (ft)	10	0	0	0	0	0	10	6
Control Delay (s)	8.1	0.0	0.0	7.9	0.0	0.0	22.5	9.3
Lane LOS	A			A			C	A
Approach Delay (s)	2.7			0.2			22.5	9.3
Approach LOS							C	A

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		32.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	105	25	5	120	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	114	27	5	130	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	141			141			568	530	71	454	538	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			141			568	530	71	454	538	71
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			95	100	100	100	100	88
cM capacity (veh/h)	1439			1439			334	412	977	456	408	977

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	125	76	65	5	87	54	16	114
Volume Left	125	0	0	5	0	0	16	0
Volume Right	0	0	27	0	0	11	0	114
cSH	1439	1700	1700	1439	1700	1700	334	977
Volume to Capacity	0.09	0.04	0.04	0.00	0.05	0.03	0.05	0.12
Queue Length 95th (ft)	7	0	0	0	0	0	4	10
Control Delay (s)	7.7	0.0	0.0	7.5	0.0	0.0	16.3	9.2
Lane LOS	A			A			C	A
Approach Delay (s)	3.6			0.3			16.3	9.2
Approach LOS							C	A

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		27.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	70	30	95	15	25	35
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	33	103	16	27	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		220	168	185	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		220	168	185	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	95		84	98	96	96
cM capacity (veh/h)	1623		664	690	676	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	120	65
Volume Left	76	103	0
Volume Right	33	0	38
cSH	1623	667	867
Volume to Capacity	0.05	0.18	0.08
Queue Length 95th (ft)	4	16	6
Control Delay (s)	5.2	11.6	9.5
Lane LOS	A	B	A
Approach Delay (s)	5.2	11.6	9.5
Approach LOS		B	A

Intersection Summary				
Average Delay		8.8		
Intersection Capacity Utilization		25.1%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	440	0	475	365	530	455	665
Turn Type	Perm	NA	Perm	Prot	NA	NA	Perm
Protected Phases		8		5	2	6	
Permitted Phases	8		8				6
Detector Phase	8	8	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	20.0
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	20.0
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	20.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 78.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	440	0	475	365	530	0	0	455	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1551	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1551	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	0	516	397	576	0	0	495	723
RTOR Reduction (vph)	0	0	0	0	0	203	0	0	0	0	0	489
Lane Group Flow (vph)	0	0	0	239	239	313	397	576	0	0	495	234
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				21.8	21.8	21.8	22.8	43.7			14.9	14.9
Effective Green, g (s)				21.8	21.8	21.8	22.8	43.7			14.9	14.9
Actuated g/C Ratio				0.28	0.28	0.28	0.29	0.56			0.19	0.19
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				472	472	436	520	1995			680	304
v/s Ratio Prot							c0.22	0.16			0.14	
v/s Ratio Perm				0.14	0.14	c0.20						c0.15
v/c Ratio				0.51	0.51	0.72	0.76	0.29			0.73	0.77
Uniform Delay, d1				23.3	23.3	25.1	24.9	8.8			29.4	29.7
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.9	0.9	5.6	6.6	0.1			3.9	11.1
Delay (s)				24.2	24.2	30.6	31.5	8.9			33.3	40.7
Level of Service				C	C	C	C	A			C	D
Approach Delay (s)		0.0			27.5			18.1			37.7	
Approach LOS		A			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	77.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	5	360	450	225	585
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 98.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	385	5	360	0	0	0	0	450	255	225	585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1775	1563					3316		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1775	1563					3316		1770	3539	
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)	418	5	391	0	0	0	0	489	277	245	636	0
RTOR Reduction (vph)	0	0	228	0	0	0	0	62	0	0	0	0
Lane Group Flow (vph)	0	423	163	0	0	0	0	704	0	245	636	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.5	32.5					28.4		19.4	53.8	
Effective Green, g (s)		32.5	32.5					28.4		19.4	53.8	
Actuated g/C Ratio		0.33	0.33					0.29		0.20	0.55	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		586	516					958		349	1936	
v/s Ratio Prot								c0.21		c0.14	0.18	
v/s Ratio Perm		0.24	0.10									
v/c Ratio		0.72	0.32					0.74		0.70	0.33	
Uniform Delay, d1		28.9	24.6					31.6		36.8	12.3	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		4.4	0.4					3.0		6.3	0.1	
Delay (s)		33.3	24.9					34.5		43.0	12.4	
Level of Service		C	C					C		D	B	
Approach Delay (s)		29.3			0.0			34.5			20.9	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2023 with Mitigation AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	490	0	40	340	40	260	10
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	45.0	45.0	45.0	25.0	55.0	30.0	30.0
Total Split (%)	45.0%	45.0%	45.0%	25.0%	55.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	490	0	40	340	40	0	0	260	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	495	0	43	343	40	0	0	263	11
RTOR Reduction (vph)	0	0	0	0	0	22	0	0	0	0	0	9
Lane Group Flow (vph)	0	0	0	247	248	21	343	40	0	0	263	2
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				48.3	48.3	48.3	15.2	39.7			19.5	19.5
Effective Green, g (s)				48.3	48.3	48.3	15.2	39.7			19.5	19.5
Actuated g/C Ratio				0.48	0.48	0.48	0.15	0.40			0.20	0.20
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				811	811	764	521	739			690	308
v/s Ratio Prot				0.15	c0.15		c0.10	0.02			c0.07	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.30	0.31	0.03	0.66	0.05			0.38	0.01
Uniform Delay, d1				15.7	15.7	13.5	40.0	18.6			35.0	32.4
Progression Factor				1.00	1.00	1.00	1.02	1.74			1.00	1.00
Incremental Delay, d2				1.0	0.2	0.1	3.0	0.0			0.4	0.0
Delay (s)				16.6	15.9	13.6	43.7	32.4			35.4	32.5
Level of Service				B	B	B	D	C			D	C
Approach Delay (s)		0.0			16.1			42.5			35.2	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	340	405	710	115	755
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	17.0		53.0		30.0	83.0
Total Split (%)	17.0%		53.0%		30.0%	83.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	340	0	0	0	0	405	710	115	755	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1794	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1794	1583					3539	2787	1770	3539	
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)	16	5	370	0	0	0	0	440	772	125	821	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	370	0	0	0	0	440	772	125	821	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		3.2	100.0					69.4	100.0	12.4	85.8	
Effective Green, g (s)		3.2	100.0					69.4	100.0	12.4	85.8	
Actuated g/C Ratio		0.03	1.00					0.69	1.00	0.12	0.86	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		57	1583					2456	2787	219	3036	
v/s Ratio Prot		0.01						0.12		c0.07	0.23	
v/s Ratio Perm			0.23						c0.28			
v/c Ratio		0.37	0.23					0.18	0.28	0.57	0.27	
Uniform Delay, d1		47.4	0.0					5.3	0.0	41.3	1.3	
Progression Factor		1.00	1.00					1.00	1.00	1.13	0.62	
Incremental Delay, d2		4.0	0.3					0.2	0.2	3.5	0.2	
Delay (s)		51.4	0.3					5.5	0.2	50.0	1.0	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		3.1			0.0			2.2			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	480	35	65	145	60	50	1045	240	205	925	160
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 112.3
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	480	35	65	145	60	50	1045	240	205	925	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	304	522	38	71	158	65	54	1136	261	223	1005	174
RTOR Reduction (vph)	0	0	30	0	0	43	0	0	74	0	0	66
Lane Group Flow (vph)	304	522	8	71	158	22	54	1136	187	223	1005	108
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	16.4	24.4	24.4	10.0	18.0	37.7	7.8	41.8	57.8	13.7	47.7	70.1
Effective Green, g (s)	16.4	24.4	24.4	10.0	18.0	37.7	7.8	41.8	57.8	13.7	47.7	70.1
Actuated g/C Ratio	0.15	0.22	0.22	0.09	0.16	0.33	0.07	0.37	0.51	0.12	0.42	0.62
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	498	764	342	156	564	528	122	1882	810	416	2148	982
v/s Ratio Prot	c0.09	c0.15		0.04	0.04		0.03	c0.22		c0.06	0.20	
v/s Ratio Perm			0.01			0.01			0.12			0.07
v/c Ratio	0.61	0.68	0.02	0.46	0.28	0.04	0.44	0.60	0.23	0.54	0.47	0.11
Uniform Delay, d1	45.3	40.7	34.9	48.9	41.7	25.4	50.5	28.8	15.2	46.6	23.5	8.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	2.5	0.0	2.1	0.3	0.0	2.6	0.6	0.1	1.3	0.2	0.0
Delay (s)	47.5	43.2	34.9	51.0	42.0	25.4	53.0	29.4	15.4	47.9	23.6	8.8
Level of Service	D	D	C	D	D	C	D	C	B	D	C	A
Approach Delay (s)		44.4			40.5			27.7			25.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	112.9	Sum of lost time (s)	23.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	215	255	245	1245	745	355
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Detector Phase	7	7 5	5	2	6	6 7
Switch Phase						
Minimum Initial (s)	4.0		4.0	30.0	30.0	
Minimum Split (s)	10.0		9.0	36.0	36.0	
Total Split (s)	37.0		30.0	83.0	53.0	
Total Split (%)	30.8%		25.0%	69.2%	44.2%	
Yellow Time (s)	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		5.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
Recall Mode	None		None	C-Max	C-Max	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	215	255	245	1245	745	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	3433	5085	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	277	266	1353	810	386
RTOR Reduction (vph)	0	45	0	0	0	44
Lane Group Flow (vph)	234	232	266	1353	810	342
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Actuated Green, G (s)	20.1	40.9	14.8	87.9	68.1	94.2
Effective Green, g (s)	20.1	40.9	14.8	87.9	68.1	94.2
Actuated g/C Ratio	0.17	0.34	0.12	0.73	0.57	0.79
Clearance Time (s)	6.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	575	539	423	3724	2885	1242
v/s Ratio Prot	0.07		c0.08	c0.27	0.16	
v/s Ratio Perm		c0.15				0.22
v/c Ratio	0.41	0.43	0.63	0.36	0.28	0.28
Uniform Delay, d1	44.6	30.5	50.0	5.9	13.4	3.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.6	2.9	0.3	0.2	0.1
Delay (s)	45.1	31.1	52.9	6.1	13.6	3.7
Level of Service	D	C	D	A	B	A
Approach Delay (s)	37.5			13.8	10.4	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/7/2014

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations								
Volume (vph)	40	550	1105	5	190	730	125	
Turn Type	Free	custom	NA	Perm	Prot	NA	Perm	
Protected Phases			2		1	6		3
Permitted Phases	Free	3 1		2			6	
Detector Phase		3 1	2	2	1	6	6	
Switch Phase								
Minimum Initial (s)			30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)			37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)			46.0	46.0	29.0	75.0	75.0	45.0
Total Split (%)			38.3%	38.3%	24.2%	62.5%	62.5%	38%
Yellow Time (s)			4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)			0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)			6.0	6.0	6.0	6.0	6.0	
Lead/Lag			Lag	Lag	Lead			
Lead-Lag Optimize?								
Recall Mode			Min	Min	None	Min	Min	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 101.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	0	0	550	0	1105	5	190	730	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	1770	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	0	0	598	0	1201	5	207	793	136
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	3	0	0	57
Lane Group Flow (vph)	0	0	43	0	0	585	0	1201	2	207	793	79
Turn Type			Free			custom		NA	Perm	Prot	NA	Perm
Protected Phases								2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			101.2			53.5		35.7	35.7	17.0	58.7	58.7
Effective Green, g (s)			101.2			53.5		35.7	35.7	17.0	58.7	58.7
Actuated g/C Ratio			1.00			0.53		0.35	0.35	0.17	0.58	0.58
Clearance Time (s)								6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)								3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611			851		1793	558	297	2949	918
v/s Ratio Prot								c0.24		0.12	0.16	
v/s Ratio Perm			0.03			c0.36			0.00			0.05
v/c Ratio			0.03			0.69		0.67	0.00	0.70	0.27	0.09
Uniform Delay, d1			0.0			17.7		27.8	21.2	39.7	10.6	9.4
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0			2.3		1.0	0.0	7.0	0.0	0.0
Delay (s)			0.0			20.0		28.7	21.2	46.6	10.6	9.4
Level of Service			A			B		C	C	D	B	A
Approach Delay (s)		0.0			20.0			28.7			17.0	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	101.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	130	215	495	185	520	185	480	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	20.0	54.0		15.0	49.0		19.0	52.0	19.0	52.0	
Total Split (%)	14.3%	38.6%		10.7%	35.0%		13.6%	37.1%	13.6%	37.1%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 114.4
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	130	215	495	185	520	10	185	480	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	5071		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	5071		3433	5085	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)	228	304	185	141	234	538	201	565	11	201	522	174
RTOR Reduction (vph)	0	0	64	0	0	56	0	1	0	0	0	94
Lane Group Flow (vph)	228	304	121	141	234	482	201	575	0	201	522	80
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	12.6	37.4	55.1	9.2	34.0	51.9	11.7	33.6		11.9	33.8	52.4
Effective Green, g (s)	12.6	37.4	55.1	9.2	34.0	51.9	11.7	33.6		11.9	33.8	52.4
Actuated g/C Ratio	0.11	0.33	0.48	0.08	0.30	0.45	0.10	0.29		0.10	0.30	0.46
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	379	610	764	276	555	720	352	1493		358	1506	726
v/s Ratio Prot	c0.07	c0.16		0.04	0.13		0.06	c0.11		0.06	0.10	
v/s Ratio Perm			0.08			c0.30						0.05
v/c Ratio	0.60	0.50	0.16	0.51	0.42	0.67	0.57	0.38		0.56	0.35	0.11
Uniform Delay, d1	48.4	30.8	16.5	50.3	32.2	24.4	48.8	32.0		48.6	31.5	17.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	0.6	0.1	1.6	0.5	2.4	2.2	0.2		2.0	0.1	0.1
Delay (s)	51.0	31.5	16.6	51.9	32.7	26.7	51.0	32.2		50.6	31.6	17.6
Level of Service	D	C	B	D	C	C	D	C		D	C	B
Approach Delay (s)		33.9			32.1			37.1			33.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	175	35	180	535	200	20	85	35	295	105	300
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	37.0	37.0	10.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	31.0	55.0	55.0	20.0	44.0		15.0	49.0		26.0	60.0	
Total Split (%)	20.7%	36.7%	36.7%	13.3%	29.3%		10.0%	32.7%		17.3%	40.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 115.4
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	175	35	180	535	200	20	85	35	295	105	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	408	190	38	196	582	217	22	92	38	321	114	326
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	22	0	0	131
Lane Group Flow (vph)	408	190	11	196	582	217	22	92	16	321	114	195
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	20.4	32.7	32.7	12.6	24.9	48.1	4.2	29.4	48.0	17.2	42.4	68.8
Effective Green, g (s)	20.4	32.7	32.7	12.6	24.9	48.1	4.2	29.4	48.0	17.2	42.4	68.8
Actuated g/C Ratio	0.18	0.28	0.28	0.11	0.22	0.42	0.04	0.26	0.42	0.15	0.37	0.60
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	609	1007	450	376	1101	1166	64	905	661	513	1305	1668
v/s Ratio Prot	c0.12	0.05		0.06	c0.11	0.08	0.01	0.03		c0.09	0.03	c0.07
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.67	0.19	0.02	0.52	0.53	0.19	0.34	0.10	0.02	0.63	0.09	0.12
Uniform Delay, d1	44.1	31.1	29.6	48.3	39.8	21.1	54.0	32.7	19.7	45.8	23.6	9.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.1	0.0	1.3	0.5	0.1	3.2	0.0	0.0	2.4	0.0	0.0
Delay (s)	46.9	31.2	29.6	49.6	40.3	21.1	57.2	32.7	19.7	48.2	23.7	10.0
Level of Service	D	C	C	D	D	C	E	C	B	D	C	A
Approach Delay (s)		41.2			37.9			33.0			28.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	114.9	Sum of lost time (s)	23.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/7/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	315	5	65	10	1260	40	725
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	14.0	52.0	16.0	54.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	12.7%	47.3%	14.5%	49.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	315	5	65	10	1260	195	40	725	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1688	1583	1770	3468		1770	3536	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1688	1583	1770	3468		1770	3536	
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	0	5	342	5	71	11	1370	212	43	788	5
RTOR Reduction (vph)	0	5	0	0	0	60	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	174	173	11	11	1574	0	43	793	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Effective Green, g (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.01	0.60		0.05	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		262	263	247	24	2090		91	2266	
v/s Ratio Prot		c0.00		c0.10	0.10		0.01	c0.45		c0.02	c0.22	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.66	0.66	0.04	0.46	0.75		0.47	0.35	
Uniform Delay, d1		54.2		43.7	43.6	39.4	53.8	15.9		50.7	9.1	
Progression Factor		1.00		1.00	1.00	1.00	1.41	0.44		1.00	1.00	
Incremental Delay, d2		0.1		6.2	5.8	0.1	10.1	2.0		3.8	0.4	
Delay (s)		54.3		49.9	49.5	39.5	85.9	8.9		54.5	9.6	
Level of Service		D		D	D	D	F	A		D	A	
Approach Delay (s)		54.3			47.9			9.4			11.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/7/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	505	25	1470	380	1055
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	33.0	33.0	77.0	77.0	77.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	505	25	1470	380	0	1055
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	27	1598	413	0	1147
RTOR Reduction (vph)	0	21	0	130	0	0
Lane Group Flow (vph)	549	6	1598	283	0	1147
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.5	22.5	75.5	75.5		75.5
Effective Green, g (s)	22.5	22.5	75.5	75.5		75.5
Actuated g/C Ratio	0.20	0.20	0.69	0.69		0.69
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	702	323	2429	1086		2429
v/s Ratio Prot	c0.16		c0.45			0.32
v/s Ratio Perm		0.00		0.18		
v/c Ratio	0.78	0.02	0.66	0.26		0.47
Uniform Delay, d1	41.4	34.9	9.9	6.6		8.0
Progression Factor	1.00	1.00	1.00	1.00		1.11
Incremental Delay, d2	5.7	0.0	1.4	0.6		0.6
Delay (s)	47.1	34.9	11.3	7.2		9.5
Level of Service	D	C	B	A		A
Approach Delay (s)	46.5		10.4			9.5
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/7/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1730	1205	420	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1880	1310	457	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	1766				2165	883
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1538				2011	492
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	361				43	441

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	627	627	627	873	893
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	457
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.51	0.53
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		50.1%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	165	1730	1205
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 59.4
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	165	1730	1205	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	179	1880	1310	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	179	1880	1310	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			11.5	59.4	35.9	
Effective Green, g (s)			11.5	59.4	35.9	
Actuated g/C Ratio			0.19	1.00	0.60	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			342	5085	2138	
v/s Ratio Prot			0.10	c0.37	c0.37	
v/s Ratio Perm						
v/c Ratio			0.52	0.37	0.61	
Uniform Delay, d1			21.5	0.0	7.4	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			1.4	0.0	0.5	
Delay (s)			22.9	0.0	7.9	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.0	7.9	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: H-1 WB Off-Ramp & H-1 WB Lp Off-Ramp & Kunia Rd

5/7/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	475	170	870	710	1845
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 119.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	475	0	170	0	0	0	0	870	0	710	1845	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	516	0	185	0	0	0	0	946	0	772	2005	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	516	0	185	0	0	0	0	946	0	772	2005	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.2		119.4					40.8		37.4	84.2	
Effective Green, g (s)	23.2		119.4					40.8		37.4	84.2	
Actuated g/C Ratio	0.19		1.00					0.34		0.31	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	667		1583					1209		1075	3585	
v/s Ratio Prot	c0.15							c0.27		c0.22	0.39	
v/s Ratio Perm			0.12									
v/c Ratio	0.77		0.12					0.78		0.72	0.56	
Uniform Delay, d1	45.6		0.0					35.3		36.3	8.6	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	5.6		0.2					3.4		2.3	0.2	
Delay (s)	51.2		0.2					38.7		38.6	8.7	
Level of Service	D		A					D		D	A	
Approach Delay (s)		37.7			0.0			38.7			17.0	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/7/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2485	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2485	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2701	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2701	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.76			
v/s Ratio Perm						
v/c Ratio			0.85			
Uniform Delay, d1			3.3			
Progression Factor			1.00			
Incremental Delay, d2			3.1			
Delay (s)			6.3			
Level of Service			A			
Approach Delay (s)	0.0		6.3			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/7/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	870	2485	0	2015	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	946	2701	0	2190	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.80	
vC, conflicting volume			3647		1676	473
vC1, stage 1 conf vol					946	
vC2, stage 2 conf vol					730	
vCu, unblocked vol			3647		977	473
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			62		285	538

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	473	473	1351	1351	730	730	730
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1351	1351	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.79	0.79	0.43	0.43	0.43
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	135	3245	115	0	2020
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.99
Hourly flow rate (vph)	0	147	3527	125	0	2040
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.82					
vC, conflicting volume	4209	1178			3529	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4144	1178			3529	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	20			100	
cM capacity (veh/h)	1	183			69	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	147	1176	1176	1176	125	680	680	680
Volume Left	0	0	0	0	0	0	0	0
Volume Right	147	0	0	0	125	0	0	0
cSH	183	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.80	0.69	0.69	0.69	0.07	0.40	0.40	0.40
Queue Length 95th (ft)	137	0	0	0	0	0	0	0
Control Delay (s)	75.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F							
Approach Delay (s)	75.1	0.0				0.0		
Approach LOS	F							

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	25	30	105	5	175	40	3220	35	45	1565	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	30	15	105	5	175	40	3220	35	45	1565	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1750		1727	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1750		1318	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	27	33	16	114	5	190	43	3389	38	49	1581	109
RTOR Reduction (vph)	0	8	0	0	0	14	0	0	11	0	0	29
Lane Group Flow (vph)	27	41	0	114	5	176	43	3389	27	49	1581	80
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Effective Green, g (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.04	0.72	0.72	0.05	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	264		199	281	358	64	3659	1110	88	3726	1100
v/s Ratio Prot		0.02			0.00		0.02	c0.67		0.03	c0.31	
v/s Ratio Perm	0.02			c0.09		c0.11			0.02			0.05
v/c Ratio	0.13	0.16		0.57	0.02	0.49	0.67	0.93	0.02	0.56	0.42	0.07
Uniform Delay, d1	88.1	88.5		94.6	86.7	80.8	114.2	28.3	9.6	111.4	12.4	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.29	0.29	0.73	1.01	1.00	0.99
Incremental Delay, d2	0.3	0.3		3.9	0.0	1.1	10.5	2.3	0.0	7.4	0.4	0.1
Delay (s)	88.4	88.8		98.6	86.7	81.9	157.6	10.4	7.0	120.1	12.7	9.1
Level of Service	F	F		F	F	F	F	B	A	F	B	A
Approach Delay (s)		88.7			88.1			12.2			15.5	
Approach LOS		F			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0	47.0	10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	20.0	173.0	173.0	20.0	173.0	173.0
Total Split (%)	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	8.3%	72.1%	72.1%	8.3%	72.1%	72.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 163 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1853	1540		1758	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.97	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1801	1540		1305	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	43	65	163	16	168	49	3418	49	49	1636	5
RTOR Reduction (vph)	0	0	55	0	0	73	0	0	13	0	0	1
Lane Group Flow (vph)	0	48	10	0	179	95	49	3418	36	49	1636	4
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		36.5	36.5		36.5	36.5	11.5	173.0	173.0	11.5	173.0	173.0
Effective Green, g (s)		36.5	36.5		36.5	36.5	11.5	173.0	173.0	11.5	173.0	173.0
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.05	0.72	0.72	0.05	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		273	234		198	240	84	3665	1112	84	3665	1111
v/s Ratio Prot							c0.03	c0.67		0.03	0.32	
v/s Ratio Perm		0.03	0.01		c0.14	0.06			0.02			0.00
v/c Ratio		0.18	0.04		0.90	0.40	0.58	0.93	0.03	0.58	0.45	0.00
Uniform Delay, d1		88.6	86.8		100.0	91.8	111.9	28.5	9.6	111.9	13.8	9.4
Progression Factor		1.00	1.00		1.00	1.00	0.93	1.20	2.69	0.90	1.52	1.00
Incremental Delay, d2		0.3	0.1		38.2	1.1	4.7	2.9	0.0	9.2	0.4	0.0
Delay (s)		89.0	86.9		138.2	92.9	108.6	37.2	25.8	109.6	21.4	9.4
Level of Service		F	F		F	F	F	D	C	F	C	A
Approach Delay (s)		87.8			116.3			38.1			23.9	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3380	1795	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 52 (43%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3380	1795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3674	1813	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3674	1813	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.72	0.36	
v/s Ratio Perm						
v/c Ratio				0.94	0.46	
Uniform Delay, d1				11.4	4.9	
Progression Factor				2.01	2.00	
Incremental Delay, d2				2.7	0.4	
Delay (s)				25.7	10.2	
Level of Service				C	B	
Approach Delay (s)	0.0			25.7	10.2	
Approach LOS	A			C	B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	160	10	5	250	3065	15	5	1525	330
Turn Type	Split	NA	custom	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3 1			2 3			6 4
Detector Phase	4	4	4 5	3	3 1	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0		11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0		46.0	166.0		11.0	131.0	
Total Split (%)	20.4%	20.4%		5.8%		19.2%	69.2%		4.6%	54.6%	
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 163 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	160	10	10	5	250	3065	15	5	1525	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
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)	440	11	174	11	11	5	272	3332	16	5	1658	359
RTOR Reduction (vph)	0	0	35	0	0	5	0	0	4	0	0	69
Lane Group Flow (vph)	224	227	139	0	22	0	272	3332	12	5	1658	290
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3 1			2 3			6 4
Actuated Green, G (s)	40.1	40.1	84.8		5.9	7.9	38.7	167.0	179.9	2.0	130.3	170.4
Effective Green, g (s)	40.1	40.1	84.8		5.9	7.9	38.7	167.0	179.9	2.0	130.3	170.4
Actuated g/C Ratio	0.17	0.17	0.35		0.02	0.03	0.16	0.70	0.75	0.01	0.54	0.71
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0		2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	280	282	514		44	52	285	3538	1077	14	2760	969
v/s Ratio Prot	0.13	c0.13			c0.01		c0.15	c0.66		0.00	0.33	
v/s Ratio Perm			0.10			0.00			0.01			0.21
v/c Ratio	0.80	0.80	0.27		0.50	0.00	0.95	0.94	0.01	0.36	0.60	0.30
Uniform Delay, d1	96.1	96.2	55.5		115.6	112.2	99.8	32.2	7.6	118.4	37.2	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.89	1.35	1.00	0.98	1.08	2.09
Incremental Delay, d2	15.0	15.3	0.3		3.2	0.0	26.3	3.6	0.0	5.3	0.9	0.2
Delay (s)	111.1	111.4	55.8		118.8	112.3	114.7	47.2	7.6	121.8	41.1	26.9
Level of Service	F	F	E		F	F	F	D	A	F	D	C
Approach Delay (s)		95.8			117.6			52.1			38.8	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	52.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	118.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	520	50	50	85	505	40	2095	5	285	1295	60
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	57.0	57.0		35.0		20.0	113.0	113.0	35.0	128.0	128.0
Total Split (%)	23.8%	23.8%		14.6%		8.3%	47.1%	47.1%	14.6%	53.3%	53.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 188 (78%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	50	50	15	85	505	40	2095	5	285	1295	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	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)	565	54	54	16	92	549	43	2277	5	310	1408	65
RTOR Reduction (vph)	0	0	41	0	0	33	0	0	3	0	0	30
Lane Group Flow (vph)	311	308	13	0	108	516	43	2277	2	310	1408	35
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	47.7	47.7	58.6		29.0	61.9	10.9	111.4	111.4	26.9	127.4	127.4
Effective Green, g (s)	47.7	47.7	58.6		29.0	61.9	10.9	111.4	111.4	26.9	127.4	127.4
Actuated g/C Ratio	0.20	0.20	0.24		0.12	0.26	0.05	0.46	0.46	0.11	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	337	386		223	718	80	2360	734	384	2699	840
v/s Ratio Prot	c0.18	0.18			0.06		0.02	c0.45		c0.09	0.28	
v/s Ratio Perm			0.01			c0.19			0.00			0.02
v/c Ratio	0.93	0.91	0.03		0.48	0.72	0.54	0.96	0.00	0.81	0.52	0.04
Uniform Delay, d1	94.5	94.1	69.1		98.5	81.1	112.1	62.4	34.5	104.0	36.5	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.08	0.76	1.00	1.48	0.41	0.28
Incremental Delay, d2	31.9	28.1	0.0		1.7	3.4	5.8	10.6	0.0	10.0	0.6	0.1
Delay (s)	126.4	122.3	69.2		100.2	84.5	127.4	57.7	34.5	163.5	15.6	7.5
Level of Service	F	F	E		F	F	F	E	C	F	B	A
Approach Delay (s)		119.9			87.1			59.0			41.0	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	64.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6 3
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	
Total Split (s)	47.0	47.0		52.0	52.0	52.0	25.0	113.0		28.0	116.0	
Total Split (%)	19.6%	19.6%		21.7%	21.7%	21.7%	10.4%	47.1%		11.7%	48.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 163 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	293	174	185	114	272	326	168	1630	54	196	1056	152
RTOR Reduction (vph)	0	0	52	0	0	49	0	0	16	0	0	42
Lane Group Flow (vph)	152	315	133	114	272	277	168	1630	38	196	1056	110
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Actuated Green, G (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Effective Green, g (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Actuated g/C Ratio	0.12	0.12	0.18	0.16	0.16	0.24	0.07	0.54	0.70	0.07	0.55	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	190	392	291	286	301	728	226	2752	1112	256	2796	1104
v/s Ratio Prot	0.09	c0.09		0.06	c0.15	0.06	0.05	c0.32		c0.06	0.21	
v/s Ratio Perm			0.08			0.04			0.02			0.07
v/c Ratio	0.80	0.80	0.46	0.40	0.90	0.38	0.74	0.59	0.03	0.77	0.38	0.10
Uniform Delay, d1	103.0	103.1	87.2	90.1	98.8	76.9	110.1	37.2	10.9	109.0	30.7	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.84	1.57	1.29
Incremental Delay, d2	19.9	10.7	0.4	0.3	28.0	0.1	11.0	0.9	0.0	10.3	0.3	0.0
Delay (s)	122.9	113.8	87.6	90.5	126.7	77.0	121.1	38.1	10.9	102.2	48.4	15.3
Level of Service	F	F	F	F	F	E	F	D	B	F	D	B
Approach Delay (s)		108.5			98.2			44.8			52.3	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	64.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	680	40	10	315	30	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	739	43	11	342	33	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			783		954	391
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			783		954	391
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		87	99
cM capacity (veh/h)			831		253	608

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	493	290	125	228	38
Volume Left	0	0	11	0	33
Volume Right	0	43	0	0	5
cSH	1700	1700	831	1700	276
Volume to Capacity	0.29	0.17	0.01	0.13	0.14
Queue Length 95th (ft)	0	0	1	0	12
Control Delay (s)	0.0	0.0	0.9	0.0	20.1
Lane LOS			A		C
Approach Delay (s)	0.0		0.3		20.1
Approach LOS					C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	645	0	55	335	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	701	0	60	364	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			701		1003	351
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			701		1003	351
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		100	93
cM capacity (veh/h)			892		223	646

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	351	351	181	243	43
Volume Left	0	0	60	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	892	1700	646
Volume to Capacity	0.21	0.21	0.07	0.14	0.07
Queue Length 95th (ft)	0	0	5	0	5
Control Delay (s)	0.0	0.0	3.5	0.0	11.0
Lane LOS			A		B
Approach Delay (s)	0.0		1.5		11.0
Approach LOS					B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay		7.2	
Level of Service		A	
Intersection Capacity Utilization		19.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	645	20	0	340	0	0	0	0	0	0	35
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	701	22	0	370	0	0	0	0	0	0	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	370			723			935	1082	361	720	1092	185
vC1, stage 1 conf vol							712	712		370	370	
vC2, stage 2 conf vol							223	370		351	723	
vCu, unblocked vol	370			723			935	1082	361	720	1092	185
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	95
cM capacity (veh/h)	1186			875			313	326	635	432	323	826

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	467	255	185	185	38
Volume Left	0	0	0	0	0
Volume Right	0	22	0	0	38
cSH	1700	1700	1700	1700	826
Volume to Capacity	0.27	0.15	0.11	0.11	0.05
Queue Length 95th (ft)	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	9.6
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.6
Approach LOS					A

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		21.8%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	645	325	340
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 45.7
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	645	0	325	340	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	701	0	353	370	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	701	0	353	370	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	18.3		15.3	45.6		
Effective Green, g (s)	18.3		15.3	45.6		
Actuated g/C Ratio	0.40		0.34	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1420		593	3539		
v/s Ratio Prot	c0.20		c0.20	0.10		
v/s Ratio Perm						
v/c Ratio	0.49		0.60	0.10		
Uniform Delay, d1	10.2		12.6	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.3		1.6	0.0		
Delay (s)	10.5		14.2	0.0		
Level of Service	B		B	A		
Approach Delay (s)	10.5			6.9	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	45.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	285	995	665	175
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 41.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	285	995	665	175	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	310	1082	723	190	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	310	1082	723	190	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	12.6	41.2	17.6	41.2		
Effective Green, g (s)	12.6	41.2	17.6	41.2		
Actuated g/C Ratio	0.31	1.00	0.43	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	541	3539	1511	1583		
v/s Ratio Prot	c0.18	0.31	c0.20			
v/s Ratio Perm				0.12		
v/c Ratio	0.57	0.31	0.48	0.12		
Uniform Delay, d1	12.0	0.0	8.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.5	0.0	0.2	0.2		
Delay (s)	13.5	0.0	8.7	0.2		
Level of Service	B	A	A	A		
Approach Delay (s)		3.0	7.0		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	4.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	11.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	425	810	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	462	880	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	902				1274	451
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	902				1274	451
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				81	95
cM capacity (veh/h)	749				143	556

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	231	231	587	315	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	749	1700	1700	1700	1700	143	556
Volume to Capacity	0.10	0.14	0.14	0.35	0.19	0.19	0.05
Queue Length 95th (ft)	8	0	0	0	0	17	4
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	36.1	11.8
Lane LOS	B					E	B
Approach Delay (s)	1.5			0.0		23.9	
Approach LOS						C	

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization		40.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	265	15	0	405	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	288	16	0	440	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	440			304			929	899	152	758	908	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440			304			929	899	152	758	908	220
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			77	96	99	100	100	68
cM capacity (veh/h)	1116			1253			143	257	867	269	254	784

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	192	112	0	293	147	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	1116	1700	1700	1700	1700	1700	177	1700	784
Volume to Capacity	0.07	0.11	0.07	0.00	0.17	0.09	0.28	0.00	0.32
Queue Length 95th (ft)	6	0	0	0	0	0	27	0	34
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	33.0	0.0	11.7
Lane LOS	A						D	A	B
Approach Delay (s)	1.8			0.0			33.0	11.7	
Approach LOS							D	B	

Intersection Summary			
Average Delay		4.7	
Intersection Capacity Utilization		38.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	145	10	0	240	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	158	11	0	261	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	261			168			690	674	84	598	679	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261			168			690	674	84	598	679	130
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			89	95	100	100	100	84
cM capacity (veh/h)	1301			1407			257	339	958	345	336	895

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	105	63	0	174	87	43	0	147
Volume Left	125	0	0	0	0	0	27	0	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	1301	1700	1700	1700	1700	1700	282	1700	895
Volume to Capacity	0.10	0.06	0.04	0.00	0.10	0.05	0.15	0.00	0.16
Queue Length 95th (ft)	8	0	0	0	0	0	13	0	15
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	20.1	0.0	9.8
Lane LOS	A						C	A	A
Approach Delay (s)	3.4			0.0			20.1	9.8	
Approach LOS							C	A	

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		28.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	45	5	0	115	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	49	5	0	125	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	130			54			429	378	27	353	378	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			54			429	378	27	353	378	65
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	98	100	100	100	88
cM capacity (veh/h)	1453			1549			425	515	1042	539	515	985

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	33	22	0	83	47	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1453	1700	1700	1700	1700	1700	451	1700	985
Volume to Capacity	0.07	0.02	0.01	0.00	0.05	0.03	0.07	0.00	0.12
Queue Length 95th (ft)	5	0	0	0	0	0	6	0	10
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	13.6	0.0	9.2
Lane LOS	A						B	A	A
Approach Delay (s)	4.9			0.0			13.6	9.2	
Approach LOS							B	A	

Intersection Summary			
Average Delay		5.3	
Intersection Capacity Utilization		23.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	5	40	50	10	80
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	5	43	54	11	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		182	90	92	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		182	90	92	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	97		94	93	99	92
cM capacity (veh/h)	1623		695	779	776	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	98	98
Volume Left	43	43	0
Volume Right	5	0	87
cSH	1623	739	1039
Volume to Capacity	0.03	0.13	0.09
Queue Length 95th (ft)	2	11	8
Control Delay (s)	6.5	10.6	8.8
Lane LOS	A	B	A
Approach Delay (s)	6.5	10.6	8.8
Approach LOS		B	A

Intersection Summary			
Average Delay		9.1	
Intersection Capacity Utilization		21.5%	ICU Level of Service A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	375	0	190	300	660	335	620
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 64.7
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	375	0	190	300	660	0	0	335	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1553	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1553	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	408	0	207	326	717	0	0	364	674
RTOR Reduction (vph)	0	0	0	0	0	151	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	204	204	56	326	717	0	0	364	674
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				15.8	15.8	15.8	17.7	36.1			12.4	63.9
Effective Green, g (s)				15.8	15.8	15.8	17.7	36.1			12.4	63.9
Actuated g/C Ratio				0.25	0.25	0.25	0.28	0.56			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				415	415	383	490	1999			686	1583
v/s Ratio Prot							c0.18	0.20			0.10	
v/s Ratio Perm				0.12	0.12	0.04						c0.43
v/c Ratio				0.49	0.49	0.15	0.67	0.36			0.53	0.43
Uniform Delay, d1				20.6	20.6	18.8	20.5	7.6			23.1	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.9	0.9	0.2	3.4	0.1			0.8	0.8
Delay (s)				21.5	21.5	19.0	23.9	7.7			23.9	0.8
Level of Service				C	C	B	C	A			C	A
Approach Delay (s)		0.0			20.7			12.8			8.9	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	80	490	415	245	495
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	66.0	66.0	42.0	32.0	74.0
Total Split (%)	47.1%	47.1%	30.0%	22.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 128
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp 5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	540	80	490	0	0	0	0	415	345	245	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3254		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3254		1770	3539	
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)	587	87	533	0	0	0	0	451	375	266	538	0
RTOR Reduction (vph)	0	0	150	0	0	0	0	107	0	0	0	0
Lane Group Flow (vph)	0	674	383	0	0	0	0	719	0	266	538	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		53.7	53.7					33.0		23.0	62.0	
Effective Green, g (s)		53.7	53.7					33.0		23.0	62.0	
Actuated g/C Ratio		0.42	0.42					0.26		0.18	0.49	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		750	657					840		318	1718	
v/s Ratio Prot								c0.22		c0.15	0.15	
v/s Ratio Perm		0.38	0.25									
v/c Ratio		0.90	0.58					0.86		0.84	0.31	
Uniform Delay, d1		34.5	28.4					45.1		50.5	19.9	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		13.5	1.3					8.6		17.1	0.1	
Delay (s)		48.0	29.7					53.7		67.6	20.0	
Level of Service		D	C					D		E	C	
Approach Delay (s)		39.9			0.0			53.7			35.8	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	127.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2023 with Mitigation PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	850	5	20	385	20	130	30
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	49.0	49.0	49.0	23.0	51.0	28.0	28.0
Total Split (%)	49.0%	49.0%	49.0%	23.0%	51.0%	28.0%	28.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	850	5	20	385	20	0	0	130	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	859	5	22	389	20	0	0	131	33
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	429	435	11	389	20	0	0	131	6
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				48.2	48.2	48.2	15.9	39.8			18.9	18.9
Effective Green, g (s)				48.2	48.2	48.2	15.9	39.8			18.9	18.9
Actuated g/C Ratio				0.48	0.48	0.48	0.16	0.40			0.19	0.19
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				810	812	763	545	741			668	299
v/s Ratio Prot				0.26	c0.26		c0.11	0.01			c0.04	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.53	0.54	0.01	0.71	0.03			0.20	0.02
Uniform Delay, d1				18.0	18.1	13.5	39.9	18.3			34.2	33.0
Progression Factor				1.00	1.00	1.00	1.14	1.66			1.00	1.00
Incremental Delay, d2				2.5	0.7	0.0	4.4	0.0			0.1	0.0
Delay (s)				20.5	18.8	13.5	50.0	30.4			34.3	33.0
Level of Service				C	B	B	D	C			C	C
Approach Delay (s)		0.0			19.5			49.1			34.0	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	255	340	660	40	1005
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	9.0		36.0		8.0	36.0
Total Split (s)	25.0		59.0		16.0	75.0
Total Split (%)	25.0%		59.0%		16.0%	75.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	255	0	0	0	0	340	660	40	1005	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1779	1583					3539	2787	1770	3539	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1779	1583					3539	2787	1770	3539	
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)	87	5	277	0	0	0	0	370	717	43	1092	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	277	0	0	0	0	370	717	43	1092	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		9.2	100.0					70.3	100.0	5.5	79.8	
Effective Green, g (s)		9.2	100.0					70.3	100.0	5.5	79.8	
Actuated g/C Ratio		0.09	1.00					0.70	1.00	0.06	0.80	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		163	1583					2487	2787	97	2824	
v/s Ratio Prot		c0.05						0.10		0.02	c0.31	
v/s Ratio Perm			0.17						0.26			
v/c Ratio		0.56	0.17					0.15	0.26	0.44	0.39	
Uniform Delay, d1		43.5	0.0					4.9	0.0	45.8	3.0	
Progression Factor		1.00	1.00					1.00	1.00	1.00	0.74	
Incremental Delay, d2		4.4	0.2					0.1	0.2	3.0	0.4	
Delay (s)		47.9	0.2					5.1	0.2	48.8	2.5	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		12.1			0.0			1.9			4.3	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	215	30	110	300	100	25	795	135	60	1135	320
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 107.2
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	215	30	110	300	100	25	795	135	60	1135	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	342	234	33	120	326	109	27	864	147	65	1234	348
RTOR Reduction (vph)	0	0	27	0	0	66	0	0	62	0	0	116
Lane Group Flow (vph)	342	234	6	120	326	43	27	864	85	65	1234	232
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	17.3	21.2	21.2	12.5	16.4	30.2	4.5	44.5	63.0	7.8	47.8	71.1
Effective Green, g (s)	17.3	21.2	21.2	12.5	16.4	30.2	4.5	44.5	63.0	7.8	47.8	71.1
Actuated g/C Ratio	0.16	0.19	0.19	0.11	0.15	0.28	0.04	0.41	0.58	0.07	0.44	0.65
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	544	688	307	202	532	438	73	2075	914	245	2229	1032
v/s Ratio Prot	c0.10	c0.07		0.07	c0.09		0.02	0.17		c0.02	c0.24	
v/s Ratio Perm			0.00			0.03			0.05			0.15
v/c Ratio	0.63	0.34	0.02	0.59	0.61	0.10	0.37	0.42	0.09	0.27	0.55	0.23
Uniform Delay, d1	42.8	37.9	35.5	45.8	43.3	29.3	50.9	23.0	10.3	47.9	22.7	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.3	0.0	4.6	2.1	0.1	3.1	0.1	0.0	0.6	0.3	0.1
Delay (s)	45.1	38.2	35.5	50.5	45.4	29.4	54.0	23.1	10.3	48.5	23.0	7.8
Level of Service	D	D	D	D	D	C	D	C	B	D	C	A
Approach Delay (s)		41.9			43.4			22.1			20.8	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	109.0	Sum of lost time (s)	23.0	
Intersection Capacity Utilization	58.0%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	325	545	305	725	1055	340
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Detector Phase	7	7 5	5	2	6	6 7
Switch Phase						
Minimum Initial (s)	4.0		4.0	30.0	30.0	
Minimum Split (s)	10.0		9.0	36.0	36.0	
Total Split (s)	37.0		30.0	83.0	53.0	
Total Split (%)	30.8%		25.0%	69.2%	44.2%	
Yellow Time (s)	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		5.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
Recall Mode	None		None	C-Max	C-Max	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 57 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	325	545	305	725	1055	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	3433	5085	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	592	332	788	1147	370
RTOR Reduction (vph)	0	11	0	0	0	34
Lane Group Flow (vph)	353	581	332	788	1147	336
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Actuated Green, G (s)	31.0	56.3	19.3	77.0	52.7	89.7
Effective Green, g (s)	31.0	56.3	19.3	77.0	52.7	89.7
Actuated g/C Ratio	0.26	0.47	0.16	0.64	0.44	0.75
Clearance Time (s)	6.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	886	742	552	3262	2233	1183
v/s Ratio Prot	0.10		0.10	0.15	c0.23	
v/s Ratio Perm		c0.37				0.21
v/c Ratio	0.40	0.78	0.60	0.24	0.51	0.28
Uniform Delay, d1	36.8	26.7	46.8	9.1	24.4	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	5.4	1.9	0.2	0.8	0.1
Delay (s)	37.1	32.2	48.6	9.3	25.2	5.0
Level of Service	D	C	D	A	C	A
Approach Delay (s)	34.0			21.0	20.3	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/7/2014

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations								
Volume (vph)	100	305	775	115	505	1135	105	
Turn Type	Free	custom	NA	Perm	Prot	NA	Perm	
Protected Phases			2		1	6		3
Permitted Phases	Free	3 1		2			6	
Detector Phase		3 1	2	2	1	6	6	
Switch Phase								
Minimum Initial (s)			30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)			37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)			57.0	57.0	98.0	155.0	155.0	25.0
Total Split (%)			31.7%	31.7%	54.4%	86.1%	86.1%	14%
Yellow Time (s)			4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)			0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)			6.0	6.0	6.0	6.0	6.0	
Lead/Lag			Lag	Lag	Lead			
Lead-Lag Optimize?								
Recall Mode			None	None	None	None	None	None

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 103.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	0	0	305	0	775	115	505	1135	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	1770	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	0	0	332	0	842	125	549	1234	114
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	85	0	0	31
Lane Group Flow (vph)	0	0	109	0	0	324	0	842	40	549	1234	83
Turn Type			Free			custom		NA	Perm	Prot	NA	Perm
Protected Phases								2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			102.8			58.1		32.7	32.7	36.3	75.0	75.0
Effective Green, g (s)			102.8			58.1		32.7	32.7	36.3	75.0	75.0
Actuated g/C Ratio			1.00			0.57		0.32	0.32	0.35	0.73	0.73
Clearance Time (s)								6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)								3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611			910		1617	503	625	3709	1154
v/s Ratio Prot								c0.17		c0.31	0.24	
v/s Ratio Perm			0.07			c0.20			0.03			0.05
v/c Ratio			0.07			0.36		0.52	0.08	0.88	0.33	0.07
Uniform Delay, d1			0.0			12.2		28.6	24.5	31.2	5.0	4.0
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1			0.2		0.3	0.1	13.3	0.1	0.0
Delay (s)			0.1			12.4		28.9	24.6	44.4	5.0	4.0
Level of Service			A			B		C	C	D	A	A
Approach Delay (s)		0.1			12.4			28.4			16.4	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	102.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	130	280	215	255	445	325	635	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	40.0	9.0	40.0	
Total Split (s)	26.0	54.0		15.0	43.0		23.0	43.0	28.0	48.0	
Total Split (%)	18.6%	38.6%		10.7%	30.7%		16.4%	30.7%	20.0%	34.3%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 120
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	130	280	215	255	445	205	325	635	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4845		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4845		3433	5085	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)	304	228	310	141	304	234	277	484	223	353	690	359
RTOR Reduction (vph)	0	0	32	0	0	56	0	58	0	0	0	94
Lane Group Flow (vph)	304	228	278	141	304	178	277	649	0	353	690	265
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	16.1	36.9	57.6	9.3	30.1	53.7	14.7	33.7		17.6	36.6	58.7
Effective Green, g (s)	16.1	36.9	57.6	9.3	30.1	53.7	14.7	33.7		17.6	36.6	58.7
Actuated g/C Ratio	0.13	0.31	0.48	0.08	0.25	0.45	0.12	0.28		0.15	0.31	0.49
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	462	575	763	267	469	711	422	1366		505	1557	777
v/s Ratio Prot	c0.09	0.12		0.04	c0.16		0.08	0.13		c0.10	c0.14	
v/s Ratio Perm			0.18			0.11						0.17
v/c Ratio	0.66	0.40	0.36	0.53	0.65	0.25	0.66	0.47		0.70	0.44	0.34
Uniform Delay, d1	49.1	32.5	19.4	53.0	40.0	20.4	50.0	35.6		48.4	33.3	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.4	0.5	0.3	1.9	3.1	0.2	3.7	0.3		4.2	0.2	0.3
Delay (s)	52.5	33.0	19.7	54.9	43.0	20.6	53.7	35.8		52.6	33.5	18.8
Level of Service	D	C	B	D	D	C	D	D		D	C	B
Approach Delay (s)		35.1			37.8			40.8			34.6	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	119.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	485	65	360	355	175	70	345	230	265	340	385
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	37.0	37.0	10.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	30.0	43.0	43.0	31.0	44.0		20.0	52.0		24.0	56.0	
Total Split (%)	20.0%	28.7%	28.7%	20.7%	29.3%		13.3%	34.7%		16.0%	37.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 122.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	485	65	360	355	175	70	345	230	265	340	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	353	527	71	391	386	190	76	375	250	288	370	418
RTOR Reduction (vph)	0	0	55	0	0	0	0	0	29	0	0	176
Lane Group Flow (vph)	353	527	16	391	386	190	76	375	221	288	370	242
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	18.6	28.3	28.3	19.7	29.4	51.1	8.7	35.4	61.1	15.7	42.4	67.0
Effective Green, g (s)	18.6	28.3	28.3	19.7	29.4	51.1	8.7	35.4	61.1	15.7	42.4	67.0
Actuated g/C Ratio	0.15	0.23	0.23	0.16	0.24	0.42	0.07	0.29	0.50	0.13	0.35	0.55
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	522	820	366	553	1224	1166	126	1026	792	441	1228	1529
v/s Ratio Prot	0.10	c0.15		c0.11	0.08	0.07	0.04	c0.11		c0.08	0.10	0.09
v/s Ratio Perm			0.01						0.14			
v/c Ratio	0.68	0.64	0.04	0.71	0.32	0.16	0.60	0.37	0.28	0.65	0.30	0.16
Uniform Delay, d1	48.9	42.3	36.4	48.5	38.1	22.2	55.0	34.4	17.7	50.6	29.1	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	1.7	0.1	4.1	0.1	0.1	7.9	0.2	0.2	3.5	0.1	0.0
Delay (s)	52.4	44.1	36.5	52.6	38.2	22.2	62.9	34.7	17.9	54.1	29.2	13.7
Level of Service	D	D	D	D	D	C	E	C	B	D	C	B
Approach Delay (s)		46.6			40.9			31.7			29.8	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	122.1	Sum of lost time (s)	23.0	
Intersection Capacity Utilization	59.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/7/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	570	0	50	5	765	130	1210
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	16.0	47.0	21.0	52.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	14.5%	42.7%	19.1%	47.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	570	0	50	5	765	505	130	1210	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3328		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3328		1770	3539	
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	0	11	620	0	54	5	832	549	141	1315	0
RTOR Reduction (vph)	0	11	0	0	0	42	0	87	0	0	0	0
Lane Group Flow (vph)	0	0	0	310	310	12	5	1294	0	141	1315	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Effective Green, g (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.46		0.12	0.57	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		382	382	359	20	1539		214	2023	
v/s Ratio Prot		c0.00		c0.18	0.18		0.00	c0.39		c0.08	0.37	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.81	0.81	0.03	0.25	0.84		0.66	0.65	
Uniform Delay, d1		54.2		40.3	40.3	33.1	53.9	26.0		46.2	16.0	
Progression Factor		1.00		1.00	1.00	1.00	1.40	0.68		1.00	1.00	
Incremental Delay, d2		0.3		12.3	12.3	0.0	5.6	5.0		7.1	1.6	
Delay (s)		54.5		52.6	52.6	33.1	81.0	22.7		53.3	17.7	
Level of Service		D		D	D	C	F	C		D	B	
Approach Delay (s)		54.5			51.0			22.9			21.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/7/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	405	25	1260	915	1840
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	26.0	26.0	84.0	84.0	84.0
Total Split (%)	23.6%	23.6%	76.4%	76.4%	76.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	405	25	1260	915	0	1840
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	440	27	1370	995	0	2000
RTOR Reduction (vph)	0	23	0	273	0	0
Lane Group Flow (vph)	440	4	1370	722	0	2000
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	18.2	18.2	79.8	79.8		79.8
Effective Green, g (s)	18.2	18.2	79.8	79.8		79.8
Actuated g/C Ratio	0.17	0.17	0.73	0.73		0.73
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	568	261	2567	1148		2567
v/s Ratio Prot	c0.13		0.39			c0.57
v/s Ratio Perm		0.00		0.46		
v/c Ratio	0.77	0.02	0.53	0.63		0.78
Uniform Delay, d1	43.9	38.4	6.8	7.6		9.5
Progression Factor	1.00	1.00	1.00	1.00		0.99
Incremental Delay, d2	6.5	0.0	0.8	2.6		1.9
Delay (s)	50.5	38.4	7.6	10.2		11.4
Level of Service	D	D	A	B		B
Approach Delay (s)	49.8		8.7			11.4
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/7/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2025	1510	645	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2201	1641	701	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.58				0.58	0.58
vC, conflicting volume	2342				2726	1171
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1876				2531	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	185				13	634

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	734	734	734	1094	1248
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	701
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.64	0.73
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	120	2025	1510
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 70.6
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	120	2025	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	130	2201	1641	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	130	2201	1641	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			9.0	71.8	50.8	
Effective Green, g (s)			9.0	71.8	50.8	
Actuated g/C Ratio			0.13	1.00	0.71	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			221	5085	2503	
v/s Ratio Prot			0.07	c0.43	c0.46	
v/s Ratio Perm						
v/c Ratio			0.59	0.43	0.66	
Uniform Delay, d1			29.7	0.0	5.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.0	0.1	0.6	
Delay (s)			33.6	0.1	6.4	
Level of Service			C	A	A	
Approach Delay (s)	0.0			1.9	6.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: H-1 WB Off-Ramp & H-1 WB Lp Off-Ramp & Kunia Rd

5/7/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	370	190	915	615	3125
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 159.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	0	190	0	0	0	0	915	0	615	3125	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	402	0	207	0	0	0	0	995	0	668	3397	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	402	0	207	0	0	0	0	995	0	668	3397	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.8		159.9					83.2		34.9	124.1	
Effective Green, g (s)	23.8		159.9					83.2		34.9	124.1	
Actuated g/C Ratio	0.15		1.00					0.52		0.22	0.78	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	510		1583					1841		749	3946	
v/s Ratio Prot	c0.12							0.28		0.19	c0.67	
v/s Ratio Perm			0.13									
v/c Ratio	0.79		0.13					0.54		0.89	0.86	
Uniform Delay, d1	65.6		0.0					25.6		60.7	12.1	
Progression Factor	1.00		1.00					1.00		0.98	0.93	
Incremental Delay, d2	7.9		0.2					0.3		12.9	2.1	
Delay (s)	73.5		0.2					25.9		72.6	13.4	
Level of Service	E		A					C		E	B	
Approach Delay (s)		48.6			0.0			25.9			23.1	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	159.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1695	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1695	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1842	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1842	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.52			
v/s Ratio Perm						
v/c Ratio			0.58			
Uniform Delay, d1			1.6			
Progression Factor			1.00			
Incremental Delay, d2			0.8			
Delay (s)			2.4			
Level of Service			A			
Approach Delay (s)	0.0		2.4			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/7/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	915	1695	0	3315	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	995	1842	0	3603	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.24	
vC, conflicting volume			2837		2196	497
vC1, stage 1 conf vol					995	
vC2, stage 2 conf vol					1201	
vCu, unblocked vol			2837		0	497
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			131		245	518

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	497	497	921	921	1201	1201	1201
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	921	921	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.29	0.54	0.54	0.71	0.71	0.71
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	110	2635	65	0	3320
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.99
Hourly flow rate (vph)	0	120	2864	71	0	3354
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.27					
vC, conflicting volume	3984	957			2866	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2556	957			2866	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	54			100	
cM capacity (veh/h)	6	258			128	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	120	955	955	955	71	1118	1118	1118
Volume Left	0	0	0	0	0	0	0	0
Volume Right	120	0	0	0	71	0	0	0
cSH	258	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.46	0.56	0.56	0.56	0.04	0.66	0.66	0.66
Queue Length 95th (ft)	57	0	0	0	0	0	0	0
Control Delay (s)	30.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D							
Approach Delay (s)	30.5	0.0				0.0		
Approach LOS	D							

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	120	100	40	5	110	35	1955	40	120	2920	130
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	100	35	40	5	110	35	1955	40	120	2920	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1738	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1773		794	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	130	109	38	43	5	120	38	2058	43	130	2949	141
RTOR Reduction (vph)	0	5	0	0	0	13	0	0	14	0	0	22
Lane Group Flow (vph)	130	142	0	43	5	107	38	2058	29	130	2949	119
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Effective Green, g (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.26	0.03	0.68	0.68	0.09	0.74	0.74
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	260		116	274	413	53	3481	1056	157	3781	1116
v/s Ratio Prot		0.08			0.00		0.02	0.40		c0.07	c0.58	
v/s Ratio Perm	c0.09			0.05		0.07			0.02			0.08
v/c Ratio	0.63	0.55		0.37	0.02	0.26	0.72	0.59	0.03	0.83	0.78	0.11
Uniform Delay, d1	96.2	94.9		92.3	87.5	70.2	115.4	20.1	12.2	107.5	18.8	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.94	0.55	1.37	1.00	1.00	1.00
Incremental Delay, d2	6.2	2.3		2.0	0.0	0.3	31.3	0.6	0.0	28.7	1.7	0.2
Delay (s)	102.4	97.2		94.3	87.6	70.6	139.3	11.7	16.7	136.2	20.4	8.8
Level of Service	F	F		F	F	E	F	B	B	F	C	A
Approach Delay (s)		99.7			77.2			14.1			24.6	
Approach LOS		F			E			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Detector Phase	4	4	4 5	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0		10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	22.0	149.0	149.0	44.0	171.0	171.0
Total Split (%)	19.6%	19.6%		19.6%	19.6%	19.6%	9.2%	62.1%	62.1%	18.3%	71.3%	71.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 220 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1858	1540		1775	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.99	1.00		0.56	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1837	1540		1024	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	87	98	38	11	114	65	2114	54	174	2919	22
RTOR Reduction (vph)	0	0	37	0	0	102	0	0	16	0	0	5
Lane Group Flow (vph)	0	92	61	0	49	12	65	2114	38	174	2919	17
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Actuated Green, G (s)		25.1	44.5		25.1	25.1	13.4	167.1	167.1	28.8	182.5	182.5
Effective Green, g (s)		25.1	44.5		25.1	25.1	13.4	167.1	167.1	28.8	182.5	182.5
Actuated g/C Ratio		0.10	0.19		0.10	0.10	0.06	0.70	0.70	0.12	0.76	0.76
Clearance Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		192	285		107	165	98	3540	1074	212	3866	1172
v/s Ratio Prot							0.04	0.42		c0.10	c0.57	
v/s Ratio Perm		c0.05	0.04		0.05	0.01			0.02			0.01
v/c Ratio		0.48	0.22		0.46	0.07	0.66	0.60	0.04	0.82	0.76	0.01
Uniform Delay, d1		101.3	82.9		101.1	96.9	111.1	19.0	11.3	103.1	16.2	7.0
Progression Factor		1.00	1.00		1.00	1.00	0.77	1.66	7.29	0.81	1.13	7.34
Incremental Delay, d2		1.9	0.4		3.1	0.2	13.8	0.7	0.1	15.2	0.9	0.0
Delay (s)		103.2	83.3		104.1	97.1	99.9	32.1	82.8	99.1	19.1	51.2
Level of Service		F	F		F	F	F	C	F	F	B	D
Approach Delay (s)		92.9			99.2			35.3			23.8	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2015	3150	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2015	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2190	3182	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2190	3182	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.43	c0.63	
v/s Ratio Perm						
v/c Ratio				0.56	0.81	
Uniform Delay, d1				5.6	8.5	
Progression Factor				1.82	1.93	
Incremental Delay, d2				0.5	1.4	
Delay (s)				10.7	17.7	
Level of Service				B	B	
Approach Delay (s)	0.0			10.7	17.7	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	25	155	15	20	170	1615	35	40	2495	365
Turn Type	Split	NA	custom	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3 1			2 3			6 4
Detector Phase	4	4	4 5	3	3 1	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0		11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0		36.0	159.0		18.0	141.0	
Total Split (%)	20.4%	20.4%		5.8%		15.0%	66.3%		7.5%	58.8%	
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 220 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	25	155	25	15	20	170	1615	35	40	2495	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
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)	326	27	168	27	16	22	185	1755	38	43	2712	397
RTOR Reduction (vph)	0	0	31	0	0	21	0	0	10	0	0	66
Lane Group Flow (vph)	176	177	137	0	43	1	185	1755	28	43	2712	331
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3 1			2 3			6 4
Actuated Green, G (s)	39.0	39.0	72.6		7.7	16.2	27.6	159.8	174.5	8.5	140.7	179.7
Effective Green, g (s)	39.0	39.0	72.6		7.7	16.2	27.6	159.8	174.5	8.5	140.7	179.7
Actuated g/C Ratio	0.16	0.16	0.30		0.03	0.07	0.12	0.67	0.73	0.04	0.59	0.75
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0		2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	273	275	440		57	106	203	3385	1045	62	2981	1022
v/s Ratio Prot	c0.10	0.10			c0.02		c0.10	0.35		0.02	c0.53	
v/s Ratio Perm			0.09			0.00			0.02			0.24
v/c Ratio	0.64	0.64	0.31		0.75	0.01	0.91	0.52	0.03	0.69	0.91	0.32
Uniform Delay, d1	94.0	94.0	64.4		115.2	104.4	105.0	20.5	9.1	114.5	44.0	10.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.90	1.29	2.88	0.90	1.34	1.17
Incremental Delay, d2	5.1	5.1	0.4		38.8	0.0	36.0	0.5	0.0	15.8	3.6	0.1
Delay (s)	99.2	99.1	64.8		154.0	104.5	131.0	26.8	26.3	119.1	62.5	11.8
Level of Service	F	F	E		F	F	F	C	C	F	E	B
Approach Delay (s)		88.1			137.2			36.5			56.9	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	53.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	225	70	50	80	360	40	1250	5	410	1995	455
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	60.0	60.0		47.0		14.0	87.0	87.0	46.0	119.0	119.0
Total Split (%)	25.0%	25.0%		19.6%		5.8%	36.3%	36.3%	19.2%	49.6%	49.6%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 215 (90%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	70	50	10	80	360	40	1250	5	410	1995	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	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)	245	76	54	11	87	391	43	1359	5	446	2168	495
RTOR Reduction (vph)	0	0	46	0	0	140	0	0	2	0	0	138
Lane Group Flow (vph)	159	162	8	0	98	251	43	1359	3	446	2168	357
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	28.2	28.2	36.1		20.9	63.5	7.9	129.3	129.3	36.6	158.0	158.0
Effective Green, g (s)	28.2	28.2	36.1		20.9	63.5	7.9	129.3	129.3	36.6	158.0	158.0
Actuated g/C Ratio	0.12	0.12	0.15		0.09	0.26	0.03	0.54	0.54	0.15	0.66	0.66
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	197	202	238		161	737	58	2739	852	523	3347	1042
v/s Ratio Prot	c0.09	0.09			c0.05		0.02	0.27		c0.13	c0.43	
v/s Ratio Perm			0.01			0.09			0.00			0.23
v/c Ratio	0.81	0.80	0.03		0.61	0.34	0.74	0.50	0.00	0.85	0.65	0.34
Uniform Delay, d1	103.2	103.2	87.1		105.6	71.3	115.0	34.8	25.6	99.1	24.4	18.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.87	1.04	1.00	1.05	1.00	2.33
Incremental Delay, d2	20.9	20.0	0.1		6.4	0.3	36.9	0.6	0.0	7.6	0.5	0.5
Delay (s)	124.2	123.2	87.1		112.0	71.6	137.2	36.7	25.6	111.2	25.1	42.6
Level of Service	F	F	F		F	E	F	D	C	F	C	D
Approach Delay (s)		118.4			79.7			39.7			40.2	
Approach LOS		F			E			D			D	

Intersection Summary				
HCM 2000 Control Delay	49.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	72.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	31.0
Total Split (s)	51.0	51.0		61.0	61.0	61.0	28.0	80.0		48.0	100.0	100.0
Total Split (%)	21.3%	21.3%		25.4%	25.4%	25.4%	11.7%	33.3%		20.0%	41.7%	41.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 220 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	239	293	201	33	283	201	190	1038	38	408	1480	266
RTOR Reduction (vph)	0	0	58	0	0	103	0	0	14	0	0	80
Lane Group Flow (vph)	172	360	143	33	283	98	190	1038	24	408	1480	186
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	31.3	31.3	48.9	41.0	41.0	73.9	17.6	109.8	150.8	32.9	125.1	125.1
Effective Green, g (s)	31.3	31.3	48.9	41.0	41.0	73.9	17.6	109.8	150.8	32.9	125.1	125.1
Actuated g/C Ratio	0.13	0.13	0.20	0.17	0.17	0.31	0.07	0.46	0.63	0.14	0.52	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	209	438	322	302	318	927	251	2326	994	470	2650	825
v/s Ratio Prot	0.11	c0.11		0.02	c0.15	0.02	0.06	0.20		c0.12	c0.29	
v/s Ratio Perm			0.09			0.02			0.02			0.12
v/c Ratio	0.82	0.82	0.44	0.11	0.89	0.11	0.76	0.45	0.02	0.87	0.56	0.22
Uniform Delay, d1	101.7	101.6	83.6	84.1	97.3	59.4	109.1	44.4	16.8	101.4	38.8	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	0.95	1.19
Incremental Delay, d2	21.3	11.2	0.4	0.1	24.1	0.0	11.0	0.6	0.0	12.1	0.7	0.5
Delay (s)	123.0	112.9	84.0	84.1	121.4	59.4	120.1	45.0	16.8	147.3	37.3	37.7
Level of Service	F	F	F	F	F	E	F	D	B	F	D	D
Approach Delay (s)		107.3			94.9			55.4			58.2	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	365	30	15	525	40	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	397	33	16	571	43	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			429		731	215
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			429		731	215
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		88	98
cM capacity (veh/h)			1127		352	790

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	264	165	207	380	60
Volume Left	0	0	16	0	43
Volume Right	0	33	0	0	16
cSH	1700	1700	1127	1700	414
Volume to Capacity	0.16	0.10	0.01	0.22	0.14
Queue Length 95th (ft)	0	0	1	0	12
Control Delay (s)	0.0	0.0	0.8	0.0	15.1
Lane LOS			A		C
Approach Delay (s)	0.0		0.3		15.1
Approach LOS					C

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	385	0	170	520	0	55
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	418	0	185	565	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			418		1071	209
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			418		1071	209
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		100	92
cM capacity (veh/h)			1137		181	797

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	209	209	373	377	60
Volume Left	0	0	185	0	0
Volume Right	0	0	0	0	60
cSH	1700	1700	1137	1700	797
Volume to Capacity	0.12	0.12	0.16	0.22	0.08
Queue Length 95th (ft)	0	0	14	0	6
Control Delay (s)	0.0	0.0	5.2	0.0	9.9
Lane LOS			A		A
Approach Delay (s)	0.0		2.6		9.9
Approach LOS					A

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay		8.0	
Level of Service		A	
Intersection Capacity Utilization		25.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	440	15	0	565	0	0	0	0	0	0	165
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	478	16	0	614	0	0	0	0	0	0	179
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	614			495			973	1101	247	853	1109	307
vC1, stage 1 conf vol							486	486		614	614	
vC2, stage 2 conf vol							486	614		239	495	
vCu, unblocked vol	614			495			973	1101	247	853	1109	307
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	74
cM capacity (veh/h)	961			1065			274	329	753	357	328	689

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	319	176	307	307	179
Volume Left	0	0	0	0	0
Volume Right	0	16	0	0	179
cSH	1700	1700	1700	1700	689
Volume to Capacity	0.19	0.10	0.18	0.18	0.26
Queue Length 95th (ft)	0	0	0	0	26
Control Delay (s)	0.0	0.0	0.0	0.0	12.1
Lane LOS					B
Approach Delay (s)	0.0		0.0		12.1
Approach LOS					B

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		32.5%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	440	655	565
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 72.9
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	440	0	655	565	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	478	0	712	614	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	478	0	712	614	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	16.4		44.5	72.9		
Effective Green, g (s)	16.4		44.5	72.9		
Actuated g/C Ratio	0.22		0.61	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	796		1080	3539		
v/s Ratio Prot	c0.14		c0.40	0.17		
v/s Ratio Perm						
v/c Ratio	0.60		0.66	0.17		
Uniform Delay, d1	25.3		9.3	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	1.3		1.5	0.0		
Delay (s)	26.6		10.7	0.0		
Level of Service	C		B	A		
Approach Delay (s)	26.6			5.8	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	72.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	240	825	1220	515
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 61.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	240	825	1220	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	897	1326	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	261	897	1326	560	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	15.3	61.1	34.8	61.1		
Effective Green, g (s)	15.3	61.1	34.8	61.1		
Actuated g/C Ratio	0.25	1.00	0.57	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	443	3539	2015	1583		
v/s Ratio Prot	c0.15	0.25	c0.37			
v/s Ratio Perm				0.35		
v/c Ratio	0.59	0.25	0.66	0.35		
Uniform Delay, d1	20.1	0.0	9.1	0.0		
Progression Factor	0.98	1.00	1.00	1.00		
Incremental Delay, d2	2.0	0.0	0.8	0.6		
Delay (s)	21.8	0.0	9.8	0.6		
Level of Service	C	A	A	A		
Approach Delay (s)		4.9	7.1		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	11.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	715	485	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	777	527	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	543				978	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	543				978	272
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	87
cM capacity (veh/h)	1022				241	726

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	389	389	351	192	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	1022	1700	1700	1700	1700	241	726
Volume to Capacity	0.03	0.23	0.23	0.21	0.11	0.09	0.13
Queue Length 95th (ft)	2	0	0	0	0	7	11
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	21.4	10.7
Lane LOS	A					C	B
Approach Delay (s)	0.3			0.0		12.7	
Approach LOS						B	

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		30.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	425	45	5	295	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	462	49	5	321	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332			511			957	1035	255	780	1054	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			511			957	1035	255	780	1054	166
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			85	100	99	100	100	89
cM capacity (veh/h)	1225			1051			176	210	744	264	204	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	103	308	203	5	214	118	33	0	92
Volume Left	103	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	1225	1700	1700	1051	1700	1700	202	1700	849
Volume to Capacity	0.08	0.18	0.12	0.01	0.13	0.07	0.16	0.00	0.11
Queue Length 95th (ft)	7	0	0	0	0	0	14	0	9
Control Delay (s)	8.2	0.0	0.0	8.4	0.0	0.0	26.2	0.0	9.8
Lane LOS	A			A			D	A	A
Approach Delay (s)	1.4			0.1			26.2	9.8	
Approach LOS							D	A	

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization		29.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	245	40	5	220	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	266	43	5	239	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	250			310			804	864	155	707	880	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			310			804	864	155	707	880	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			90	98	100	100	100	92
cM capacity (veh/h)	1313			1248			229	254	863	287	249	902

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	178	132	5	159	91	27	0	71
Volume Left	158	0	0	5	0	0	22	0	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	1313	1700	1700	1248	1700	1700	233	1700	902
Volume to Capacity	0.12	0.10	0.08	0.00	0.09	0.05	0.12	0.00	0.08
Queue Length 95th (ft)	10	0	0	0	0	0	10	0	6
Control Delay (s)	8.1	0.0	0.0	7.9	0.0	0.0	22.5	0.0	9.3
Lane LOS	A			A			C	A	A
Approach Delay (s)	2.7			0.2			22.5	9.3	
Approach LOS							C	A	

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		27.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	105	25	5	120	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	114	27	5	130	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	141			141			568	530	71	454	538	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			141			568	530	71	454	538	71
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			95	100	100	100	100	88
cM capacity (veh/h)	1439			1439			334	412	977	456	408	977

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	76	65	5	87	54	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	1439	1700	1700	1439	1700	1700	334	1700	977
Volume to Capacity	0.09	0.04	0.04	0.00	0.05	0.03	0.05	0.00	0.12
Queue Length 95th (ft)	7	0	0	0	0	0	4	0	10
Control Delay (s)	7.7	0.0	0.0	7.5	0.0	0.0	16.3	0.0	9.2
Lane LOS	A			A			C	A	A
Approach Delay (s)	3.6			0.3			16.3	9.2	
Approach LOS							C	A	

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization		23.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	70	30	95	15	25	35
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	33	103	16	27	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		220	168	185	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		220	168	185	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	95		84	98	96	96
cM capacity (veh/h)	1623		664	690	676	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	120	65
Volume Left	76	103	0
Volume Right	33	0	38
cSH	1623	667	867
Volume to Capacity	0.05	0.18	0.08
Queue Length 95th (ft)	4	16	6
Control Delay (s)	5.2	11.6	9.5
Lane LOS	A	B	A
Approach Delay (s)	5.2	11.6	9.5
Approach LOS		B	A

Intersection Summary			
Average Delay		8.8	
Intersection Capacity Utilization		25.1%	ICU Level of Service A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	440	0	475	365	530	455	665
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 78.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	440	0	475	365	530	0	0	455	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1551	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1551	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	0	516	397	576	0	0	495	723
RTOR Reduction (vph)	0	0	0	0	0	203	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	239	239	313	397	576	0	0	495	723
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				21.8	21.8	21.8	22.8	43.7			14.9	77.5
Effective Green, g (s)				21.8	21.8	21.8	22.8	43.7			14.9	77.5
Actuated g/C Ratio				0.28	0.28	0.28	0.29	0.56			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				472	472	436	520	1995			680	1583
v/s Ratio Prot							c0.22	0.16			c0.14	
v/s Ratio Perm				0.14	0.14	c0.20						0.46
v/c Ratio				0.51	0.51	0.72	0.76	0.29			0.73	0.46
Uniform Delay, d1				23.3	23.3	25.1	24.9	8.8			29.4	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.9	0.9	5.6	6.6	0.1			3.9	1.0
Delay (s)				24.2	24.2	30.6	31.5	8.9			33.3	1.0
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			27.5			18.1			14.1	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	77.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	5	360	450	225	585
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 98.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp 5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	385	5	360	0	0	0	0	450	255	225	585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1775	1563					3316		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1775	1563					3316		1770	3539	
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)	418	5	391	0	0	0	0	489	277	245	636	0
RTOR Reduction (vph)	0	0	228	0	0	0	0	62	0	0	0	0
Lane Group Flow (vph)	0	423	163	0	0	0	0	704	0	245	636	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.5	32.5					28.4		19.4	53.8	
Effective Green, g (s)		32.5	32.5					28.4		19.4	53.8	
Actuated g/C Ratio		0.33	0.33					0.29		0.20	0.55	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		586	516					958		349	1936	
v/s Ratio Prot								c0.21		c0.14	0.18	
v/s Ratio Perm		0.24	0.10									
v/c Ratio		0.72	0.32					0.74		0.70	0.33	
Uniform Delay, d1		28.9	24.6					31.6		36.8	12.3	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		4.4	0.4					3.0		6.3	0.1	
Delay (s)		33.3	24.9					34.5		43.0	12.4	
Level of Service		C	C					C		D	B	
Approach Delay (s)		29.3			0.0			34.5			20.9	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2035 AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	770	0	180	455	85	870	60
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	45.0	45.0	45.0	25.0	55.0	30.0	30.0
Total Split (%)	45.0%	45.0%	45.0%	25.0%	55.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	770	0	180	455	85	0	0	870	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	778	0	196	460	86	0	0	879	65
RTOR Reduction (vph)	0	0	0	0	0	115	0	0	0	0	0	49
Lane Group Flow (vph)	0	0	0	389	389	81	460	86	0	0	879	16
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				41.2	41.2	41.2	17.8	46.8			24.0	24.0
Effective Green, g (s)				41.2	41.2	41.2	17.8	46.8			24.0	24.0
Actuated g/C Ratio				0.41	0.41	0.41	0.18	0.47			0.24	0.24
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				692	692	652	611	871			849	379
v/s Ratio Prot				c0.23	0.23		c0.13	0.05			c0.25	
v/s Ratio Perm						0.05						0.01
v/c Ratio				0.56	0.56	0.12	0.75	0.10			1.04	0.04
Uniform Delay, d1				22.5	22.5	18.2	39.0	14.8			38.0	29.2
Progression Factor				1.00	1.00	1.00	0.80	1.82			1.00	1.00
Incremental Delay, d2				3.3	1.0	0.4	5.0	0.0			40.4	0.0
Delay (s)				25.8	23.5	18.6	36.3	27.1			78.4	29.2
Level of Service				C	C	B	D	C			E	C
Approach Delay (s)		0.0			23.4			34.9			75.0	
Approach LOS		A			C			C			E	

Intersection Summary			
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	485	570	915	425	1215
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	17.0		53.0		30.0	83.0
Total Split (%)	17.0%		53.0%		30.0%	83.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	5	485	0	0	0	0	570	915	425	1215	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1790	1583					3539	2787	1770	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	5	527	0	0	0	0	620	995	462	1321	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	527	0	0	0	0	620	995	462	1321	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		4.8	100.0					49.3	100.0	30.9	84.2	
Effective Green, g (s)		4.8	100.0					49.3	100.0	30.9	84.2	
Actuated g/C Ratio		0.05	1.00					0.49	1.00	0.31	0.84	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		85	1583					1744	2787	546	2979	
v/s Ratio Prot		0.02						0.18		c0.26	c0.37	
v/s Ratio Perm			0.33						c0.36			
v/c Ratio		0.32	0.33					0.36	0.36	0.85	0.44	
Uniform Delay, d1		46.0	0.0					15.6	0.0	32.3	2.0	
Progression Factor		1.00	1.00					1.00	1.00	1.55	0.46	
Incremental Delay, d2		2.2	0.6					0.6	0.4	7.7	0.3	
Delay (s)		48.2	0.6					16.2	0.4	57.9	1.2	
Level of Service		D	A					B	A	E	A	
Approach Delay (s)		2.9			0.0			6.4			15.9	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	625	40	125	195	55	150	1115	335	325	1125	250
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 141.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	625	40	125	195	55	150	1115	335	325	1125	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	451	679	43	136	212	60	163	1212	364	353	1223	272
RTOR Reduction (vph)	0	0	32	0	0	37	0	0	59	0	0	104
Lane Group Flow (vph)	451	679	11	136	212	23	163	1212	305	353	1223	168
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	20.5	34.9	34.9	12.3	26.7	53.5	17.5	50.2	68.5	20.8	53.5	80.0
Effective Green, g (s)	20.5	34.9	34.9	12.3	26.7	53.5	17.5	50.2	68.5	20.8	53.5	80.0
Actuated g/C Ratio	0.15	0.25	0.25	0.09	0.19	0.38	0.12	0.36	0.49	0.15	0.38	0.57
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	498	874	391	154	669	599	219	1807	767	505	1926	896
v/s Ratio Prot	c0.13	c0.19		0.08	0.06		0.09	c0.24		c0.10	c0.24	
v/s Ratio Perm			0.01			0.01			0.19			0.11
v/c Ratio	0.91	0.78	0.03	0.88	0.32	0.04	0.74	0.67	0.40	0.70	0.63	0.19
Uniform Delay, d1	59.4	49.5	40.3	63.7	49.4	27.6	59.7	38.5	23.2	57.2	35.9	14.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.9	4.4	0.0	40.4	0.3	0.0	12.8	1.0	0.3	4.2	0.7	0.1
Delay (s)	79.3	53.9	40.3	104.1	49.7	27.7	72.5	39.5	23.5	61.4	36.6	14.9
Level of Service	E	D	D	F	D	C	E	D	C	E	D	B
Approach Delay (s)		63.2			64.6			39.2			38.1	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	141.2	Sum of lost time (s)	23.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	215	255	245	1560	990	355
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Detector Phase	7	7 5	5	2	6	6 7
Switch Phase						
Minimum Initial (s)	4.0		4.0	30.0	30.0	
Minimum Split (s)	10.0		9.0	36.0	36.0	
Total Split (s)	37.0		30.0	83.0	53.0	
Total Split (%)	30.8%		25.0%	69.2%	44.2%	
Yellow Time (s)	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		5.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
Recall Mode	None		None	C-Max	C-Max	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	215	255	245	1560	990	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	3433	5085	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	277	266	1696	1076	386
RTOR Reduction (vph)	0	17	0	0	0	44
Lane Group Flow (vph)	234	260	266	1696	1076	342
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Actuated Green, G (s)	22.5	43.3	14.8	85.5	65.7	94.2
Effective Green, g (s)	22.5	43.3	14.8	85.5	65.7	94.2
Actuated g/C Ratio	0.19	0.36	0.12	0.71	0.55	0.79
Clearance Time (s)	6.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	643	571	423	3623	2784	1242
v/s Ratio Prot	0.07		c0.08	c0.33	0.21	
v/s Ratio Perm		c0.16				0.22
v/c Ratio	0.36	0.46	0.63	0.47	0.39	0.28
Uniform Delay, d1	42.5	29.3	50.0	7.4	15.6	3.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.6	2.9	0.4	0.4	0.1
Delay (s)	42.9	29.9	52.9	7.9	16.0	3.7
Level of Service	D	C	D	A	B	A
Approach Delay (s)	35.8			14.0	12.7	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/7/2014

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations								
Volume (vph)	40	550	1255	5	190	940	125	
Turn Type	Free	custom	NA	Perm	Prot	NA	Perm	
Protected Phases			2		1	6		3
Permitted Phases	Free	3 1		2			6	
Detector Phase		3 1	2	2	1	6	6	
Switch Phase								
Minimum Initial (s)			30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)			37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)			46.0	46.0	29.0	75.0	75.0	45.0
Total Split (%)			38.3%	38.3%	24.2%	62.5%	62.5%	38%
Yellow Time (s)			4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)			0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)			6.0	6.0	6.0	6.0	6.0	
Lead/Lag			Lag	Lag	Lead			
Lead-Lag Optimize?								
Recall Mode			Min	Min	None	Min	Min	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 104.4
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	0	0	550	0	1255	5	190	940	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	1770	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	0	0	598	0	1364	5	207	1022	136
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	3	0	0	57
Lane Group Flow (vph)	0	0	43	0	0	585	0	1364	2	207	1022	79
Turn Type			Free			custom		NA	Perm	Prot	NA	Perm
Protected Phases								2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			104.1			54.8		37.3	37.3	17.4	60.7	60.7
Effective Green, g (s)			104.1			54.8		37.3	37.3	17.4	60.7	60.7
Actuated g/C Ratio			1.00			0.53		0.36	0.36	0.17	0.58	0.58
Clearance Time (s)								6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)								3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611			848		1822	567	295	2965	923
v/s Ratio Prot								c0.27		0.12	0.20	
v/s Ratio Perm			0.03			c0.36			0.00			0.05
v/c Ratio			0.03			0.69		0.75	0.00	0.70	0.34	0.09
Uniform Delay, d1			0.0			18.3		29.3	21.5	40.9	11.3	9.5
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0			2.4		1.7	0.0	7.3	0.1	0.0
Delay (s)			0.0			20.8		31.0	21.5	48.2	11.4	9.6
Level of Service			A			C		C	C	D	B	A
Approach Delay (s)		0.0			20.8			31.0			16.8	
Approach LOS		A			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	104.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	130	215	495	185	505	185	635	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	20.0	54.0		15.0	49.0		19.0	52.0	19.0	52.0	
Total Split (%)	14.3%	38.6%		10.7%	35.0%		13.6%	37.1%	13.6%	37.1%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 114.2
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	130	215	495	185	505	10	185	635	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	5070		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	5070		3433	5085	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)	228	304	185	141	234	538	201	549	11	201	690	174
RTOR Reduction (vph)	0	0	35	0	0	60	0	1	0	0	0	94
Lane Group Flow (vph)	228	304	150	141	234	478	201	559	0	201	690	80
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	12.5	37.1	54.8	9.2	33.8	51.7	11.7	33.6		11.9	33.8	52.3
Effective Green, g (s)	12.5	37.1	54.8	9.2	33.8	51.7	11.7	33.6		11.9	33.8	52.3
Actuated g/C Ratio	0.11	0.33	0.48	0.08	0.30	0.45	0.10	0.30		0.10	0.30	0.46
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	377	607	762	277	553	719	352	1496		358	1510	727
v/s Ratio Prot	c0.07	c0.16		0.04	0.13		0.06	0.11		0.06	c0.14	
v/s Ratio Perm			0.09			c0.30						0.05
v/c Ratio	0.60	0.50	0.20	0.51	0.42	0.66	0.57	0.37		0.56	0.46	0.11
Uniform Delay, d1	48.3	30.9	16.9	50.1	32.2	24.3	48.7	31.8		48.5	32.5	17.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	0.7	0.1	1.5	0.5	2.3	2.2	0.2		2.0	0.2	0.1
Delay (s)	51.0	31.5	17.0	51.6	32.7	26.6	50.9	31.9		50.5	32.8	17.6
Level of Service	D	C	B	D	C	C	D	C		D	C	B
Approach Delay (s)		34.0			32.0			36.9			33.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	113.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	400	175	35	180	985	215	20	85	35	374	103	368
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	37.0	37.0	10.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	31.0	55.0	55.0	20.0	44.0		15.0	49.0		26.0	60.0	
Total Split (%)	20.7%	36.7%	36.7%	13.3%	29.3%		10.0%	32.7%		17.3%	40.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 133.8
Natural Cycle: 130
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	400	175	35	180	985	215	20	85	35	374	103	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	435	190	38	196	1071	234	22	92	38	407	112	400
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	23	0	0	113
Lane Group Flow (vph)	435	190	13	196	1071	234	22	92	15	407	112	287
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	22.1	45.3	45.3	12.6	35.8	61.5	4.5	34.5	53.1	19.7	49.7	77.8
Effective Green, g (s)	22.1	45.3	45.3	12.6	35.8	61.5	4.5	34.5	53.1	19.7	49.7	77.8
Actuated g/C Ratio	0.16	0.34	0.34	0.09	0.26	0.46	0.03	0.26	0.39	0.15	0.37	0.58
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	561	1186	530	320	1347	1268	58	903	622	500	1301	1604
v/s Ratio Prot	c0.13	0.05		0.06	c0.21	0.08	0.01	0.03		c0.12	0.03	c0.10
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.78	0.16	0.02	0.61	0.80	0.18	0.38	0.10	0.02	0.81	0.09	0.18
Uniform Delay, d1	54.1	31.5	30.1	58.9	46.2	21.9	63.9	38.5	25.1	55.9	27.9	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	0.1	0.0	3.5	3.3	0.1	4.1	0.0	0.0	9.8	0.0	0.1
Delay (s)	60.8	31.6	30.1	62.4	49.6	22.0	68.0	38.5	25.1	65.7	27.9	13.6
Level of Service	E	C	C	E	D	C	E	D	C	E	C	B
Approach Delay (s)		50.6			46.9			39.4			38.4	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	135.1	Sum of lost time (s)	23.0	
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/7/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	365	5	75	10	1515	40	865
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	14.0	52.0	16.0	54.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	12.7%	47.3%	14.5%	49.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	365	5	75	10	1515	195	40	865	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1687	1583	1770	3479		1770	3536	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1687	1583	1770	3479		1770	3536	
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	0	5	397	5	82	11	1647	212	43	940	5
RTOR Reduction (vph)	0	5	0	0	0	67	0	7	0	0	0	0
Lane Group Flow (vph)	0	0	0	202	200	15	11	1852	0	43	945	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		19.5	19.5	19.5	1.5	64.0		5.7	68.2	
Effective Green, g (s)		0.8		19.5	19.5	19.5	1.5	64.0		5.7	68.2	
Actuated g/C Ratio		0.01		0.18	0.18	0.18	0.01	0.58		0.05	0.62	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		297	299	280	24	2024		91	2192	
v/s Ratio Prot		c0.00		c0.12	0.12		0.01	c0.53		c0.02	c0.27	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.68	0.67	0.05	0.46	0.92		0.47	0.43	
Uniform Delay, d1		54.2		42.3	42.2	37.6	53.8	20.6		50.7	10.8	
Progression Factor		1.00		1.00	1.00	1.00	1.39	0.46		1.00	1.00	
Incremental Delay, d2		0.1		6.3	5.6	0.1	8.4	5.2		3.8	0.6	
Delay (s)		54.3		48.6	47.8	37.7	83.1	14.7		54.5	11.5	
Level of Service		D		D	D	D	F	B		D	B	
Approach Delay (s)		54.3			46.4			15.1			13.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/7/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	500	25	1735	400	1260
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	33.0	33.0	77.0	77.0	77.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	500	25	1735	400	0	1260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	543	27	1886	435	0	1370
RTOR Reduction (vph)	0	16	0	136	0	0
Lane Group Flow (vph)	543	11	1886	299	0	1370
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.4	22.4	75.6	75.6		75.6
Effective Green, g (s)	22.4	22.4	75.6	75.6		75.6
Actuated g/C Ratio	0.20	0.20	0.69	0.69		0.69
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	699	322	2432	1087		2432
v/s Ratio Prot	c0.16		c0.53			0.39
v/s Ratio Perm		0.01		0.19		
v/c Ratio	0.78	0.03	0.78	0.28		0.56
Uniform Delay, d1	41.4	35.1	11.5	6.6		8.8
Progression Factor	1.00	1.00	1.00	1.00		1.03
Incremental Delay, d2	5.4	0.0	2.5	0.6		0.9
Delay (s)	46.9	35.2	14.0	7.3		10.0
Level of Service	D	D	B	A		A
Approach Delay (s)	46.3		12.7			10.0
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/7/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1965	1285	545	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2136	1397	592	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.79				0.79	0.79
vC, conflicting volume	1989				2405	995
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1722				2248	464
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	287				28	431

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	712	712	712	931	1058
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	592
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.42	0.42	0.42	0.55	0.62
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		56.3%	ICU Level of Service B
Analysis Period (min)		15	

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	165	1965	1285
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 62.7
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	165	1965	1285	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	179	2136	1397	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	179	2136	1397	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			11.8	62.7	38.9	
Effective Green, g (s)			11.8	62.7	38.9	
Actuated g/C Ratio			0.19	1.00	0.62	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			333	5085	2195	
v/s Ratio Prot			0.10	c0.42	c0.39	
v/s Ratio Perm						
v/c Ratio			0.54	0.42	0.64	
Uniform Delay, d1			23.0	0.0	7.5	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			1.7	0.1	0.6	
Delay (s)			24.7	0.1	8.1	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.0	8.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: H-1 WB Off-Ramp & H-1 WB Lp Off-Ramp & Kunia Rd

5/7/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	535	150	980	625	2075
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 126
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	535	0	150	0	0	0	0	980	0	625	2075	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	582	0	163	0	0	0	0	1065	0	679	2255	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	582	0	163	0	0	0	0	1065	0	679	2255	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	27.3		125.7					48.4		32.0	86.4	
Effective Green, g (s)	27.3		125.7					48.4		32.0	86.4	
Actuated g/C Ratio	0.22		1.00					0.39		0.25	0.69	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	745		1583					1362		873	3495	
v/s Ratio Prot	c0.17							c0.30		c0.20	0.44	
v/s Ratio Perm			0.10									
v/c Ratio	0.78		0.10					0.78		0.78	0.65	
Uniform Delay, d1	46.4		0.0					34.0		43.5	11.0	
Progression Factor	1.00		1.00					1.00		0.99	0.99	
Incremental Delay, d2	5.3		0.1					3.0		4.4	0.4	
Delay (s)	51.7		0.1					37.0		47.3	11.3	
Level of Service	D		A					D		D	B	
Approach Delay (s)		40.4			0.0			37.0			19.6	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	125.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/7/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2305	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2305	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2505	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2505	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.71			
v/s Ratio Perm						
v/c Ratio			0.79			
Uniform Delay, d1			2.7			
Progression Factor			1.00			
Incremental Delay, d2			2.1			
Delay (s)			4.7			
Level of Service			A			
Approach Delay (s)	0.0		4.7		0.0	
Approach LOS	A		A		A	

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/7/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	980	2305	0	2225	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1065	2505	0	2418	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.74	
vC, conflicting volume			3571		1871	533
vC1, stage 1 conf vol					1065	
vC2, stage 2 conf vol					806	
vCu, unblocked vol			3571		945	533
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			66		253	492

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	533	533	1253	1253	806	806	806
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1253	1253	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.31	0.74	0.74	0.47	0.47	0.47
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	145	2995	125	0	2225
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.99
Hourly flow rate (vph)	0	158	3255	136	0	2247
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.75					
vC, conflicting volume	4007	1087			3257	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3841	1087			3257	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	25			100	
cM capacity (veh/h)	2	211			89	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	158	1085	1085	1085	136	749	749	749
Volume Left	0	0	0	0	0	0	0	0
Volume Right	158	0	0	0	136	0	0	0
cSH	211	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.75	0.64	0.64	0.64	0.08	0.44	0.44	0.44
Queue Length 95th (ft)	126	0	0	0	0	0	0	0
Control Delay (s)	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F							
Approach Delay (s)	60.0	0.0				0.0		
Approach LOS	F							

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	20	35	135	5	165	65	3075	30	40	1760	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	35	20	135	5	165	65	3075	30	40	1760	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1736		1728	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1736		1271	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	22	38	22	147	5	179	71	3237	33	43	1778	109
RTOR Reduction (vph)	0	9	0	0	0	14	0	0	9	0	0	31
Lane Group Flow (vph)	22	51	0	147	5	165	71	3237	24	43	1778	78
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Effective Green, g (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.05	0.72	0.72	0.05	0.71	0.71
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	267		195	287	357	92	3661	1110	82	3633	1072
v/s Ratio Prot		0.03			0.00		c0.04	c0.64		0.02	0.35	
v/s Ratio Perm	0.02			c0.12		0.10			0.02			0.05
v/c Ratio	0.10	0.19		0.75	0.02	0.46	0.77	0.88	0.02	0.52	0.49	0.07
Uniform Delay, d1	87.2	88.4		97.1	86.1	80.3	112.3	25.9	9.6	111.8	15.0	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.30	0.26	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3		15.2	0.0	1.0	15.3	1.5	0.0	5.9	0.5	0.1
Delay (s)	87.4	88.8		112.3	86.1	81.3	161.7	8.3	9.6	117.7	15.5	10.4
Level of Service	F	F		F	F	F	F	A	A	F	B	B
Approach Delay (s)		88.4			95.1			11.6			17.5	
Approach LOS		F			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	150	80	190	15	150	45	3025	45	45	1825	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0	47.0	10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	20.0	173.0	173.0	20.0	173.0	173.0
Total Split (%)	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	8.3%	72.1%	72.1%	8.3%	72.1%	72.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 163 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	150	80	190	15	150	45	3025	45	45	1825	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1860	1540		1763	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.95	1.00		0.41	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1776	1540		747	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	163	87	207	16	163	49	3288	49	49	1843	5
RTOR Reduction (vph)	0	0	70	0	0	71	0	0	14	0	0	1
Lane Group Flow (vph)	0	168	17	0	223	92	49	3288	35	49	1843	4
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		41.0	41.0		41.0	41.0	11.5	168.5	168.5	11.5	168.5	168.5
Effective Green, g (s)		41.0	41.0		41.0	41.0	11.5	168.5	168.5	11.5	168.5	168.5
Actuated g/C Ratio		0.17	0.17		0.17	0.17	0.05	0.70	0.70	0.05	0.70	0.70
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		303	263		127	270	84	3570	1083	84	3570	1082
v/s Ratio Prot							c0.03	c0.65		0.03	0.36	
v/s Ratio Perm		0.09	0.01		c0.30	0.06			0.02			0.00
v/c Ratio		0.55	0.07		1.76	0.34	0.58	0.92	0.03	0.58	0.52	0.00
Uniform Delay, d1		91.1	83.4		99.5	87.6	111.9	30.1	10.9	111.9	16.7	10.7
Progression Factor		1.00	1.00		1.00	1.00	0.92	1.16	2.84	0.89	1.57	1.00
Incremental Delay, d2		2.2	0.1		370.4	0.8	5.0	2.7	0.0	8.8	0.5	0.0
Delay (s)		93.3	83.5		469.9	88.3	108.1	37.6	31.0	107.9	26.6	10.7
Level of Service		F	F		F	F	F	D	C	F	C	B
Approach Delay (s)		90.0			308.8			38.5			28.7	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3315	2020	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 52 (43%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3315	2020	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3603	2040	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3603	2040	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.71	0.40	
v/s Ratio Perm						
v/c Ratio				0.92	0.52	
Uniform Delay, d1				10.9	5.3	
Progression Factor				2.00	1.88	
Incremental Delay, d2				2.2	0.4	
Delay (s)				24.0	10.4	
Level of Service				C	B	
Approach Delay (s)	0.0			24.0	10.4	
Approach LOS	A			C	B	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	210	10	5	360	3005	15	5	1715	480
Turn Type	Split	NA	custom	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3 1			2 3			6 4
Detector Phase	4	4	4 5	3	3 1	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0		11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0		46.0	166.0		11.0	131.0	
Total Split (%)	20.4%	20.4%		5.8%		19.2%	69.2%		4.6%	54.6%	
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 163 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	210	10	10	5	360	3005	15	5	1715	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
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)	440	11	228	11	11	5	391	3266	16	5	1864	522
RTOR Reduction (vph)	0	0	30	0	0	5	0	0	4	0	0	56
Lane Group Flow (vph)	224	227	198	0	22	0	391	3266	12	5	1864	466
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3 1			2 3			6 4
Actuated Green, G (s)	40.6	40.6	92.3		5.9	7.9	45.7	166.5	179.4	2.0	122.8	163.4
Effective Green, g (s)	40.6	40.6	92.3		5.9	7.9	45.7	166.5	179.4	2.0	122.8	163.4
Actuated g/C Ratio	0.17	0.17	0.38		0.02	0.03	0.19	0.69	0.75	0.01	0.51	0.68
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0		2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	284	285	559		44	52	337	3527	1074	14	2601	929
v/s Ratio Prot	0.13	c0.13			c0.01		c0.22	c0.64		0.00	0.37	
v/s Ratio Perm			0.14			0.00			0.01			0.34
v/c Ratio	0.79	0.80	0.35		0.50	0.00	1.16	0.93	0.01	0.36	0.72	0.50
Uniform Delay, d1	95.6	95.7	52.6		115.6	112.2	97.2	31.5	7.7	118.4	45.2	18.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.88	1.36	1.00	0.96	1.03	1.39
Incremental Delay, d2	13.5	14.2	0.4		3.2	0.0	88.1	3.0	0.0	5.2	1.6	0.4
Delay (s)	109.1	110.0	53.0		118.8	112.3	173.2	45.7	7.7	118.6	48.1	26.3
Level of Service	F	F	D		F	F	F	D	A	F	D	C
Approach Delay (s)		90.6			117.6			59.1			43.5	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	57.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	117.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	485	45	45	85	515	40	2140	5	350	1460	75
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	57.0	57.0		35.0		20.0	113.0	113.0	35.0	128.0	128.0
Total Split (%)	23.8%	23.8%		14.6%		8.3%	47.1%	47.1%	14.6%	53.3%	53.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 188 (78%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	45	45	15	85	515	40	2140	5	350	1460	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	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)	527	49	49	16	92	560	43	2326	5	380	1587	82
RTOR Reduction (vph)	0	0	38	0	0	33	0	0	3	0	0	38
Lane Group Flow (vph)	285	291	11	0	108	527	43	2326	2	380	1587	44
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	45.3	45.3	56.2		29.0	63.7	10.9	112.0	112.0	28.7	129.8	129.8
Effective Green, g (s)	45.3	45.3	56.2		29.0	63.7	10.9	112.0	112.0	28.7	129.8	129.8
Actuated g/C Ratio	0.19	0.19	0.23		0.12	0.27	0.05	0.47	0.47	0.12	0.54	0.54
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	320	370		223	739	80	2373	738	410	2750	856
v/s Ratio Prot	0.17	c0.17			0.06		0.02	c0.46		c0.11	0.31	
v/s Ratio Perm			0.01			c0.19			0.00			0.03
v/c Ratio	0.90	0.91	0.03		0.48	0.71	0.54	0.98	0.00	0.93	0.58	0.05
Uniform Delay, d1	95.1	95.3	70.9		98.5	79.9	112.1	62.9	34.2	104.6	36.8	26.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.70	1.00	1.42	0.39	0.16
Incremental Delay, d2	26.4	28.1	0.0		1.7	3.3	5.3	12.3	0.0	21.5	0.7	0.1
Delay (s)	121.5	123.4	70.9		100.2	83.1	117.9	56.5	34.2	170.0	15.1	4.3
Level of Service	F	F	E		F	F	F	E	C	F	B	A
Approach Delay (s)		118.4			85.9			57.6			43.4	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	62.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1530	65	220	1175	170
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6 3
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	
Total Split (s)	47.0	47.0		52.0	52.0	52.0	25.0	113.0		28.0	116.0	
Total Split (%)	19.6%	19.6%		21.7%	21.7%	21.7%	10.4%	47.1%		11.7%	48.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 163 (68%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1530	65	220	1175	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	353	212	223	125	304	364	179	1663	71	239	1187	185
RTOR Reduction (vph)	0	0	51	0	0	33	0	0	23	0	0	35
Lane Group Flow (vph)	184	381	172	125	304	331	179	1663	48	239	1187	150
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Actuated Green, G (s)	33.1	33.1	49.5	42.2	42.2	62.1	16.4	119.8	162.0	19.9	123.3	163.4
Effective Green, g (s)	33.1	33.1	49.5	42.2	42.2	62.1	16.4	119.8	162.0	19.9	123.3	163.4
Actuated g/C Ratio	0.14	0.14	0.21	0.18	0.18	0.26	0.07	0.50	0.68	0.08	0.51	0.68
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	222	457	326	311	327	790	234	2538	1068	284	2612	1077
v/s Ratio Prot	0.11	c0.11		0.07	c0.16	0.07	0.05	c0.33		c0.07	c0.23	
v/s Ratio Perm			0.11			0.05			0.03			0.09
v/c Ratio	0.83	0.83	0.53	0.40	0.93	0.42	0.76	0.66	0.04	0.84	0.45	0.14
Uniform Delay, d1	100.7	100.8	84.8	87.7	97.4	73.9	109.9	44.7	13.1	108.5	37.0	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	1.57	1.21
Incremental Delay, d2	20.9	11.8	0.7	0.3	31.3	0.1	12.5	1.3	0.0	16.3	0.5	0.0
Delay (s)	121.6	112.6	85.6	88.0	128.7	74.1	122.4	46.1	13.1	111.4	58.6	16.3
Level of Service	F	F	F	F	F	E	F	D	B	F	E	B
Approach Delay (s)		107.0			97.2			52.0			61.6	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	70.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	975	50	10	465	35	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1060	54	11	505	38	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1114		1361	557
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1114		1361	557
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		72	99
cM capacity (veh/h)			623		137	474

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	707	408	179	337	43
Volume Left	0	0	11	0	38
Volume Right	0	54	0	0	5
cSH	1700	1700	623	1700	150
Volume to Capacity	0.42	0.24	0.02	0.20	0.29
Queue Length 95th (ft)	0	0	1	0	28
Control Delay (s)	0.0	0.0	0.9	0.0	38.5
Lane LOS			A		E
Approach Delay (s)	0.0		0.3		38.5
Approach LOS					E

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	875	0	60	485	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	951	0	65	527	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			951		1345	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			951		1345	476
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	92
cM capacity (veh/h)			718		130	536

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	476	476	241	351	43
Volume Left	0	0	65	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	718	1700	536
Volume to Capacity	0.28	0.28	0.09	0.21	0.08
Queue Length 95th (ft)	0	0	7	0	7
Control Delay (s)	0.0	0.0	3.6	0.0	12.3
Lane LOS			A		B
Approach Delay (s)	0.0		1.5		12.3
Approach LOS					B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay		7.2	
Level of Service		A	
Intersection Capacity Utilization		19.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	840	20	0	515	0	0	0	0	0	0	30
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	913	22	0	560	0	0	0	0	0	0	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	560			935			1236	1484	467	1016	1495	280
vC1, stage 1 conf vol							924	924		560	560	
vC2, stage 2 conf vol							312	560		457	935	
vCu, unblocked vol	560			935			1236	1484	467	1016	1495	280
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	95
cM capacity (veh/h)	1007			728			229	242	542	322	239	717

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	609	326	280	280	33
Volume Left	0	0	0	0	0
Volume Right	0	22	0	0	33
cSH	1700	1700	1700	1700	717
Volume to Capacity	0.36	0.19	0.16	0.16	0.05
Queue Length 95th (ft)	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	10.3
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.3
Approach LOS					B

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		27.2%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	840	385	515
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 58.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	840	0	385	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	913	0	418	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	913	0	418	560	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	26.4		20.3	58.7		
Effective Green, g (s)	26.4		20.3	58.7		
Actuated g/C Ratio	0.45		0.35	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1591		612	3539		
v/s Ratio Prot	c0.26		c0.24	0.16		
v/s Ratio Perm						
v/c Ratio	0.57		0.68	0.16		
Uniform Delay, d1	12.0		16.4	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.5		3.1	0.0		
Delay (s)	12.5		19.6	0.0		
Level of Service	B		B	A		
Approach Delay (s)	12.5			8.4	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	340	1220	825	210
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 50.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	340	1220	825	210	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	1326	897	228	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	370	1326	897	228	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	16.2	50.4	23.2	50.4		
Effective Green, g (s)	16.2	50.4	23.2	50.4		
Actuated g/C Ratio	0.32	1.00	0.46	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	568	3539	1629	1583		
v/s Ratio Prot	c0.21	0.37	c0.25			
v/s Ratio Perm				0.14		
v/c Ratio	0.65	0.37	0.55	0.14		
Uniform Delay, d1	14.7	0.0	9.8	0.0		
Progression Factor	0.99	1.00	1.00	1.00		
Incremental Delay, d2	2.7	0.1	0.4	0.2		
Delay (s)	17.2	0.1	10.2	0.2		
Level of Service	B	A	B	A		
Approach Delay (s)		3.8	8.2		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	11.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	425	810	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	462	880	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	902				1274	451
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	902				1274	451
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				81	95
cM capacity (veh/h)	749				143	556

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	231	231	587	315	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	749	1700	1700	1700	1700	143	556
Volume to Capacity	0.10	0.14	0.14	0.35	0.19	0.19	0.05
Queue Length 95th (ft)	8	0	0	0	0	17	4
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	36.1	11.8
Lane LOS	B					E	B
Approach Delay (s)	1.5			0.0		23.9	
Approach LOS						C	

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization		40.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	265	15	0	405	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	288	16	0	440	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	440			304			929	899	152	758	908	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440			304			929	899	152	758	908	220
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			77	96	99	100	100	68
cM capacity (veh/h)	1116			1253			143	257	867	269	254	784

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	192	112	0	293	147	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	1116	1700	1700	1700	1700	1700	177	1700	784
Volume to Capacity	0.07	0.11	0.07	0.00	0.17	0.09	0.28	0.00	0.32
Queue Length 95th (ft)	6	0	0	0	0	0	27	0	34
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	33.0	0.0	11.7
Lane LOS	A						D	A	B
Approach Delay (s)	1.8			0.0			33.0	11.7	
Approach LOS							D	B	

Intersection Summary			
Average Delay		4.7	
Intersection Capacity Utilization		38.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	145	10	0	240	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	158	11	0	261	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	261			168			690	674	84	598	679	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261			168			690	674	84	598	679	130
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			89	95	100	100	100	84
cM capacity (veh/h)	1301			1407			257	339	958	345	336	895

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	105	63	0	174	87	43	0	147
Volume Left	125	0	0	0	0	0	27	0	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	1301	1700	1700	1700	1700	1700	282	1700	895
Volume to Capacity	0.10	0.06	0.04	0.00	0.10	0.05	0.15	0.00	0.16
Queue Length 95th (ft)	8	0	0	0	0	0	13	0	15
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	20.1	0.0	9.8
Lane LOS	A						C	A	A
Approach Delay (s)	3.4			0.0			20.1	9.8	
Approach LOS							C	A	

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		28.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	45	5	0	115	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	49	5	0	125	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	130			54			429	378	27	353	378	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			54			429	378	27	353	378	65
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	98	100	100	100	88
cM capacity (veh/h)	1453			1549			425	515	1042	539	515	985

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	33	22	0	83	47	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1453	1700	1700	1700	1700	1700	451	1700	985
Volume to Capacity	0.07	0.02	0.01	0.00	0.05	0.03	0.07	0.00	0.12
Queue Length 95th (ft)	5	0	0	0	0	0	6	0	10
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	13.6	0.0	9.2
Lane LOS	A						B	A	A
Approach Delay (s)	4.9			0.0			13.6	9.2	
Approach LOS							B	A	

Intersection Summary			
Average Delay		5.3	
Intersection Capacity Utilization		23.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	5	40	50	10	80
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	5	43	54	11	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		182	90	92	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		182	90	92	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	97		94	93	99	92
cM capacity (veh/h)	1623		695	779	776	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	98	98
Volume Left	43	43	0
Volume Right	5	0	87
cSH	1623	739	1039
Volume to Capacity	0.03	0.13	0.09
Queue Length 95th (ft)	2	11	8
Control Delay (s)	6.5	10.6	8.8
Lane LOS	A	B	A
Approach Delay (s)	6.5	10.6	8.8
Approach LOS		B	A

Intersection Summary			
Average Delay		9.1	
Intersection Capacity Utilization		21.5%	ICU Level of Service A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	460	0	200	325	730	335	625
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 68.7
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	460	0	200	325	730	0	0	335	625
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1552	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1552	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	500	0	217	353	793	0	0	364	679
RTOR Reduction (vph)	0	0	0	0	0	123	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	250	250	94	353	793	0	0	364	679
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				18.0	18.0	18.0	19.5	38.0			12.5	68.0
Effective Green, g (s)				18.0	18.0	18.0	19.5	38.0			12.5	68.0
Actuated g/C Ratio				0.26	0.26	0.26	0.29	0.56			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				444	444	410	507	1977			650	1583
v/s Ratio Prot							c0.20	0.22			0.10	
v/s Ratio Perm				0.15	0.15	0.06						c0.43
v/c Ratio				0.56	0.56	0.23	0.70	0.40			0.56	0.43
Uniform Delay, d1				21.6	21.6	19.6	21.6	8.5			25.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.6	1.6	0.3	4.1	0.1			1.1	0.9
Delay (s)				23.2	23.2	19.9	25.7	8.7			26.4	0.9
Level of Service				C	C	B	C	A			C	A
Approach Delay (s)		0.0			22.2			13.9			9.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	80	515	355	240	605
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	66.0	66.0	42.0	32.0	74.0
Total Split (%)	47.1%	47.1%	30.0%	22.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 129
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	80	515	0	0	0	0	355	335	240	605	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1784	1563					3234		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1784	1563					3234		1770	3539	
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)	647	87	560	0	0	0	0	386	364	261	658	0
RTOR Reduction (vph)	0	0	103	0	0	0	0	125	0	0	0	0
Lane Group Flow (vph)	0	734	457	0	0	0	0	625	0	261	658	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		57.3	57.3					30.6		22.9	59.5	
Effective Green, g (s)		57.3	57.3					30.6		22.9	59.5	
Actuated g/C Ratio		0.44	0.44					0.24		0.18	0.46	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		793	695					768		314	1634	
v/s Ratio Prot								c0.19		c0.15	0.19	
v/s Ratio Perm		0.41	0.29									
v/c Ratio		0.93	0.66					0.81		0.83	0.40	
Uniform Delay, d1		33.7	28.1					46.4		51.1	22.9	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		16.5	2.3					6.6		16.8	0.2	
Delay (s)		50.2	30.3					53.0		67.9	23.1	
Level of Service		D	C					D		E	C	
Approach Delay (s)		41.6			0.0			53.0			35.8	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	128.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2035 PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1180	5	315	425	110	255	145
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	49.0	49.0	49.0	23.0	51.0	28.0	28.0
Total Split (%)	49.0%	49.0%	49.0%	23.0%	51.0%	28.0%	28.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1180	5	315	425	110	0	0	255	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1192	5	342	429	111	0	0	258	158
RTOR Reduction (vph)	0	0	0	0	0	181	0	0	0	0	0	127
Lane Group Flow (vph)	0	0	0	596	601	161	429	111	0	0	258	31
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				47.1	47.1	47.1	16.5	40.9			19.4	19.4
Effective Green, g (s)				47.1	47.1	47.1	16.5	40.9			19.4	19.4
Actuated g/C Ratio				0.47	0.47	0.47	0.16	0.41			0.19	0.19
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				791	794	745	566	761			686	307
v/s Ratio Prot				0.35	c0.36		c0.12	0.06			c0.07	
v/s Ratio Perm						0.10						0.02
v/c Ratio				0.75	0.76	0.22	0.76	0.15			0.38	0.10
Uniform Delay, d1				21.7	21.7	15.6	39.8	18.6			35.0	33.1
Progression Factor				1.00	1.00	1.00	1.15	1.43			1.00	1.00
Incremental Delay, d2				6.6	4.1	0.7	5.6	0.1			0.3	0.1
Delay (s)				28.3	25.9	16.2	51.4	26.6			35.4	33.3
Level of Service				C	C	B	D	C			D	C
Approach Delay (s)		0.0			24.7			46.3			34.6	
Approach LOS		A			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	450	440	880	95	1340
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	9.0		36.0		8.0	36.0
Total Split (s)	25.0		59.0		16.0	75.0
Total Split (%)	25.0%		59.0%		16.0%	75.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	450	0	0	0	0	440	880	95	1340	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1780	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1780	1583					3539	2787	1770	3539	
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)	158	11	489	0	0	0	0	478	957	103	1457	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	169	489	0	0	0	0	478	957	103	1457	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		14.7	100.0					61.3	100.0	9.0	74.3	
Effective Green, g (s)		14.7	100.0					61.3	100.0	9.0	74.3	
Actuated g/C Ratio		0.15	1.00					0.61	1.00	0.09	0.74	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		261	1583					2169	2787	159	2629	
v/s Ratio Prot		c0.09						0.14		c0.06	c0.41	
v/s Ratio Perm			0.31						0.34			
v/c Ratio		0.65	0.31					0.22	0.34	0.65	0.55	
Uniform Delay, d1		40.2	0.0					8.7	0.0	44.0	5.6	
Progression Factor		1.00	1.00					1.00	1.00	1.12	0.85	
Incremental Delay, d2		5.4	0.5					0.2	0.3	6.9	0.7	
Delay (s)		45.6	0.5					8.9	0.3	56.3	5.4	
Level of Service		D	A					A	A	E	A	
Approach Delay (s)		12.1			0.0			3.2			8.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	270	35	190	410	95	30	915	340	95	1325	370
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 133.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	270	35	190	410	95	30	915	340	95	1325	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	446	293	38	207	446	103	33	995	370	103	1440	402
RTOR Reduction (vph)	0	0	29	0	0	64	0	0	163	0	0	92
Lane Group Flow (vph)	446	293	9	207	446	39	33	995	207	103	1440	310
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	20.8	32.1	32.1	12.5	23.8	39.7	6.7	56.8	75.3	9.9	60.0	86.8
Effective Green, g (s)	20.8	32.1	32.1	12.5	23.8	39.7	6.7	56.8	75.3	9.9	60.0	86.8
Actuated g/C Ratio	0.15	0.24	0.24	0.09	0.18	0.30	0.05	0.42	0.56	0.07	0.45	0.65
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	531	845	378	164	627	467	88	2150	887	253	2271	1023
v/s Ratio Prot	c0.13	0.08		c0.12	c0.13		0.02	0.20		c0.03	c0.28	
v/s Ratio Perm			0.01			0.02			0.13			0.20
v/c Ratio	0.84	0.35	0.02	1.26	0.71	0.08	0.38	0.46	0.23	0.41	0.63	0.30
Uniform Delay, d1	55.1	42.4	39.1	60.9	52.0	34.2	61.8	27.8	14.9	59.4	28.7	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	0.2	0.0	157.6	3.8	0.1	2.7	0.2	0.1	1.1	0.6	0.2
Delay (s)	66.3	42.6	39.1	218.5	55.8	34.2	64.4	28.0	15.1	60.5	29.3	10.6
Level of Service	E	D	D	F	E	C	E	C	B	E	C	B
Approach Delay (s)		56.1			97.4			25.4			27.1	
Approach LOS		E			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	42.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	134.3	Sum of lost time (s)	23.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	325	545	305	905	1320	340
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Detector Phase	7	7 5	5	2	6	6 7
Switch Phase						
Minimum Initial (s)	4.0		4.0	30.0	30.0	
Minimum Split (s)	10.0		9.0	36.0	36.0	
Total Split (s)	37.0		30.0	83.0	53.0	
Total Split (%)	30.8%		25.0%	69.2%	44.2%	
Yellow Time (s)	4.0		3.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		5.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
Recall Mode	None		None	C-Max	C-Max	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 57 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	325	545	305	905	1320	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	3433	5085	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	592	332	984	1435	370
RTOR Reduction (vph)	0	4	0	0	0	34
Lane Group Flow (vph)	353	588	332	984	1435	336
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		7 5				6 7
Actuated Green, G (s)	31.0	56.5	19.5	77.0	52.5	89.5
Effective Green, g (s)	31.0	56.5	19.5	77.0	52.5	89.5
Actuated g/C Ratio	0.26	0.47	0.16	0.64	0.44	0.75
Clearance Time (s)	6.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	886	745	557	3262	2224	1180
v/s Ratio Prot	0.10		0.10	0.19	c0.28	
v/s Ratio Perm		c0.37				0.21
v/c Ratio	0.40	0.79	0.60	0.30	0.65	0.28
Uniform Delay, d1	36.8	26.7	46.6	9.6	26.5	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	5.6	1.7	0.2	1.5	0.1
Delay (s)	37.1	32.3	48.3	9.8	27.9	5.1
Level of Service	D	C	D	A	C	A
Approach Delay (s)	34.1			19.5	23.2	
Approach LOS	C			B	C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/7/2014

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations								
Volume (vph)	100	305	905	115	505	1255	105	
Turn Type	Free	custom	NA	Perm	Prot	NA	Perm	
Protected Phases			2		1	6		3
Permitted Phases	Free	3 1		2			6	
Detector Phase		3 1	2	2	1	6	6	
Switch Phase								
Minimum Initial (s)			30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)			37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)			57.0	57.0	98.0	155.0	155.0	25.0
Total Split (%)			31.7%	31.7%	54.4%	86.1%	86.1%	14%
Yellow Time (s)			4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)			0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)			6.0	6.0	6.0	6.0	6.0	
Lead/Lag			Lag	Lag	Lead			
Lead-Lag Optimize?								
Recall Mode			None	None	None	None	None	None

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 109.4
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	0	0	305	0	905	115	505	1255	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	1770	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	0	0	332	0	984	125	549	1364	114
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	85	0	0	29
Lane Group Flow (vph)	0	0	109	0	0	324	0	984	40	549	1364	85
Turn Type			Free			custom		NA	Perm	Prot	NA	Perm
Protected Phases								2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			108.9			62.0		34.9	34.9	39.9	80.8	80.8
Effective Green, g (s)			108.9			62.0		34.9	34.9	39.9	80.8	80.8
Actuated g/C Ratio			1.00			0.57		0.32	0.32	0.37	0.74	0.74
Clearance Time (s)								6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)								3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611			917		1629	507	648	3772	1174
v/s Ratio Prot								c0.19		c0.31	0.27	
v/s Ratio Perm			0.07			c0.20			0.03			0.05
v/c Ratio			0.07			0.35		0.60	0.08	0.85	0.36	0.07
Uniform Delay, d1			0.0			12.6		31.2	25.8	31.7	5.0	3.8
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1			0.2		0.6	0.1	10.0	0.1	0.0
Delay (s)			0.1			12.9		31.8	25.9	41.7	5.0	3.9
Level of Service			A			B		C	C	D	A	A
Approach Delay (s)		0.1			12.9			31.1			14.9	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	108.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	130	280	215	255	445	325	700	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	40.0	9.0	40.0	
Total Split (s)	26.0	54.0		15.0	43.0		23.0	43.0	28.0	48.0	
Total Split (%)	18.6%	38.6%		10.7%	30.7%		16.4%	30.7%	20.0%	34.3%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 120
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	130	280	215	255	445	205	325	700	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4845		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4845		3433	5085	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)	304	228	310	141	304	234	277	484	223	353	761	359
RTOR Reduction (vph)	0	0	32	0	0	56	0	58	0	0	0	94
Lane Group Flow (vph)	304	228	278	141	304	178	277	649	0	353	761	265
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	16.1	36.9	57.6	9.3	30.1	53.7	14.7	33.7		17.6	36.6	58.7
Effective Green, g (s)	16.1	36.9	57.6	9.3	30.1	53.7	14.7	33.7		17.6	36.6	58.7
Actuated g/C Ratio	0.13	0.31	0.48	0.08	0.25	0.45	0.12	0.28		0.15	0.31	0.49
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	462	575	763	267	469	711	422	1366		505	1557	777
v/s Ratio Prot	c0.09	0.12		0.04	c0.16		0.08	0.13		c0.10	c0.15	
v/s Ratio Perm			0.18			0.11						0.17
v/c Ratio	0.66	0.40	0.36	0.53	0.65	0.25	0.66	0.47		0.70	0.49	0.34
Uniform Delay, d1	49.1	32.5	19.4	53.0	40.0	20.4	50.0	35.6		48.4	33.8	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.4	0.5	0.3	1.9	3.1	0.2	3.7	0.3		4.2	0.2	0.3
Delay (s)	52.5	33.0	19.7	54.9	43.0	20.6	53.7	35.8		52.6	34.1	18.8
Level of Service	D	C	B	D	D	C	D	D		D	C	B
Approach Delay (s)		35.1			37.8			40.8			34.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	119.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	365	795	65	360	495	195	70	345	230	311	338	476
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	37.0	37.0	10.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	30.0	43.0	43.0	31.0	44.0		20.0	52.0		24.0	56.0	
Total Split (%)	20.0%	28.7%	28.7%	20.7%	29.3%		13.3%	34.7%		16.0%	37.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 132.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	365	795	65	360	495	195	70	345	230	311	338	476
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	397	864	71	391	538	212	76	375	250	338	367	517
RTOR Reduction (vph)	0	0	51	0	0	0	0	0	31	0	0	136
Lane Group Flow (vph)	397	864	20	391	538	212	76	375	219	338	367	381
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	20.6	36.7	36.7	20.4	36.5	59.7	9.2	35.7	62.1	17.2	43.7	70.3
Effective Green, g (s)	20.6	36.7	36.7	20.4	36.5	59.7	9.2	35.7	62.1	17.2	43.7	70.3
Actuated g/C Ratio	0.15	0.28	0.28	0.15	0.27	0.45	0.07	0.27	0.47	0.13	0.33	0.53
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	531	976	436	526	1395	1251	122	949	739	443	1162	1473
v/s Ratio Prot	c0.12	c0.24		0.11	0.11	0.08	0.04	c0.11		c0.10	0.10	0.14
v/s Ratio Perm			0.01						0.14			
v/c Ratio	0.75	0.89	0.04	0.74	0.39	0.17	0.62	0.40	0.30	0.76	0.32	0.26
Uniform Delay, d1	53.7	46.1	35.3	53.8	39.2	21.9	60.2	39.8	21.9	55.9	33.5	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	9.7	0.0	5.6	0.2	0.1	9.5	0.3	0.2	7.6	0.2	0.1
Delay (s)	59.4	55.8	35.3	59.4	39.3	21.9	69.7	40.1	22.2	63.5	33.6	17.2
Level of Service	E	E	D	E	D	C	E	D	C	E	C	B
Approach Delay (s)		55.8			43.0			36.9			35.0	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	133.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/7/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	625	0	55	5	915	150	1360
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	16.0	47.0	21.0	52.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	14.5%	42.7%	19.1%	47.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	625	0	55	5	915	575	150	1360	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3334		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3334		1770	3539	
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	0	11	679	0	60	5	995	625	163	1478	0
RTOR Reduction (vph)	0	11	0	0	0	46	0	80	0	0	0	0
Lane Group Flow (vph)	0	0	0	339	340	14	5	1540	0	163	1478	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		26.4	26.4	26.4	1.3	48.8		14.0	61.5	
Effective Green, g (s)		0.8		26.4	26.4	26.4	1.3	48.8		14.0	61.5	
Actuated g/C Ratio		0.01		0.24	0.24	0.24	0.01	0.44		0.13	0.56	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		403	403	379	20	1479		225	1978	
v/s Ratio Prot		c0.00		0.20	c0.20		0.00	c0.46		c0.09	c0.42	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.84	0.84	0.04	0.25	1.04		0.72	0.75	
Uniform Delay, d1		54.2		39.8	39.8	32.1	53.9	30.6		46.1	18.4	
Progression Factor		1.00		1.00	1.00	1.00	1.42	0.70		1.00	1.00	
Incremental Delay, d2		0.3		14.6	14.8	0.0	5.3	32.8		11.0	2.6	
Delay (s)		54.5		54.4	54.6	32.1	81.6	54.2		57.1	21.0	
Level of Service		D		D	D	C	F	D		E	C	
Approach Delay (s)		54.5			52.7			54.3			24.6	
Approach LOS		D			D			D			C	

Intersection Summary

HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
22: Kunia Rd & South Kupuna Lp

5/7/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	415	25	1435	920	2075
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	26.0	26.0	84.0	84.0	84.0
Total Split (%)	23.6%	23.6%	76.4%	76.4%	76.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	415	25	1435	920	0	2075
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	451	27	1560	1000	0	2255
RTOR Reduction (vph)	0	22	0	276	0	0
Lane Group Flow (vph)	451	5	1560	724	0	2255
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	18.4	18.4	79.6	79.6		79.6
Effective Green, g (s)	18.4	18.4	79.6	79.6		79.6
Actuated g/C Ratio	0.17	0.17	0.72	0.72		0.72
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	574	264	2560	1145		2560
v/s Ratio Prot	c0.13		0.44			c0.64
v/s Ratio Perm		0.00		0.46		
v/c Ratio	0.79	0.02	0.61	0.63		0.88
Uniform Delay, d1	43.9	38.2	7.5	7.7		11.6
Progression Factor	1.00	1.00	1.00	1.00		0.97
Incremental Delay, d2	7.0	0.0	1.1	2.7		3.6
Delay (s)	50.9	38.3	8.6	10.4		14.8
Level of Service	D	D	A	B		B
Approach Delay (s)	50.2		9.3			14.8
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/7/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2165	1760	740	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2353	1913	804	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.30				0.30	0.30
vC, conflicting volume	2717				3100	1359
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2048				3336	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	80				2	322

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	784	784	784	1275	1442
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	804
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.46	0.46	0.46	0.75	0.85
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	55	2165	1760
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 75.1
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	55	2165	1760	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	60	2353	1913	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	60	2353	1913	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			5.0	77.6	60.6	
Effective Green, g (s)			5.0	77.6	60.6	
Actuated g/C Ratio			0.06	1.00	0.78	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			114	5085	2763	
v/s Ratio Prot			0.03	c0.46	c0.54	
v/s Ratio Perm						
v/c Ratio			0.53	0.46	0.69	
Uniform Delay, d1			35.2	0.0	4.1	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.3	0.1	0.8	
Delay (s)			39.4	0.1	4.8	
Level of Service			D	A	A	
Approach Delay (s)	0.0			1.0	4.8	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: H-1 WB Off-Ramp & H-1 WB Lp Off-Ramp & Kunia Rd

5/7/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	395	140	1045	680	3150
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 161.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	0	140	0	0	0	0	1045	0	680	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	429	0	152	0	0	0	0	1136	0	739	3424	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	429	0	152	0	0	0	0	1136	0	739	3424	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	25.2		161.3					81.1		37.0	124.1	
Effective Green, g (s)	25.2		161.3					81.1		37.0	124.1	
Actuated g/C Ratio	0.16		1.00					0.50		0.23	0.77	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	536		1583					1779		787	3912	
v/s Ratio Prot	c0.12							0.32		0.22	c0.67	
v/s Ratio Perm			0.10									
v/c Ratio	0.80		0.10					0.64		0.94	0.88	
Uniform Delay, d1	65.6		0.0					29.4		61.0	13.1	
Progression Factor	1.00		1.00					1.00		0.99	0.95	
Incremental Delay, d2	8.4		0.1					0.8		18.6	2.4	
Delay (s)	74.0		0.1					30.1		79.1	14.9	
Level of Service	E		A					C		E	B	
Approach Delay (s)		54.7			0.0			30.1			26.3	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	161.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/7/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1610	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1610	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1750	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1750	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.49			
v/s Ratio Perm						
v/c Ratio			0.55			
Uniform Delay, d1			1.5			
Progression Factor			1.00			
Incremental Delay, d2			0.7			
Delay (s)			2.2			
Level of Service			A			
Approach Delay (s)	0.0		2.2			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/7/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	1045	1610	0	3290	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1136	1750	0	3576	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.25	
vC, conflicting volume			2886		2328	568
vC1, stage 1 conf vol					1136	
vC2, stage 2 conf vol					1192	
vCu, unblocked vol			2886		0	568
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			126		251	466

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	568	568	875	875	1192	1192	1192
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	875	875	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.33	0.33	0.51	0.51	0.70	0.70	0.70
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/7/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	120	2695	65	0	3290
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.99
Hourly flow rate (vph)	0	130	2929	71	0	3323
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.27					
vC, conflicting volume	4039	978			2931	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2804	978			2931	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	48			100	
cM capacity (veh/h)	4	249			120	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	130	976	976	976	71	1108	1108	1108
Volume Left	0	0	0	0	0	0	0	0
Volume Right	130	0	0	0	71	0	0	0
cSH	249	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.52	0.57	0.57	0.57	0.04	0.65	0.65	0.65
Queue Length 95th (ft)	69	0	0	0	0	0	0	0
Control Delay (s)	34.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D							
Approach Delay (s)	34.3	0.0				0.0		
Approach LOS	D							

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	125	150	40	5	115	50	2090	35	115	2835	125
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	150	35	40	5	115	50	2090	35	115	2835	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797		1743	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1797		547	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	136	163	38	43	5	125	54	2200	38	125	2864	136
RTOR Reduction (vph)	0	3	0	0	0	13	0	0	12	0	0	23
Lane Group Flow (vph)	136	198	0	43	5	112	54	2200	26	125	2864	113
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	63.9	9.6	163.1	163.1	20.9	174.4	174.4
Effective Green, g (s)	37.0	37.0		37.0	37.0	63.9	9.6	163.1	163.1	20.9	174.4	174.4
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.27	0.04	0.68	0.68	0.09	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	277		84	287	421	70	3455	1048	154	3695	1090
v/s Ratio Prot		c0.11			0.00		0.03	0.43		c0.07	c0.56	
v/s Ratio Perm	0.10			0.08		0.07			0.02			0.08
v/c Ratio	0.63	0.71		0.51	0.02	0.27	0.77	0.64	0.02	0.81	0.78	0.10
Uniform Delay, d1	95.1	96.5		93.2	86.1	69.5	114.1	21.7	12.5	107.6	20.5	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.91	0.65	15.83	1.00	1.00	1.00
Incremental Delay, d2	5.6	8.4		5.2	0.0	0.3	32.0	0.7	0.0	26.7	1.7	0.2
Delay (s)	100.7	104.9		98.4	86.1	69.9	135.6	14.8	198.4	134.3	22.2	9.9
Level of Service	F	F		F	F	E	F	B	F	F	C	A
Approach Delay (s)		103.2			77.4			20.7			26.1	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	100	85	35	10	115	60	2145	50	160	2845	75
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Detector Phase	4	4	4 5	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0		10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	22.0	149.0	149.0	44.0	171.0	171.0
Total Split (%)	19.6%	19.6%		19.6%	19.6%	19.6%	9.2%	62.1%	62.1%	18.3%	71.3%	71.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 220 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	100	85	35	10	115	60	2145	50	160	2845	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1859	1540		1776	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.99	1.00		0.48	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1842	1540		882	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	109	92	38	11	125	65	2332	54	174	2874	82
RTOR Reduction (vph)	0	0	36	0	0	111	0	0	17	0	0	20
Lane Group Flow (vph)	0	114	56	0	49	14	65	2332	37	174	2874	62
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Actuated Green, G (s)		26.6	46.0		26.6	26.6	13.4	165.6	165.6	28.8	181.0	181.0
Effective Green, g (s)		26.6	46.0		26.6	26.6	13.4	165.6	165.6	28.8	181.0	181.0
Actuated g/C Ratio		0.11	0.19		0.11	0.11	0.06	0.69	0.69	0.12	0.75	0.75
Clearance Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		204	295		97	175	98	3508	1064	212	3834	1162
v/s Ratio Prot							0.04	0.46		c0.10	c0.57	
v/s Ratio Perm		c0.06	0.04		0.06	0.01			0.02			0.04
v/c Ratio		0.56	0.19		0.51	0.08	0.66	0.66	0.04	0.82	0.75	0.05
Uniform Delay, d1		101.1	81.3		100.5	95.7	111.1	21.3	11.8	103.1	16.7	7.6
Progression Factor		1.00	1.00		1.00	1.00	0.76	1.54	6.32	0.82	1.08	2.70
Incremental Delay, d2		3.3	0.3		4.1	0.2	13.2	0.8	0.1	15.7	0.9	0.1
Delay (s)		104.4	81.7		104.6	95.9	97.6	33.6	74.8	99.8	18.9	20.5
Level of Service		F	F		F	F	F	C	E	F	B	C
Approach Delay (s)		94.3			98.4			36.2			23.5	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2225	3120	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 1 (1%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2225	3120	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2418	3152	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2418	3152	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.48	c0.62	
v/s Ratio Perm						
v/c Ratio				0.62	0.81	
Uniform Delay, d1				6.1	8.4	
Progression Factor				1.71	1.90	
Incremental Delay, d2				0.6	1.3	
Delay (s)				11.0	17.2	
Level of Service				B	B	
Approach Delay (s)	0.0			11.0	17.2	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	30	165	15	20	185	1785	35	40	2465	395
Turn Type	Split	NA	custom	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3 1			2 3			6 4
Detector Phase	4	4	4 5	3	3 1	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0		11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0		36.0	159.0		18.0	141.0	
Total Split (%)	20.4%	20.4%		5.8%		15.0%	66.3%		7.5%	58.8%	
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 220 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	30	165	25	15	20	185	1785	35	40	2465	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1455		1806	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1455		1806	1583	1770	5085	1438	1770	5085	1365
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)	326	33	179	27	16	22	201	1940	38	43	2679	429
RTOR Reduction (vph)	0	0	31	0	0	21	0	0	10	0	0	63
Lane Group Flow (vph)	179	180	148	0	43	1	201	1940	28	43	2679	366
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3 1			2 3			6 4
Actuated Green, G (s)	39.1	39.1	74.1		7.7	16.2	29.0	159.7	174.4	8.5	139.2	178.3
Effective Green, g (s)	39.1	39.1	74.1		7.7	16.2	29.0	159.7	174.4	8.5	139.2	178.3
Actuated g/C Ratio	0.16	0.16	0.31		0.03	0.07	0.12	0.67	0.73	0.04	0.58	0.74
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0		2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	273	276	449		57	106	213	3383	1044	62	2949	1014
v/s Ratio Prot	c0.11	0.11			c0.02		c0.11	0.38		0.02	c0.53	
v/s Ratio Perm			0.10			0.00			0.02			0.27
v/c Ratio	0.66	0.65	0.33		0.75	0.01	0.94	0.57	0.03	0.69	0.91	0.36
Uniform Delay, d1	94.1	94.1	63.8		115.2	104.4	104.7	21.7	9.1	114.5	44.7	10.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.92	1.18	2.04	0.89	1.41	1.21
Incremental Delay, d2	5.6	5.4	0.4		38.8	0.0	41.1	0.6	0.0	16.0	3.6	0.1
Delay (s)	99.7	99.5	64.3		154.0	104.5	137.3	26.2	18.7	118.1	66.8	13.3
Level of Service	F	F	E		F	F	F	C	B	F	E	B
Approach Delay (s)		87.9			137.2			36.3			60.2	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	54.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	235	75	50	85	405	35	1385	5	420	1970	450
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	60.0	60.0		47.0		14.0	87.0	87.0	46.0	119.0	119.0
Total Split (%)	25.0%	25.0%		19.6%		5.8%	36.3%	36.3%	19.2%	49.6%	49.6%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 215 (90%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	75	50	10	85	405	35	1385	5	420	1970	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	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)	255	82	54	11	92	440	38	1505	5	457	2141	489
RTOR Reduction (vph)	0	0	46	0	0	128	0	0	2	0	0	148
Lane Group Flow (vph)	166	171	8	0	103	312	38	1505	3	457	2141	341
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	29.3	29.3	37.0		25.8	68.9	7.7	122.8	122.8	37.1	152.2	152.2
Effective Green, g (s)	29.3	29.3	37.0		25.8	68.9	7.7	122.8	122.8	37.1	152.2	152.2
Actuated g/C Ratio	0.12	0.12	0.15		0.11	0.29	0.03	0.51	0.51	0.15	0.63	0.63
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	210	244		199	800	56	2601	809	530	3224	1003
v/s Ratio Prot	0.10	c0.10			c0.06		0.02	0.30		c0.13	c0.42	
v/s Ratio Perm			0.01			0.11			0.00			0.22
v/c Ratio	0.81	0.81	0.03		0.52	0.39	0.68	0.58	0.00	0.86	0.66	0.34
Uniform Delay, d1	102.6	102.7	86.3		101.2	68.7	114.9	40.7	28.7	99.0	27.7	20.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.82	1.29	1.00	1.11	0.93	2.14
Incremental Delay, d2	20.5	20.9	0.1		2.3	0.3	24.5	0.8	0.0	8.2	0.6	0.5
Delay (s)	123.1	123.6	86.4		103.5	69.0	119.2	53.4	28.7	117.9	26.3	44.4
Level of Service	F	F	F		F	E	F	D	C	F	C	D
Approach Delay (s)		118.3			75.5			54.9			42.8	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	54.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1060	40	390	1525	255
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	31.0
Total Split (s)	51.0	51.0		61.0	61.0	61.0	28.0	80.0		48.0	100.0	100.0
Total Split (%)	21.3%	21.3%		25.4%	25.4%	25.4%	11.7%	33.3%		20.0%	41.7%	41.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 220 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1060	40	390	1525	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	266	332	223	38	375	266	228	1152	43	424	1540	277
RTOR Reduction (vph)	0	0	57	0	0	77	0	0	17	0	0	91
Lane Group Flow (vph)	194	404	166	38	375	189	228	1152	26	424	1540	186
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	34.7	34.7	54.2	51.0	51.0	85.0	19.5	95.3	146.3	34.0	109.8	109.8
Effective Green, g (s)	34.7	34.7	54.2	51.0	51.0	85.0	19.5	95.3	146.3	34.0	109.8	109.8
Actuated g/C Ratio	0.14	0.14	0.23	0.21	0.21	0.35	0.08	0.40	0.61	0.14	0.46	0.46
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	232	485	357	376	395	1056	278	2019	964	486	2326	724
v/s Ratio Prot	c0.12	0.12		0.02	c0.20	0.04	0.07	0.23		c0.12	c0.30	
v/s Ratio Perm			0.11			0.03			0.02			0.12
v/c Ratio	0.84	0.83	0.47	0.10	0.95	0.18	0.82	0.57	0.03	0.87	0.66	0.26
Uniform Delay, d1	99.9	99.8	80.4	76.1	93.2	53.4	108.5	56.4	18.6	100.9	50.7	40.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.42	0.92	1.01
Incremental Delay, d2	21.3	11.2	0.4	0.0	31.8	0.0	16.6	1.2	0.0	12.3	1.2	0.7
Delay (s)	121.2	111.0	80.7	76.1	125.0	53.5	125.1	57.6	18.6	155.0	47.6	41.2
Level of Service	F	F	F	E	F	D	F	E	B	F	D	D
Approach Delay (s)		105.2			94.3			67.2			67.1	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	76.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	590	35	15	755	50	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	641	38	16	821	54	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			679		1103	340
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			679		1103	340
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		73	98
cM capacity (veh/h)			909		202	656

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	428	252	290	547	71
Volume Left	0	0	16	0	54
Volume Right	0	38	0	0	16
cSH	1700	1700	909	1700	240
Volume to Capacity	0.25	0.15	0.02	0.32	0.29
Queue Length 95th (ft)	0	0	1	0	30
Control Delay (s)	0.0	0.0	0.7	0.0	26.1
Lane LOS			A		D
Approach Delay (s)	0.0		0.2		26.1
Approach LOS					D

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	615	0	180	750	0	60
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	668	0	196	815	0	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			668		1467	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			668		1467	334
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		100	90
cM capacity (veh/h)			917		93	662

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	334	334	467	543	65
Volume Left	0	0	196	0	0
Volume Right	0	0	0	0	65
cSH	1700	1700	917	1700	662
Volume to Capacity	0.20	0.20	0.21	0.32	0.10
Queue Length 95th (ft)	0	0	20	0	8
Control Delay (s)	0.0	0.0	5.7	0.0	11.0
Lane LOS			A		B
Approach Delay (s)	0.0		2.6		11.0
Approach LOS					B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay		8.0	
Level of Service		A	
Intersection Capacity Utilization		25.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	670	15	0	745	0	0	0	0	0	0	250
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	728	16	0	810	0	0	0	0	0	0	272
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		1			1							
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	810			745			1413	1546	372	1174	1554	405
vC1, stage 1 conf vol							736	736		810	810	
vC2, stage 2 conf vol							677	810		364	745	
vCu, unblocked vol	810			745			1413	1546	372	1174	1554	405
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	54
cM capacity (veh/h)	812			859			150	237	625	260	236	595

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	486	259	405	405	272
Volume Left	0	0	0	0	0
Volume Right	0	16	0	0	272
cSH	1700	1700	1700	1700	595
Volume to Capacity	0.29	0.15	0.24	0.24	0.46
Queue Length 95th (ft)	0	0	0	0	59
Control Delay (s)	0.0	0.0	0.0	0.0	16.0
Lane LOS					C
Approach Delay (s)	0.0		0.0		16.0
Approach LOS					C

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		42.7%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	670	670	745
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 87.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/7/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	670	0	670	745	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	728	0	728	810	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	728	0	728	810	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	24.5		51.3	87.8		
Effective Green, g (s)	24.5		51.3	87.8		
Actuated g/C Ratio	0.28		0.58	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	987		1034	3539		
v/s Ratio Prot	c0.21		c0.41	0.23		
v/s Ratio Perm						
v/c Ratio	0.74		0.70	0.23		
Uniform Delay, d1	28.7		12.9	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	2.9		2.2	0.0		
Delay (s)	31.6		15.1	0.0		
Level of Service	C		B	A		
Approach Delay (s)	31.6			7.2	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	87.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	255	955	1460	550
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 77.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	255	955	1460	550	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	1038	1587	598	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	277	1038	1587	598	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	18.8	77.8	48.0	77.8		
Effective Green, g (s)	18.8	77.8	48.0	77.8		
Actuated g/C Ratio	0.24	1.00	0.62	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	427	3539	2183	1583		
v/s Ratio Prot	c0.16	0.29	c0.45			
v/s Ratio Perm				0.38		
v/c Ratio	0.65	0.29	0.73	0.38		
Uniform Delay, d1	26.5	0.0	10.3	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.4	0.0	1.2	0.7		
Delay (s)	29.8	0.0	11.6	0.7		
Level of Service	C	A	B	A		
Approach Delay (s)		6.3	8.6		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	11.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/7/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	715	485	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	777	527	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	543				978	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	543				978	272
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	87
cM capacity (veh/h)	1022				241	726

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	389	389	351	192	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	1022	1700	1700	1700	1700	241	726
Volume to Capacity	0.03	0.23	0.23	0.21	0.11	0.09	0.13
Queue Length 95th (ft)	2	0	0	0	0	7	11
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	21.4	10.7
Lane LOS	A					C	B
Approach Delay (s)	0.3			0.0		12.7	
Approach LOS						B	

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		30.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	425	45	5	295	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	462	49	5	321	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332			511			957	1035	255	780	1054	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			511			957	1035	255	780	1054	166
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			85	100	99	100	100	89
cM capacity (veh/h)	1225			1051			176	210	744	264	204	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	103	308	203	5	214	118	33	0	92
Volume Left	103	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	1225	1700	1700	1051	1700	1700	202	1700	849
Volume to Capacity	0.08	0.18	0.12	0.01	0.13	0.07	0.16	0.00	0.11
Queue Length 95th (ft)	7	0	0	0	0	0	14	0	9
Control Delay (s)	8.2	0.0	0.0	8.4	0.0	0.0	26.2	0.0	9.8
Lane LOS	A			A			D	A	A
Approach Delay (s)	1.4			0.1			26.2	9.8	
Approach LOS							D	A	

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization		29.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	245	40	5	220	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	266	43	5	239	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	250			310			804	864	155	707	880	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			310			804	864	155	707	880	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			90	98	100	100	100	92
cM capacity (veh/h)	1313			1248			229	254	863	287	249	902

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	178	132	5	159	91	27	0	71
Volume Left	158	0	0	5	0	0	22	0	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	1313	1700	1700	1248	1700	1700	233	1700	902
Volume to Capacity	0.12	0.10	0.08	0.00	0.09	0.05	0.12	0.00	0.08
Queue Length 95th (ft)	10	0	0	0	0	0	10	0	6
Control Delay (s)	8.1	0.0	0.0	7.9	0.0	0.0	22.5	0.0	9.3
Lane LOS	A			A			C	A	A
Approach Delay (s)	2.7			0.2			22.5	9.3	
Approach LOS							C	A	

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		27.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	105	25	5	120	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	114	27	5	130	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	141			141			568	530	71	454	538	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			141			568	530	71	454	538	71
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			95	100	100	100	100	88
cM capacity (veh/h)	1439			1439			334	412	977	456	408	977

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	76	65	5	87	54	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	1439	1700	1700	1439	1700	1700	334	1700	977
Volume to Capacity	0.09	0.04	0.04	0.00	0.05	0.03	0.05	0.00	0.12
Queue Length 95th (ft)	7	0	0	0	0	0	4	0	10
Control Delay (s)	7.7	0.0	0.0	7.5	0.0	0.0	16.3	0.0	9.2
Lane LOS	A			A			C	A	A
Approach Delay (s)	3.6			0.3			16.3	9.2	
Approach LOS							C	A	

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization		23.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/7/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	70	30	95	15	25	35
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	33	103	16	27	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		220	168	185	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		220	168	185	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	95		84	98	96	96
cM capacity (veh/h)	1623		664	690	676	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	120	65
Volume Left	76	103	0
Volume Right	33	0	38
cSH	1623	667	867
Volume to Capacity	0.05	0.18	0.08
Queue Length 95th (ft)	4	16	6
Control Delay (s)	5.2	11.6	9.5
Lane LOS	A	B	A
Approach Delay (s)	5.2	11.6	9.5
Approach LOS		B	A

Intersection Summary			
Average Delay		8.8	
Intersection Capacity Utilization		25.1%	ICU Level of Service A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	430	0	435	475	595	555	790
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 84
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	430	0	435	475	595	0	0	555	790
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1550	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1550	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	467	0	473	516	647	0	0	603	859
RTOR Reduction (vph)	0	0	0	0	0	175	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	233	234	298	516	647	0	0	603	859
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				22.5	22.5	22.5	28.3	49.0			14.7	83.5
Effective Green, g (s)				22.5	22.5	22.5	28.3	49.0			14.7	83.5
Actuated g/C Ratio				0.27	0.27	0.27	0.34	0.59			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				452	452	417	599	2076			623	1583
v/s Ratio Prot							c0.29	0.18			c0.17	
v/s Ratio Perm				0.14	0.14	c0.19						0.54
v/c Ratio				0.52	0.52	0.72	0.86	0.31			0.97	0.54
Uniform Delay, d1				25.9	25.9	27.6	25.8	8.7			34.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.0	1.0	5.8	12.1	0.1			27.8	1.3
Delay (s)				26.9	26.9	33.4	37.9	8.8			62.0	1.3
Level of Service				C	C	C	D	A			E	A
Approach Delay (s)		0.0			30.1			21.7			26.4	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	5	325	425	190	570
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 92.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/7/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	430	5	325	0	0	0	0	425	220	190	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1775	1563					3330		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1775	1563					3330		1770	3539	
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)	467	5	353	0	0	0	0	462	239	207	620	0
RTOR Reduction (vph)	0	0	227	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	0	472	126	0	0	0	0	648	0	207	620	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.4	32.4					25.1		16.5	47.6	
Effective Green, g (s)		32.4	32.4					25.1		16.5	47.6	
Actuated g/C Ratio		0.35	0.35					0.27		0.18	0.52	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		625	550					908		317	1831	
v/s Ratio Prot								c0.19		c0.12	0.18	
v/s Ratio Perm		0.27	0.08									
v/c Ratio		0.76	0.23					0.71		0.65	0.34	
Uniform Delay, d1		26.3	21.0					30.2		35.1	13.0	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		5.2	0.2					2.7		4.8	0.1	
Delay (s)		31.5	21.2					32.9		39.9	13.1	
Level of Service		C	C					C		D	B	
Approach Delay (s)		27.1			0.0			32.9			19.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2035 with Mitigation AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	770	0	180	455	85	870	60
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	60.0	60.0	60.0	30.0	70.0	40.0	40.0
Total Split (%)	46.2%	46.2%	46.2%	23.1%	53.8%	30.8%	30.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	770	0	180	455	85	0	0	870	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	778	0	196	460	86	0	0	879	65
RTOR Reduction (vph)	0	0	0	0	0	110	0	0	0	0	0	48
Lane Group Flow (vph)	0	0	0	389	389	86	460	86	0	0	879	17
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				57.0	57.0	57.0	22.0	61.0			34.0	34.0
Effective Green, g (s)				57.0	57.0	57.0	22.0	61.0			34.0	34.0
Actuated g/C Ratio				0.44	0.44	0.44	0.17	0.47			0.26	0.26
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				737	737	694	580	874			925	414
v/s Ratio Prot				c0.23	0.23		c0.13	0.05			c0.25	
v/s Ratio Perm						0.05						0.01
v/c Ratio				0.53	0.53	0.12	0.79	0.10			0.95	0.04
Uniform Delay, d1				26.7	26.7	21.7	51.8	19.2			47.2	35.8
Progression Factor				1.00	1.00	1.00	0.65	1.47			1.00	1.00
Incremental Delay, d2				2.7	0.7	0.4	6.8	0.0			18.7	0.0
Delay (s)				29.4	27.4	22.0	40.7	28.4			65.8	35.9
Level of Service				C	C	C	D	C			E	D
Approach Delay (s)		0.0			27.1			38.7			63.8	
Approach LOS		A			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	485	570	915	425	1215
Turn Type	NA	Prot	NA	Free	Prot	NA
Protected Phases	4	4	2		1	6
Permitted Phases				Free		
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	30.0		4.0	30.0
Minimum Split (s)	10.0	10.0	36.0		10.0	36.0
Total Split (s)	48.0	48.0	55.0		27.0	82.0
Total Split (%)	36.9%	36.9%	42.3%		20.8%	63.1%
Yellow Time (s)	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		None	C-Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	5	485	0	0	0	0	570	915	425	1215	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	0.88					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790	2787					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1790	2787					3539	2787	1770	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99	0.92	0.99	0.92
Adj. Flow (vph)	22	5	527	0	0	0	0	576	924	462	1227	0
RTOR Reduction (vph)	0	0	93	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	434	0	0	0	0	576	924	462	1227	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		26.3	26.3					49.0	130.0	37.7	91.7	
Effective Green, g (s)		26.3	26.3					49.0	130.0	37.7	91.7	
Actuated g/C Ratio		0.20	0.20					0.38	1.00	0.29	0.71	
Clearance Time (s)		6.0	6.0					6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		362	563					1333	2787	513	2496	
v/s Ratio Prot			c0.16					0.16		c0.26	c0.35	
v/s Ratio Perm		0.02							0.33			
v/c Ratio		0.07	0.77					0.43	0.33	0.90	0.49	
Uniform Delay, d1		42.0	49.0					30.1	0.0	44.3	8.6	
Progression Factor		1.00	1.00					1.00	1.00	0.98	0.20	
Incremental Delay, d2		0.1	6.5					1.0	0.3	13.5	0.5	
Delay (s)		42.1	55.5					31.2	0.3	56.9	2.2	
Level of Service		D	E					C	A	E	A	
Approach Delay (s)		54.8			0.0			12.2			17.2	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	625	40	125	195	55	150	1115	335	325	1125	250
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	39.0	44.0		39.0	44.0		33.0	65.0		52.0	84.0	
Total Split (%)	19.5%	22.0%		19.5%	22.0%		16.5%	32.5%		26.0%	42.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	

Intersection Summary
Cycle Length: 200
Actuated Cycle Length: 153.9
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	625	40	125	195	55	150	1115	335	325	1125	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	451	679	43	136	212	60	163	1212	364	353	1223	272
RTOR Reduction (vph)	0	0	30	0	0	36	0	0	36	0	0	70
Lane Group Flow (vph)	451	679	13	136	212	24	163	1212	328	353	1223	202
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	25.9	27.9	46.8	11.7	13.7	41.2	12.9	69.8	87.5	21.5	78.4	110.3
Effective Green, g (s)	25.9	27.9	46.8	11.7	13.7	41.2	12.9	69.8	87.5	21.5	78.4	110.3
Actuated g/C Ratio	0.17	0.18	0.30	0.08	0.09	0.27	0.08	0.45	0.57	0.14	0.51	0.72
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	577	921	481	260	452	423	287	2306	900	479	2590	1134
v/s Ratio Prot	c0.13	c0.13		0.04	0.04		0.05	c0.24		c0.10	0.24	
v/s Ratio Perm			0.01			0.02			0.21			0.13
v/c Ratio	0.78	0.74	0.03	0.52	0.47	0.06	0.57	0.53	0.36	0.74	0.47	0.18
Uniform Delay, d1	61.3	59.5	37.6	68.4	66.6	41.9	67.8	30.2	18.1	63.5	24.4	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.8	3.1	0.0	1.9	0.8	0.1	2.6	0.9	0.3	5.8	0.6	0.1
Delay (s)	68.1	62.6	37.6	70.3	67.4	42.0	70.4	31.0	18.3	69.3	25.0	7.2
Level of Service	E	E	D	E	E	D	E	C	B	E	C	A
Approach Delay (s)		63.8			64.6			32.1			30.8	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	41.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	153.9	Sum of lost time (s)	23.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

4/23/2013

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø4
Lane Configurations							
Volume (vph)	215	255	245	1560	990	355	
Turn Type	NA	custom	Prot	NA	NA	custom	
Protected Phases	7		5	2	6		4
Permitted Phases		4 5				6 7	
Detector Phase	7	4 5	5	2	6	6 7	
Switch Phase							
Minimum Initial (s)	4.0		4.0	30.0	30.0		4.0
Minimum Split (s)	10.0		9.0	36.0	36.0		44.0
Total Split (s)	47.0		23.0	73.0	50.0		47.0
Total Split (%)	39.2%		19.2%	60.8%	41.7%		39%
Yellow Time (s)	4.0		3.0	4.0	4.0		4.0
All-Red Time (s)	2.0		2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		
Total Lost Time (s)	6.0		5.0	6.0	6.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?							
Recall Mode	None		None	C-Max	C-Max		None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 33 (28%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	215	255	245	1560	990	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	3433	5085	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	277	266	1696	1076	386
RTOR Reduction (vph)	0	11	0	0	0	22
Lane Group Flow (vph)	234	266	266	1696	1076	364
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		4 5				6 7
Actuated Green, G (s)	33.3	53.7	14.4	74.7	55.3	94.6
Effective Green, g (s)	33.3	53.7	14.4	74.7	55.3	94.6
Actuated g/C Ratio	0.28	0.45	0.12	0.62	0.46	0.79
Clearance Time (s)	6.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	952	708	411	3165	2343	1247
v/s Ratio Prot	0.07		c0.08	c0.33	0.21	
v/s Ratio Perm		c0.17				0.23
v/c Ratio	0.25	0.38	0.65	0.54	0.46	0.29
Uniform Delay, d1	33.6	22.0	50.4	12.8	22.1	3.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	3.5	0.7	0.7	0.1
Delay (s)	33.7	22.4	53.9	13.5	22.8	3.6
Level of Service	C	C	D	B	C	A
Approach Delay (s)	27.6			19.0	17.7	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

4/23/2013

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	40	550	1255	5	190	940	125
Turn Type	Free	Over	NA	Perm	Prot	NA	Perm
Protected Phases		1	2		1	6	
Permitted Phases	Free			2			6
Detector Phase		1	2	2	1	6	6
Switch Phase							
Minimum Initial (s)		4.0	30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0	37.0	37.0	10.0	37.0	37.0
Total Split (s)		63.0	57.0	57.0	63.0	120.0	120.0
Total Split (%)		52.5%	47.5%	47.5%	52.5%	100.0%	100.0%
Yellow Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead		
Lead-Lag Optimize?							
Recall Mode		None	Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 89
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	0	0	550	0	1255	5	190	940	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	3433	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	0	0	598	0	1364	5	207	1022	136
RTOR Reduction (vph)	0	0	0	0	0	16	0	0	3	0	0	0
Lane Group Flow (vph)	0	0	43	0	0	582	0	1364	2	207	1022	136
Turn Type			Free			Over		NA	Perm	Prot	NA	Perm
Protected Phases						1		2		1	6	
Permitted Phases			Free						2			6
Actuated Green, G (s)			88.7			37.7		39.0	39.0	37.7	88.7	88.7
Effective Green, g (s)			88.7			37.7		39.0	39.0	37.7	88.7	88.7
Actuated g/C Ratio			1.00			0.43		0.44	0.44	0.43	1.00	1.00
Clearance Time (s)						6.0		6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)						3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611			684		2235	696	1459	5085	1583
v/s Ratio Prot						c0.36		c0.27		0.06	0.20	
v/s Ratio Perm			0.03						0.00			0.09
v/c Ratio			0.03			0.85		0.61	0.00	0.14	0.20	0.09
Uniform Delay, d1			0.0			23.0		19.0	13.9	15.6	0.0	0.0
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0			10.0		0.5	0.0	0.0	0.0	0.0
Delay (s)			0.0			33.0		19.5	13.9	15.6	0.0	0.0
Level of Service			A			C		B	B	B	A	A
Approach Delay (s)		0.0			33.0			19.5			2.4	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	130	215	495	185	505	185	635	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	19.0	40.0		19.0	40.0		20.0	40.0	21.0	41.0	
Total Split (%)	15.8%	33.3%		15.8%	33.3%		16.7%	33.3%	17.5%	34.2%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 112.5
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	130	215	495	185	505	10	185	635	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	5070		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	5070		3433	5085	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)	228	304	185	141	234	538	201	549	11	201	690	174
RTOR Reduction (vph)	0	0	53	0	0	46	0	1	0	0	0	91
Lane Group Flow (vph)	228	304	132	141	234	492	201	559	0	201	690	83
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	12.1	33.4	51.2	10.0	31.3	49.6	11.8	34.8		12.3	35.3	53.4
Effective Green, g (s)	12.1	33.4	51.2	10.0	31.3	49.6	11.8	34.8		12.3	35.3	53.4
Actuated g/C Ratio	0.11	0.30	0.46	0.09	0.28	0.44	0.10	0.31		0.11	0.31	0.47
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	369	553	720	305	518	697	360	1568		375	1595	751
v/s Ratio Prot	c0.07	0.16		0.04	0.13		0.06	0.11		0.06	c0.14	
v/s Ratio Perm			0.08			c0.31						0.05
v/c Ratio	0.62	0.55	0.18	0.46	0.45	0.71	0.56	0.36		0.54	0.43	0.11
Uniform Delay, d1	48.0	33.2	18.2	48.7	33.5	25.5	47.9	30.2		47.4	30.6	16.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.1	1.1	0.1	1.1	0.6	3.3	1.9	0.1		1.5	0.2	0.1
Delay (s)	51.1	34.4	18.3	49.8	34.1	28.8	49.8	30.3		48.9	30.8	16.4
Level of Service	D	C	B	D	C	C	D	C		D	C	B
Approach Delay (s)		35.5			33.4			35.4			31.9	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	112.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	400	175	35	180	985	215	20	85	35	374	103	368
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		14.0	44.0		18.0	48.0	
Total Split (%)	29.3%	29.3%	29.3%	29.3%	29.3%		9.3%	29.3%		12.0%	32.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 134.8
Natural Cycle: 145
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	400	175	35	180	985	215	20	85	35	374	103	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.94	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
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)	435	190	38	196	1071	234	22	92	38	407	112	400
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	22	0	0	98
Lane Group Flow (vph)	435	190	14	196	1071	234	22	92	16	407	112	302
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	31.2	49.3	49.3	17.3	35.4	55.0	4.4	32.3	55.6	13.6	41.5	78.7
Effective Green, g (s)	31.2	49.3	49.3	17.3	35.4	55.0	4.4	32.3	55.6	13.6	41.5	78.7
Actuated g/C Ratio	0.23	0.36	0.36	0.13	0.26	0.41	0.03	0.24	0.41	0.10	0.31	0.58
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1148	1287	575	438	1328	1131	57	843	649	500	1083	1618
v/s Ratio Prot	c0.09	0.05		0.06	c0.21	0.08	0.01	0.03		c0.08	0.03	c0.11
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.38	0.15	0.02	0.45	0.81	0.21	0.39	0.11	0.02	0.81	0.10	0.19
Uniform Delay, d1	44.0	29.0	27.7	54.7	46.8	26.1	64.2	40.3	23.8	59.7	33.7	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	0.0	0.7	3.7	0.1	4.3	0.1	0.0	9.8	0.0	0.1
Delay (s)	44.2	29.0	27.7	55.4	50.5	26.2	68.5	40.4	23.8	69.5	33.7	13.4
Level of Service	D	C	C	E	D	C	E	D	C	E	C	B
Approach Delay (s)		38.9			47.4			40.3			40.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	135.5	Sum of lost time (s)	23.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

4/23/2013

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	365	5	75	10	1515	40	865
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	365	5	75	10	1515	195	40	865	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.91	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1687	1583	1770	3479		1770	5081	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1687	1583	1770	3479		1770	5081	
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	0	5	397	5	82	11	1647	212	43	940	5
RTOR Reduction (vph)	0	5	0	0	0	69	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	202	200	13	11	1855	0	43	945	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		1.1		27.7	27.7	27.7	3.2	122.6		8.6	128.0	
Effective Green, g (s)		1.1		27.7	27.7	27.7	3.2	122.6		8.6	128.0	
Actuated g/C Ratio		0.01		0.15	0.15	0.15	0.02	0.68		0.05	0.71	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		9		258	259	243	31	2369		84	3613	
v/s Ratio Prot		c0.00		c0.12	0.12		0.01	c0.53		c0.02	0.19	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.78	0.77	0.05	0.35	0.78		0.51	0.26	
Uniform Delay, d1		88.9		73.3	73.1	65.0	87.4	19.6		83.7	9.2	
Progression Factor		1.00		1.00	1.00	1.00	1.39	0.37		1.00	1.00	
Incremental Delay, d2		0.1		14.3	13.3	0.1	4.8	1.9		5.2	0.2	
Delay (s)		89.1		87.6	86.4	65.0	126.3	9.0		88.8	9.4	
Level of Service		F		F	F	E	F	A		F	A	
Approach Delay (s)		89.1			83.3			9.7			12.9	
Approach LOS		F			F			A			B	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

4/23/2013

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	500	25	1735	400	1260
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	500	25	1735	400	0	1260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.91
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		5085
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	543	27	1886	435	0	1370
RTOR Reduction (vph)	0	14	0	66	0	0
Lane Group Flow (vph)	543	13	1886	369	0	1370
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	34.4	34.4	133.6	133.6		133.6
Effective Green, g (s)	34.4	34.4	133.6	133.6		133.6
Actuated g/C Ratio	0.19	0.19	0.74	0.74		0.74
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	656	302	2626	1174		3774
v/s Ratio Prot	c0.16		c0.53			0.27
v/s Ratio Perm		0.01		0.23		
v/c Ratio	0.83	0.04	0.72	0.31		0.36
Uniform Delay, d1	70.0	59.4	12.8	7.8		8.2
Progression Factor	1.00	1.00	1.00	1.00		1.14
Incremental Delay, d2	8.5	0.1	1.7	0.7		0.3
Delay (s)	78.4	59.4	14.5	8.5		9.6
Level of Service	E	E	B	A		A
Approach Delay (s)	77.5		13.4			9.6
Approach LOS	E		B			A

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

4/23/2013

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1965	1285	545	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2136	1397	592	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.91				0.91	0.91
vC, conflicting volume	1989				2405	762
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1729				2188	375
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	327				35	564

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	712	712	712	559	559	872
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	592
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.42	0.42	0.42	0.33	0.33	0.51
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

4/23/2013

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	165	1965	1285
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 53.2
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	165	1965	1285	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.91	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	5085	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	179	2136	1397	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	179	2136	1397	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			10.7	53.2	30.5	
Effective Green, g (s)			10.7	53.2	30.5	
Actuated g/C Ratio			0.20	1.00	0.57	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			355	5085	2915	
v/s Ratio Prot			0.10	c0.42	0.27	
v/s Ratio Perm						
v/c Ratio			0.50	0.42	0.48	
Uniform Delay, d1			18.9	0.0	6.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			1.1	0.1	0.1	
Delay (s)			20.0	0.1	6.8	
Level of Service			C	A	A	
Approach Delay (s)	0.0			1.6	6.8	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: H-1 WB Off-Ramp & H-1 WB Lp Off-Ramp & Kunia Rd

4/23/2013

Intersection Sign configuration not allowed in HCM analysis.

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/23/2013

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	535	150	980	625	2075
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 126
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	535	0	150	0	0	0	0	980	0	625	2075	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.86	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	6408	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	6408	
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)	582	0	163	0	0	0	0	1065	0	679	2255	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	582	0	163	0	0	0	0	1065	0	679	2255	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	27.3		125.7					48.4		32.0	86.4	
Effective Green, g (s)	27.3		125.7					48.4		32.0	86.4	
Actuated g/C Ratio	0.22		1.00					0.39		0.25	0.69	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	745		1583					1362		873	4404	
v/s Ratio Prot	c0.17							c0.30		c0.20	0.35	
v/s Ratio Perm			0.10									
v/c Ratio	0.78		0.10					0.78		0.78	0.51	
Uniform Delay, d1	46.4		0.0					34.0		43.5	9.5	
Progression Factor	1.00		1.00					1.00		0.99	0.99	
Incremental Delay, d2	5.3		0.1					3.0		4.4	0.1	
Delay (s)	51.7		0.1					37.0		47.3	9.5	
Level of Service	D		A					D		D	A	
Approach Delay (s)		40.4			0.0			37.0			18.2	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	125.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2305	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2305	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2505	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2505	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.71			
v/s Ratio Perm						
v/c Ratio			0.79			
Uniform Delay, d1			2.7			
Progression Factor			1.00			
Incremental Delay, d2			2.1			
Delay (s)			4.7			
Level of Service			A			
Approach Delay (s)	0.0		4.7			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	980	2305	0	2225	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1065	2505	0	2418	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.83	
vC, conflicting volume			3571		1670	533
vC1, stage 1 conf vol					1065	
vC2, stage 2 conf vol					605	
vCu, unblocked vol			3571		803	533
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			66		266	492

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	533	533	1253	1253	605	605	605	605
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	1253	1253	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.31	0.74	0.74	0.36	0.36	0.36	0.36
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	145	2995	125	0	2225
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.99
Hourly flow rate (vph)	0	158	3255	136	0	2247
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.79					
vC, conflicting volume	4007	1087			3257	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3878	1087			3257	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	25			100	
cM capacity (veh/h)	2	211			89	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	158	1085	1085	1085	136	749	749	749
Volume Left	0	0	0	0	0	0	0	0
Volume Right	158	0	0	0	136	0	0	0
cSH	211	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.75	0.64	0.64	0.64	0.08	0.44	0.44	0.44
Queue Length 95th (ft)	126	0	0	0	0	0	0	0
Control Delay (s)	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F							
Approach Delay (s)	60.0	0.0				0.0		
Approach LOS	F							

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	20	35	135	5	165	65	3075	30	40	1760	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	35	20	135	5	165	65	3075	30	40	1760	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1736		1728	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1736		1271	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	130%	100%	100%	100%
Adj. Flow (vph)	22	38	22	147	5	179	71	3342	42	43	1778	109
RTOR Reduction (vph)	0	9	0	0	0	14	0	0	12	0	0	31
Lane Group Flow (vph)	22	51	0	147	5	165	71	3342	30	43	1778	78
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Effective Green, g (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.05	0.72	0.72	0.05	0.71	0.71
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	267		195	287	357	92	3661	1110	82	3633	1070
v/s Ratio Prot		0.03			0.00		c0.04	c0.66		0.02	0.35	
v/s Ratio Perm	0.02			c0.12		0.10			0.02			0.05
v/c Ratio	0.10	0.19		0.75	0.02	0.46	0.77	0.91	0.03	0.52	0.49	0.07
Uniform Delay, d1	87.2	88.4		97.1	86.1	80.3	112.3	27.4	9.6	111.8	15.0	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.71	1.04	8.82	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3		15.2	0.0	1.0	11.2	1.5	0.0	5.9	0.5	0.1
Delay (s)	87.4	88.8		112.3	86.1	81.3	91.1	30.0	84.7	117.7	15.5	10.4
Level of Service	F	F		F	F	F	F	C	F	F	B	B
Approach Delay (s)		88.4			95.1			31.9			17.5	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	150	80	190	15	150	45	3025	45	45	1825	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	64.0	64.0	64.0	64.0	64.0	64.0	13.0	163.0	163.0	13.0	163.0	163.0
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%	26.7%	5.4%	67.9%	67.9%	5.4%	67.9%	67.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 165
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	150	80	190	15	150	45	3025	45	45	1825	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1860	1533		1759	1583	1770	5085	1551	1770	5085	1545
Flt Permitted		0.99	1.00		0.49	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1845	1533		900	1583	1770	5085	1551	1770	5085	1545
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	163	87	207	16	163	49	3288	49	49	1843	5
RTOR Reduction (vph)	0	0	52	0	0	36	0	0	14	0	0	2
Lane Group Flow (vph)	0	168	35	0	223	127	49	3288	35	49	1843	3
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		58.0	58.0		58.0	58.0	7.0	156.0	156.0	7.0	156.0	156.0
Effective Green, g (s)		58.0	58.0		58.0	58.0	7.0	156.0	156.0	7.0	156.0	156.0
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.03	0.65	0.65	0.03	0.65	0.65
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		445	370		217	382	51	3305	1008	51	3305	1004
v/s Ratio Prot							c0.03	c0.65		0.03	0.36	
v/s Ratio Perm		0.09	0.02		c0.25	0.08			0.02			0.00
v/c Ratio		0.38	0.09		1.03	0.33	0.96	0.99	0.03	0.96	0.56	0.00
Uniform Delay, d1		75.9	70.6		91.0	75.0	116.4	41.6	15.0	116.4	23.1	14.7
Progression Factor		1.00	1.00		1.00	1.00	1.06	0.86	0.98	1.01	0.78	1.00
Incremental Delay, d2		0.5	0.1		68.5	0.5	75.5	9.9	0.0	103.7	0.6	0.0
Delay (s)		76.5	70.7		159.5	75.5	199.1	45.5	14.8	221.4	18.6	14.7
Level of Service		E	E		F	E	F	D	B	F	B	B
Approach Delay (s)		74.5			124.0			47.2			23.8	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	45.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3315	2020	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 97 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3315	2020	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3603	2040	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3603	2040	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.71	0.40	
v/s Ratio Perm						
v/c Ratio				0.92	0.52	
Uniform Delay, d1				10.9	5.3	
Progression Factor				1.12	1.11	
Incremental Delay, d2				2.5	0.4	
Delay (s)				14.7	6.3	
Level of Service				B	A	
Approach Delay (s)	0.0			14.7	6.3	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	210	10	5	360	3005	15	5	1715	480
Turn Type	Split	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3		4 5			2			6
Detector Phase	3	3	3	4	4 5	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	4.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	60.0	60.0	60.0	10.0		11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	60.0	60.0	60.0	38.0		19.0	112.0	112.0	30.0	123.0	123.0
Total Split (%)	25.0%	25.0%	25.0%	15.8%		7.9%	46.7%	46.7%	12.5%	51.3%	51.3%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	210	10	10	5	360	3005	15	5	1715	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.93		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1477		1817	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1477		1817	1583	1770	5085	1391	1770	5085	1346
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)	440	11	228	11	11	5	391	3266	16	5	1864	522
RTOR Reduction (vph)	0	0	99	0	0	4	0	0	5	0	0	272
Lane Group Flow (vph)	224	227	129	0	22	1	391	3266	11	5	1864	250
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	Perm	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4 5			2			6
Actuated Green, G (s)	37.9	37.9	37.9		7.2	68.2	55.0	168.6	168.6	1.3	114.9	114.9
Effective Green, g (s)	37.9	37.9	37.9		7.2	68.2	55.0	168.6	168.6	1.3	114.9	114.9
Actuated g/C Ratio	0.16	0.16	0.16		0.03	0.28	0.23	0.70	0.70	0.01	0.48	0.48
Clearance Time (s)	6.0	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0		3.0		2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	265	266	233		54	449	405	3572	977	9	2434	644
v/s Ratio Prot	0.13	c0.13			c0.01		c0.22	c0.64		0.00	0.37	
v/s Ratio Perm			0.09			0.00			0.01			0.19
v/c Ratio	0.85	0.85	0.56		0.41	0.00	0.97	0.91	0.01	0.56	0.77	0.39
Uniform Delay, d1	98.2	98.3	93.3		114.3	61.5	91.6	29.7	10.7	119.1	51.5	40.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.80	1.75	1.00	1.09	1.03	3.98
Incremental Delay, d2	20.4	21.6	1.6		4.9	0.0	23.7	2.6	0.0	33.7	2.2	1.6
Delay (s)	118.6	120.0	94.9		119.3	61.5	97.4	54.5	10.7	163.3	55.1	161.0
Level of Service	F	F	F		F	E	F	D	B	F	E	F
Approach Delay (s)		111.1			108.6			58.9			78.5	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	71.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	123.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	485	45	45	85	515	40	2140	5	350	1460	75
Turn Type	Split	NA	custom	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4 1	5	2		1	6	
Permitted Phases			3 5					2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0		10.0		10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	60.0	60.0		33.0		27.0	111.0	111.0	36.0	120.0	120.0
Total Split (%)	25.0%	25.0%		13.8%		11.3%	46.3%	46.3%	15.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 68 (28%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	45	45	15	85	515	40	2140	5	350	1460	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	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)	527	49	49	16	92	560	43	2326	5	380	1587	82
RTOR Reduction (vph)	0	0	37	0	0	33	0	0	3	0	0	37
Lane Group Flow (vph)	285	291	12	0	108	527	43	2326	2	380	1587	45
Turn Type	Split	NA	custom	Split	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases			3 5						2			6
Actuated Green, G (s)	45.9	45.9	57.1		27.0	62.3	11.2	112.8	112.8	29.3	130.9	130.9
Effective Green, g (s)	45.9	45.9	57.1		27.0	62.3	11.2	112.8	112.8	29.3	130.9	130.9
Actuated g/C Ratio	0.19	0.19	0.24		0.11	0.26	0.05	0.47	0.47	0.12	0.55	0.55
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	321	324	376		208	723	82	2389	744	419	2773	863
v/s Ratio Prot	0.17	c0.17			0.06	c0.19	0.02	c0.46		c0.11	0.31	
v/s Ratio Perm			0.01						0.00			0.03
v/c Ratio	0.89	0.90	0.03		0.52	0.73	0.52	0.97	0.00	0.91	0.57	0.05
Uniform Delay, d1	94.5	94.8	70.2		100.4	81.1	111.8	62.1	33.8	104.0	36.1	25.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.83	1.45	1.00	1.34	0.20	0.12
Incremental Delay, d2	24.2	25.8	0.0		2.2	3.7	4.6	11.1	0.0	16.7	0.6	0.1
Delay (s)	118.8	120.6	70.2		102.6	84.8	97.0	101.0	33.8	156.4	7.9	3.3
Level of Service	F	F	E		F	F	F	F	C	F	A	A
Approach Delay (s)		115.8			87.7			100.8			35.3	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	77.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1530	65	220	1175	170
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 134 (56%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1530	65	220	1175	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	353	212	223	125	304	364	179	1663	71	239	1187	185
RTOR Reduction (vph)	0	0	58	0	0	33	0	0	23	0	0	78
Lane Group Flow (vph)	184	381	165	125	304	331	179	1663	48	239	1187	107
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	32.1	32.1	48.9	43.2	43.2	64.3	16.8	118.6	161.8	21.1	122.9	122.9
Effective Green, g (s)	32.1	32.1	48.9	43.2	43.2	64.3	16.8	118.6	161.8	21.1	122.9	122.9
Actuated g/C Ratio	0.13	0.13	0.20	0.18	0.18	0.27	0.07	0.49	0.67	0.09	0.51	0.51
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	215	443	322	318	335	816	240	2512	1067	301	2603	810
v/s Ratio Prot	0.11	c0.11		0.07	c0.16	0.07	0.05	c0.33		c0.07	c0.23	
v/s Ratio Perm			0.10			0.05			0.03			0.07
v/c Ratio	0.86	0.86	0.51	0.39	0.91	0.41	0.75	0.66	0.04	0.79	0.46	0.13
Uniform Delay, d1	101.7	101.8	84.9	86.8	96.4	72.2	109.5	45.6	13.1	107.3	37.3	30.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.36	0.19	0.32
Incremental Delay, d2	25.9	15.1	0.6	0.3	26.4	0.1	10.5	1.4	0.0	10.8	0.5	0.3
Delay (s)	127.6	116.8	85.5	87.1	122.9	72.3	120.0	47.0	13.1	156.3	7.7	10.2
Level of Service	F	F	F	F	F	E	F	D	B	F	A	B
Approach Delay (s)		110.5			94.0			52.6			30.0	
Approach LOS		F			F			D			C	

Intersection Summary				
HCM 2000 Control Delay	60.8	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	81.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	975	50	10	465	35	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1060	54	11	505	38	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1114		1361	557
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1114		1361	557
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		72	99
cM capacity (veh/h)			623		137	474

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	707	408	179	337	38	5
Volume Left	0	0	11	0	38	0
Volume Right	0	54	0	0	0	5
cSH	1700	1700	623	1700	137	474
Volume to Capacity	0.42	0.24	0.02	0.20	0.28	0.01
Queue Length 95th (ft)	0	0	1	0	27	1
Control Delay (s)	0.0	0.0	0.9	0.0	41.1	12.7
Lane LOS			A		E	B
Approach Delay (s)	0.0		0.3		37.6	
Approach LOS					E	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	875	0	60	485	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	951	0	65	527	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			951		1345	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			951		1345	476
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	92
cM capacity (veh/h)			718		130	536

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	476	476	241	351	43
Volume Left	0	0	65	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	718	1700	536
Volume to Capacity	0.28	0.28	0.09	0.21	0.08
Queue Length 95th (ft)	0	0	7	0	7
Control Delay (s)	0.0	0.0	3.6	0.0	12.3
Lane LOS			A		B
Approach Delay (s)	0.0		1.5		12.3
Approach LOS					B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay		7.2	
Level of Service		A	
Intersection Capacity Utilization		19.1%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	840	385	515
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 58.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	840	0	385	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	913	0	418	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	913	0	418	560	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	26.4		20.3	58.7		
Effective Green, g (s)	26.4		20.3	58.7		
Actuated g/C Ratio	0.45		0.35	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1591		612	3539		
v/s Ratio Prot	c0.26		c0.24	0.16		
v/s Ratio Perm						
v/c Ratio	0.57		0.68	0.16		
Uniform Delay, d1	12.0		16.4	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.5		3.1	0.0		
Delay (s)	12.5		19.6	0.0		
Level of Service	B		B	A		
Approach Delay (s)	12.5			8.4	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	340	1220	825	210
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 50.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	340	1220	825	210	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	1326	897	228	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	370	1326	897	228	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	16.2	50.4	23.2	50.4		
Effective Green, g (s)	16.2	50.4	23.2	50.4		
Actuated g/C Ratio	0.32	1.00	0.46	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	568	3539	1629	1583		
v/s Ratio Prot	c0.21	0.37	c0.25			
v/s Ratio Perm				0.14		
v/c Ratio	0.65	0.37	0.55	0.14		
Uniform Delay, d1	14.7	0.0	9.8	0.0		
Progression Factor	0.99	1.00	1.00	1.00		
Incremental Delay, d2	2.7	0.1	0.4	0.2		
Delay (s)	17.2	0.1	10.2	0.2		
Level of Service	B	A	B	A		
Approach Delay (s)		3.8	8.2		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	50.4	Sum of lost time (s)	11.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	425	810	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	462	880	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		Raised	Raised			
Median storage veh)		1	1			
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	902				1274	451
vC1, stage 1 conf vol					891	
vC2, stage 2 conf vol					383	
vCu, unblocked vol	902				1274	451
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	90				90	95
cM capacity (veh/h)	749				264	556

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	231	231	587	315	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	749	1700	1700	1700	1700	264	556
Volume to Capacity	0.10	0.14	0.14	0.35	0.19	0.10	0.05
Queue Length 95th (ft)	8	0	0	0	0	8	4
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	20.2	11.8
Lane LOS	B					C	B
Approach Delay (s)	1.5			0.0		16.0	
Approach LOS						C	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	265	15	0	405	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	288	16	0	440	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	440			304			929	899	152	758	908	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440			304			929	899	152	758	908	220
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			77	96	99	100	100	68
cM capacity (veh/h)	1116			1253			143	257	867	269	254	784

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	192	112	0	293	147	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	1116	1700	1700	1700	1700	1700	177	1700	784
Volume to Capacity	0.07	0.11	0.07	0.00	0.17	0.09	0.28	0.00	0.32
Queue Length 95th (ft)	6	0	0	0	0	0	27	0	34
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	33.0	0.0	11.7
Lane LOS	A						D	A	B
Approach Delay (s)	1.8			0.0			33.0	11.7	
Approach LOS							D	B	

Intersection Summary			
Average Delay		4.7	
Intersection Capacity Utilization		38.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	145	10	0	240	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	158	11	0	261	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	261			168			690	674	84	598	679	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261			168			690	674	84	598	679	130
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			89	95	100	100	100	84
cM capacity (veh/h)	1301			1407			257	339	958	345	336	895

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	105	63	0	174	87	43	0	147
Volume Left	125	0	0	0	0	0	27	0	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	1301	1700	1700	1700	1700	1700	282	1700	895
Volume to Capacity	0.10	0.06	0.04	0.00	0.10	0.05	0.15	0.00	0.16
Queue Length 95th (ft)	8	0	0	0	0	0	13	0	15
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	20.1	0.0	9.8
Lane LOS	A						C	A	A
Approach Delay (s)	3.4			0.0			20.1	9.8	
Approach LOS							C	A	

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		28.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	45	5	0	115	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	49	5	0	125	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	130			54			429	378	27	353	378	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			54			429	378	27	353	378	65
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			95	98	100	100	100	88
cM capacity (veh/h)	1453			1549			425	515	1042	539	515	985

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	33	22	0	83	47	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1453	1700	1700	1700	1700	1700	451	1700	985
Volume to Capacity	0.07	0.02	0.01	0.00	0.05	0.03	0.07	0.00	0.12
Queue Length 95th (ft)	5	0	0	0	0	0	6	0	10
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	13.6	0.0	9.2
Lane LOS	A						B	A	A
Approach Delay (s)	4.9			0.0			13.6	9.2	
Approach LOS							B	A	

Intersection Summary				
Average Delay		5.3		
Intersection Capacity Utilization		23.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	40	5	40	50	10	80
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	5	43	54	11	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		182	90	92	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		182	90	92	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	97		94	93	99	92
cM capacity (veh/h)	1623		695	779	776	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	98	98
Volume Left	43	43	0
Volume Right	5	0	87
cSH	1623	739	1039
Volume to Capacity	0.03	0.13	0.09
Queue Length 95th (ft)	2	11	8
Control Delay (s)	6.5	10.6	8.8
Lane LOS	A	B	A
Approach Delay (s)	6.5	10.6	8.8
Approach LOS		B	A

Intersection Summary				
Average Delay		9.1		
Intersection Capacity Utilization		21.5%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	460	0	200	325	730	335	625
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 68.7
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	460	0	200	325	730	0	0	335	625
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1552	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1552	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	500	0	217	353	793	0	0	364	679
RTOR Reduction (vph)	0	0	0	0	0	123	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	250	250	94	353	793	0	0	364	679
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				18.0	18.0	18.0	19.5	38.0			12.5	68.0
Effective Green, g (s)				18.0	18.0	18.0	19.5	38.0			12.5	68.0
Actuated g/C Ratio				0.26	0.26	0.26	0.29	0.56			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				444	444	410	507	1977			650	1583
v/s Ratio Prot							c0.20	0.22			0.10	
v/s Ratio Perm				0.15	0.15	0.06						c0.43
v/c Ratio				0.56	0.56	0.23	0.70	0.40			0.56	0.43
Uniform Delay, d1				21.6	21.6	19.6	21.6	8.5			25.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.6	1.6	0.3	4.1	0.1			1.1	0.9
Delay (s)				23.2	23.2	19.9	25.7	8.7			26.4	0.9
Level of Service				C	C	B	C	A			C	A
Approach Delay (s)		0.0			22.2			13.9			9.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	80	515	355	240	605
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	59.0	59.0	52.0	40.0	92.0
Total Split (%)	39.1%	39.1%	34.4%	26.5%	60.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 127.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	80	515	0	0	0	0	355	335	240	605	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1784	1563					3234		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1784	1563					3234		1770	3539	
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)	647	87	560	0	0	0	0	386	364	261	658	0
RTOR Reduction (vph)	0	0	140	0	0	0	0	122	0	0	0	0
Lane Group Flow (vph)	0	734	420	0	0	0	0	628	0	261	658	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		53.7	53.7					31.6		23.8	61.4	
Effective Green, g (s)		53.7	53.7					31.6		23.8	61.4	
Actuated g/C Ratio		0.42	0.42					0.25		0.19	0.48	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		753	660					804		331	1709	
v/s Ratio Prot								c0.19		c0.15	0.19	
v/s Ratio Perm		0.41	0.27									
v/c Ratio		0.97	0.64					0.78		0.79	0.39	
Uniform Delay, d1		36.0	29.0					44.5		49.3	20.9	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		26.4	2.0					5.0		11.8	0.1	
Delay (s)		62.5	31.0					49.5		61.0	21.0	
Level of Service		E	C					D		E	C	
Approach Delay (s)		48.9			0.0			49.5			32.4	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	127.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2035 with Mitigation PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1180	5	315	425	110	255	145
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	60.0	60.0	60.0	30.0	70.0	40.0	40.0
Total Split (%)	46.2%	46.2%	46.2%	23.1%	53.8%	30.8%	30.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1180	5	315	425	110	0	0	255	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1192	5	342	429	111	0	0	258	158
RTOR Reduction (vph)	0	0	0	0	0	152	0	0	0	0	0	134
Lane Group Flow (vph)	0	0	0	596	601	190	429	111	0	0	258	24
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				72.1	72.1	72.1	21.1	45.9			19.8	19.8
Effective Green, g (s)				72.1	72.1	72.1	21.1	45.9			19.8	19.8
Actuated g/C Ratio				0.55	0.55	0.55	0.16	0.35			0.15	0.15
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				932	935	877	557	657			539	241
v/s Ratio Prot				0.35	c0.36		c0.12	0.06			c0.07	
v/s Ratio Perm						0.12						0.02
v/c Ratio				0.64	0.64	0.22	0.77	0.17			0.48	0.10
Uniform Delay, d1				20.0	20.0	14.7	52.1	28.9			50.4	47.4
Progression Factor				1.00	1.00	1.00	0.99	1.14			1.00	1.00
Incremental Delay, d2				3.4	1.5	0.6	6.4	0.1			0.7	0.2
Delay (s)				23.3	21.6	15.2	58.0	33.2			51.1	47.6
Level of Service				C	C	B	E	C			D	D
Approach Delay (s)		0.0			20.8			52.9			49.7	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	450	440	880	95	1340
Turn Type	NA	Prot	NA	Free	Prot	NA
Protected Phases	4	4	2		1	6
Permitted Phases				Free		
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	30.0		4.0	30.0
Minimum Split (s)	10.0	10.0	36.0		10.0	36.0
Total Split (s)	48.0	48.0	62.0		20.0	82.0
Total Split (%)	36.9%	36.9%	47.7%		15.4%	63.1%
Yellow Time (s)	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		None	C-Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	450	0	0	0	0	440	880	95	1340	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	0.88					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1780	2787					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1780	2787					3539	2787	1770	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99	0.92	0.99	0.92
Adj. Flow (vph)	158	11	489	0	0	0	0	444	889	103	1354	0
RTOR Reduction (vph)	0	0	69	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	169	420	0	0	0	0	444	889	103	1354	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		26.3	26.3					73.8	130.0	12.9	91.7	
Effective Green, g (s)		26.3	26.3					73.8	130.0	12.9	91.7	
Actuated g/C Ratio		0.20	0.20					0.57	1.00	0.10	0.71	
Clearance Time (s)		6.0	6.0					6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		360	563					2009	2787	175	2496	
v/s Ratio Prot			c0.15					0.13		0.06	c0.38	
v/s Ratio Perm		0.09							0.32			
v/c Ratio		0.47	0.75					0.22	0.32	0.59	0.54	
Uniform Delay, d1		45.7	48.7					13.9	0.0	56.0	9.1	
Progression Factor		1.00	1.00					1.00	1.00	1.23	0.36	
Incremental Delay, d2		1.0	5.4					0.3	0.3	4.1	0.7	
Delay (s)		46.7	54.1					14.1	0.3	73.2	4.0	
Level of Service		D	D					B	A	E	A	
Approach Delay (s)		52.2			0.0			4.9			8.9	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	270	35	190	410	95	30	915	340	95	1325	370
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	39.0	44.0		39.0	44.0		33.0	65.0		52.0	84.0	
Total Split (%)	19.5%	22.0%		19.5%	22.0%		16.5%	32.5%		26.0%	42.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	

Intersection Summary
Cycle Length: 200
Actuated Cycle Length: 151.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	270	35	190	410	95	30	915	340	95	1325	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	446	293	38	207	446	103	33	995	370	103	1440	402
RTOR Reduction (vph)	0	0	27	0	0	37	0	0	140	0	0	103
Lane Group Flow (vph)	446	293	11	207	446	66	33	995	230	103	1440	299
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	25.7	30.6	42.3	14.9	19.8	35.9	5.7	74.3	95.2	10.1	78.7	110.4
Effective Green, g (s)	25.7	30.6	42.3	14.9	19.8	35.9	5.7	74.3	95.2	10.1	78.7	110.4
Actuated g/C Ratio	0.17	0.20	0.28	0.10	0.13	0.23	0.04	0.49	0.62	0.07	0.51	0.72
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	577	1017	437	334	658	371	127	2470	985	226	2617	1142
v/s Ratio Prot	c0.13	0.06		0.06	c0.09		0.01	0.20		c0.03	c0.28	
v/s Ratio Perm			0.01			0.04			0.15			0.19
v/c Ratio	0.77	0.29	0.02	0.62	0.68	0.18	0.26	0.40	0.23	0.46	0.55	0.26
Uniform Delay, d1	60.8	51.9	40.3	66.3	63.5	46.7	71.5	25.1	12.7	68.8	25.1	7.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.2	0.0	3.4	2.8	0.2	1.1	0.5	0.1	1.5	0.8	0.1
Delay (s)	67.2	52.1	40.3	69.7	66.3	46.9	72.6	25.6	12.9	70.2	26.0	7.4
Level of Service	E	D	D	E	E	D	E	C	B	E	C	A
Approach Delay (s)		60.2			64.6			23.3			24.5	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	152.9	Sum of lost time (s)	23.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

4/23/2013

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø4
Lane Configurations							
Volume (vph)	325	545	305	905	1320	340	
Turn Type	NA	custom	Prot	NA	NA	custom	
Protected Phases	7		5	2	6		4
Permitted Phases		4 5				6 7	
Detector Phase	7	4 5	5	2	6	6 7	
Switch Phase							
Minimum Initial (s)	4.0		4.0	30.0	30.0		4.0
Minimum Split (s)	10.0		9.0	36.0	36.0		44.0
Total Split (s)	47.0		23.0	73.0	50.0		47.0
Total Split (%)	39.2%		19.2%	60.8%	41.7%		39%
Yellow Time (s)	4.0		3.0	4.0	4.0		4.0
All-Red Time (s)	2.0		2.0	2.0	2.0		2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		
Total Lost Time (s)	6.0		5.0	6.0	6.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?							
Recall Mode	None		None	C-Max	C-Max		None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 33 (28%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	325	545	305	905	1320	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	3433	5085	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	592	332	984	1435	370
RTOR Reduction (vph)	0	2	0	0	0	13
Lane Group Flow (vph)	353	590	332	984	1435	357
Turn Type	NA	custom	Prot	NA	NA	custom
Protected Phases	7		5	2	6	
Permitted Phases		4 5				6 7
Actuated Green, G (s)	38.7	61.1	16.4	69.3	47.9	92.6
Effective Green, g (s)	38.7	61.1	16.4	69.3	47.9	92.6
Actuated g/C Ratio	0.32	0.51	0.14	0.58	0.40	0.77
Clearance Time (s)	6.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1107	806	469	2936	2029	1221
v/s Ratio Prot	0.10		0.10	0.19	c0.28	
v/s Ratio Perm		c0.37				0.23
v/c Ratio	0.32	0.73	0.71	0.34	0.71	0.29
Uniform Delay, d1	30.7	23.0	49.5	13.3	30.2	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	3.4	4.8	0.3	2.1	0.1
Delay (s)	30.9	26.5	54.4	13.6	32.3	4.2
Level of Service	C	C	D	B	C	A
Approach Delay (s)	28.1			23.9	26.5	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

4/23/2013

Lane Group	EBR	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	100	305	905	115	505	1255	105
Turn Type	Free	Over	NA	Perm	Prot	NA	Perm
Protected Phases		1	2		1	6	
Permitted Phases	Free			2			6
Detector Phase		1	2	2	1	6	6
Switch Phase							
Minimum Initial (s)		4.0	30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0	37.0	37.0	10.0	37.0	37.0
Total Split (s)		63.0	57.0	57.0	63.0	120.0	120.0
Total Split (%)		52.5%	47.5%	47.5%	52.5%	100.0%	100.0%
Yellow Time (s)		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag		Lead	Lag	Lag	Lead		
Lead-Lag Optimize?							
Recall Mode		None	Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 60.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	0	0	305	0	905	115	505	1255	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00			1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86			0.86		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611			1611		5085	1583	3433	5085	1583
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611			1611		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	0	0	332	0	984	125	549	1364	114
RTOR Reduction (vph)	0	0	0	0	0	35	0	0	61	0	0	0
Lane Group Flow (vph)	0	0	109	0	0	297	0	984	64	549	1364	114
Turn Type			Free			Over		NA	Perm	Prot	NA	Perm
Protected Phases						1		2		1	6	
Permitted Phases			Free						2			6
Actuated Green, G (s)			60.2			17.3		30.9	30.9	17.3	60.2	60.2
Effective Green, g (s)			60.2			17.3		30.9	30.9	17.3	60.2	60.2
Actuated g/C Ratio			1.00			0.29		0.51	0.51	0.29	1.00	1.00
Clearance Time (s)						6.0		6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)						3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611			462		2610	812	986	5085	1583
v/s Ratio Prot						c0.18		c0.19		0.16	0.27	
v/s Ratio Perm			0.07						0.04			0.07
v/c Ratio			0.07			0.64		0.38	0.08	0.56	0.27	0.07
Uniform Delay, d1			0.0			18.8		8.8	7.4	18.2	0.0	0.0
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1			3.1		0.1	0.0	0.7	0.0	0.0
Delay (s)			0.1			21.8		8.9	7.5	18.9	0.0	0.0
Level of Service			A			C		A	A	B	A	A
Approach Delay (s)		0.1			21.8			8.8			5.1	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	130	280	215	255	445	325	700	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	19.0	40.0		19.0	40.0		20.0	40.0	21.0	41.0	
Total Split (%)	15.8%	33.3%		15.8%	33.3%		16.7%	33.3%	17.5%	34.2%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 114.5
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	130	280	215	255	445	205	325	700	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4845		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4845		3433	5085	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)	304	228	310	141	304	234	277	484	223	353	761	359
RTOR Reduction (vph)	0	0	48	0	0	50	0	68	0	0	0	105
Lane Group Flow (vph)	304	228	262	141	304	184	277	639	0	353	761	254
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.3	32.7	52.2	10.1	29.5	50.6	13.5	34.4		15.1	36.0	55.3
Effective Green, g (s)	13.3	32.7	52.2	10.1	29.5	50.6	13.5	34.4		15.1	36.0	55.3
Actuated g/C Ratio	0.12	0.29	0.46	0.09	0.26	0.44	0.12	0.30		0.13	0.31	0.48
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	399	532	722	303	480	700	405	1458		453	1601	765
v/s Ratio Prot	c0.09	c0.12		0.04	c0.16		0.08	0.13		c0.10	c0.15	
v/s Ratio Perm			0.17			0.12						0.16
v/c Ratio	0.76	0.43	0.36	0.47	0.63	0.26	0.68	0.44		0.78	0.48	0.33
Uniform Delay, d1	49.0	33.2	20.2	49.5	37.6	20.1	48.4	32.2		48.0	31.5	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.4	0.6	0.3	1.1	2.7	0.2	4.7	0.2		8.3	0.2	0.3
Delay (s)	57.3	33.8	20.5	50.7	40.3	20.3	53.1	32.4		56.2	31.8	18.4
Level of Service	E	C	C	D	D	C	D	C		E	C	B
Approach Delay (s)		37.4			35.6			38.2			34.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	114.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	365	795	65	360	495	195	70	345	230	311	338	476
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		14.0	44.0		18.0	48.0	
Total Split (%)	29.3%	29.3%	29.3%	29.3%	29.3%		9.3%	29.3%		12.0%	32.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 127.2
Natural Cycle: 145
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	365	795	65	360	495	195	70	345	230	311	338	476
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.94	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
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)	397	864	71	391	538	212	76	375	250	338	367	517
RTOR Reduction (vph)	0	0	50	0	0	0	0	0	30	0	0	68
Lane Group Flow (vph)	397	864	21	391	538	212	76	375	220	338	367	449
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	31.4	36.8	36.8	22.1	27.5	46.1	8.8	31.9	60.0	12.6	35.7	73.1
Effective Green, g (s)	31.4	36.8	36.8	22.1	27.5	46.1	8.8	31.9	60.0	12.6	35.7	73.1
Actuated g/C Ratio	0.25	0.29	0.29	0.17	0.22	0.36	0.07	0.25	0.47	0.10	0.28	0.58
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1239	1030	460	600	1106	1016	123	893	751	497	999	1611
v/s Ratio Prot	0.08	c0.24		c0.11	0.11	0.08	0.04	c0.11		c0.07	c0.10	0.16
v/s Ratio Perm			0.01						0.14			
v/c Ratio	0.32	0.84	0.04	0.65	0.49	0.21	0.62	0.42	0.29	0.68	0.37	0.28
Uniform Delay, d1	38.8	42.0	32.2	48.6	43.3	27.6	57.2	39.5	20.3	55.0	36.3	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	6.1	0.0	2.5	0.3	0.1	8.9	0.3	0.2	3.8	0.2	0.1
Delay (s)	38.9	48.1	32.2	51.1	43.6	27.7	66.1	39.8	20.5	58.8	36.5	13.5
Level of Service	D	D	C	D	D	C	E	D	C	E	D	B
Approach Delay (s)		44.5			43.2			35.8			32.9	
Approach LOS		D			D			D			C	

Intersection Summary				
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	126.4	Sum of lost time (s)	23.0	
Intersection Capacity Utilization	67.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

4/23/2013

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	625	0	55	5	915	150	1360
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	625	0	55	5	915	575	150	1360	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.91	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3334		1770	5085	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3334		1770	5085	
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	0	11	679	0	60	5	995	625	163	1478	0
RTOR Reduction (vph)	0	11	0	0	0	47	0	50	0	0	0	0
Lane Group Flow (vph)	0	0	0	339	340	13	5	1570	0	163	1478	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		2.2		40.2	40.2	40.2	1.5	98.5		19.1	116.1	
Effective Green, g (s)		2.2		40.2	40.2	40.2	1.5	98.5		19.1	116.1	
Actuated g/C Ratio		0.01		0.22	0.22	0.22	0.01	0.55		0.11	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		19		375	375	353	14	1824		187	3279	
v/s Ratio Prot		c0.00		0.20	c0.20		0.00	c0.47		c0.09	0.29	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.90	0.91	0.04	0.36	0.86		0.87	0.45	
Uniform Delay, d1		87.8		68.0	68.1	54.8	88.8	34.9		79.2	16.0	
Progression Factor		1.00		1.00	1.00	1.00	1.27	0.74		1.00	1.00	
Incremental Delay, d2		0.1		24.3	24.7	0.0	12.7	4.8		33.0	0.4	
Delay (s)		88.0		92.3	92.7	54.8	125.2	30.5		112.2	16.4	
Level of Service		F		F	F	D	F	C		F	B	
Approach Delay (s)		88.0			89.5			30.8			26.0	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

4/23/2013

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	415	25	1435	920	2075
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	415	25	1435	920	0	2075
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.91
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		5085
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	451	27	1560	1000	0	2255
RTOR Reduction (vph)	0	23	0	163	0	0
Lane Group Flow (vph)	451	4	1560	837	0	2255
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	29.3	29.3	138.7	138.7		138.7
Effective Green, g (s)	29.3	29.3	138.7	138.7		138.7
Actuated g/C Ratio	0.16	0.16	0.77	0.77		0.77
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	558	257	2726	1219		3918
v/s Ratio Prot	c0.13		0.44			0.44
v/s Ratio Perm		0.00		c0.53		
v/c Ratio	0.81	0.02	0.57	0.69		0.58
Uniform Delay, d1	72.6	63.3	8.5	10.1		8.5
Progression Factor	1.00	1.00	1.00	1.00		0.88
Incremental Delay, d2	8.4	0.0	0.9	3.2		0.5
Delay (s)	81.1	63.3	9.4	13.2		8.1
Level of Service	F	E	A	B		A
Approach Delay (s)	80.1		10.9			8.1
Approach LOS	F		B			A

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

4/23/2013

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2165	1760	740	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2353	1913	804	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.81				0.81	0.81
vC, conflicting volume	2717				3100	1040
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2298				2770	225
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	175				12	630

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	784	784	784	765	765	1187
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	804
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.46	0.46	0.46	0.45	0.45	0.70
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

4/23/2013

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	55	2165	1760
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 69.2
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	55	2165	1760	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.91	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	5085	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	60	2353	1913	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	60	2353	1913	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			4.9	71.7	54.8	
Effective Green, g (s)			4.9	71.7	54.8	
Actuated g/C Ratio			0.07	1.00	0.76	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			120	5085	3886	
v/s Ratio Prot			0.03	c0.46	0.38	
v/s Ratio Perm						
v/c Ratio			0.50	0.46	0.49	
Uniform Delay, d1			32.2	0.0	3.2	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			3.3	0.1	0.1	
Delay (s)			35.4	0.1	3.3	
Level of Service			D	A	A	
Approach Delay (s)	0.0			0.9	3.3	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	2.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	71.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: H-1 WB Off-Ramp & H-1 WB Lp Off-Ramp & Kunia Rd

4/23/2013

Intersection Sign configuration not allowed in HCM analysis.

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/23/2013

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	395	140	1045	680	3150
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 161.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	0	140	0	0	0	0	1045	0	680	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.86	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	6408	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	6408	
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)	429	0	152	0	0	0	0	1136	0	739	3424	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	429	0	152	0	0	0	0	1136	0	739	3424	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	25.2		161.3					81.1		37.0	124.1	
Effective Green, g (s)	25.2		161.3					81.1		37.0	124.1	
Actuated g/C Ratio	0.16		1.00					0.50		0.23	0.77	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	536		1583					1779		787	4930	
v/s Ratio Prot	c0.12							0.32		c0.22	c0.53	
v/s Ratio Perm			0.10									
v/c Ratio	0.80		0.10					0.64		0.94	0.69	
Uniform Delay, d1	65.6		0.0					29.4		61.0	9.2	
Progression Factor	1.00		1.00					1.00		0.99	0.97	
Incremental Delay, d2	8.4		0.1					0.8		18.6	0.4	
Delay (s)	74.0		0.1					30.1		79.1	9.4	
Level of Service	E		A					C		E	A	
Approach Delay (s)		54.7			0.0			30.1			21.8	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	161.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1610	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1610	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1750	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1750	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.49			
v/s Ratio Perm						
v/c Ratio			0.55			
Uniform Delay, d1			1.5			
Progression Factor			1.00			
Incremental Delay, d2			0.7			
Delay (s)			2.2			
Level of Service			A			
Approach Delay (s)	0.0		2.2			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

4/23/2013

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	1045	1610	0	3290	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1136	1750	0	3576	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.72	
vC, conflicting volume			2886		2030	568
vC1, stage 1 conf vol					1136	
vC2, stage 2 conf vol					894	
vCu, unblocked vol			2886		501	568
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			126		218	466

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	568	568	875	875	894	894	894	894
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	875	875	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.33	0.33	0.51	0.51	0.53	0.53	0.53	0.53
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

4/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	120	2695	65	0	3290
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.99
Hourly flow rate (vph)	0	130	2929	71	0	3323
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						1003
pX, platoon unblocked	0.26					
vC, conflicting volume	4039	978			2931	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2717	978			2931	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	48			100	
cM capacity (veh/h)	4	249			120	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	130	976	976	976	71	1108	1108	1108
Volume Left	0	0	0	0	0	0	0	0
Volume Right	130	0	0	0	71	0	0	0
cSH	249	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.52	0.57	0.57	0.57	0.04	0.65	0.65	0.65
Queue Length 95th (ft)	69	0	0	0	0	0	0	0
Control Delay (s)	34.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D							
Approach Delay (s)	34.3	0.0				0.0		
Approach LOS	D							

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	125	150	40	5	115	50	2090	35	115	2835	125
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	150	35	40	5	115	50	2090	35	115	2835	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797		1743	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1797		547	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	130%	100%	100%	100%
Adj. Flow (vph)	136	163	38	43	5	125	54	2272	49	125	2864	136
RTOR Reduction (vph)	0	3	0	0	0	13	0	0	16	0	0	23
Lane Group Flow (vph)	136	198	0	43	5	112	54	2272	33	125	2864	113
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	63.9	9.6	163.1	163.1	20.9	174.4	174.4
Effective Green, g (s)	37.0	37.0		37.0	37.0	63.9	9.6	163.1	163.1	20.9	174.4	174.4
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.27	0.04	0.68	0.68	0.09	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	277		84	287	421	70	3455	1048	154	3695	1088
v/s Ratio Prot		c0.11			0.00		0.03	0.45		c0.07	c0.56	
v/s Ratio Perm	0.10			0.08		0.07			0.02			0.08
v/c Ratio	0.63	0.71		0.51	0.02	0.27	0.77	0.66	0.03	0.81	0.78	0.10
Uniform Delay, d1	95.1	96.5		93.2	86.1	69.5	114.1	22.3	12.6	107.6	20.5	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.80	0.79	4.35	1.00	1.00	1.00
Incremental Delay, d2	5.6	8.4		5.2	0.0	0.3	32.4	0.8	0.0	26.7	1.7	0.2
Delay (s)	100.7	104.9		98.4	86.1	69.9	123.8	18.3	54.8	134.3	22.2	9.9
Level of Service	F	F		F	F	E	F	B	D	F	C	A
Approach Delay (s)		103.2			77.4			21.5			26.1	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	100	85	35	10	115	60	2145	50	160	2845	75
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	24.0	154.0	154.0	46.0	176.0	176.0
Total Split (%)	16.7%	16.7%	16.7%	16.7%	16.7%	16.7%	10.0%	64.2%	64.2%	19.2%	73.3%	73.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	100	85	35	10	115	60	2145	50	160	2845	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1859	1533		1772	1583	1770	5085	1551	1770	5085	1545
Flt Permitted		0.99	1.00		0.44	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1841	1533		803	1583	1770	5085	1551	1770	5085	1545
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	109	92	38	11	125	65	2332	54	174	2874	82
RTOR Reduction (vph)	0	0	83	0	0	113	0	0	16	0	0	19
Lane Group Flow (vph)	0	114	9	0	49	12	65	2332	38	174	2874	63
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		23.0	23.0		23.0	23.0	14.2	169.1	169.1	28.9	183.8	183.8
Effective Green, g (s)		23.0	23.0		23.0	23.0	14.2	169.1	169.1	28.9	183.8	183.8
Actuated g/C Ratio		0.10	0.10		0.10	0.10	0.06	0.70	0.70	0.12	0.77	0.77
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		176	146		76	151	104	3582	1092	213	3894	1183
v/s Ratio Prot							0.04	0.46		c0.10	c0.57	
v/s Ratio Perm		c0.06	0.01		0.06	0.01			0.02			0.04
v/c Ratio		0.65	0.06		0.64	0.08	0.62	0.65	0.03	0.82	0.74	0.05
Uniform Delay, d1		104.6	98.7		104.6	98.9	110.3	19.3	10.7	103.0	15.1	6.9
Progression Factor		1.00	1.00		1.00	1.00	1.08	0.80	1.24	0.86	0.83	1.71
Incremental Delay, d2		8.0	0.2		17.2	0.2	9.4	0.8	0.0	15.0	0.9	0.1
Delay (s)		112.5	98.8		121.8	99.1	129.0	16.3	13.3	103.4	13.4	11.8
Level of Service		F	F		F	F	F	B	B	F	B	B
Approach Delay (s)		106.4			105.5			19.2			18.3	
Approach LOS		F			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2225	3120	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 97 (81%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2225	3120	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2418	3152	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2418	3152	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.48	c0.62	
v/s Ratio Perm						
v/c Ratio				0.62	0.81	
Uniform Delay, d1				6.1	8.4	
Progression Factor				0.87	1.47	
Incremental Delay, d2				0.6	1.3	
Delay (s)				5.9	13.6	
Level of Service				A	B	
Approach Delay (s)	0.0			5.9	13.6	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	30	165	15	20	185	1785	35	40	2465	395
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4		3			2			6
Detector Phase	4	4	4	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0	41.0	11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0	43.0	14.0	14.0	35.0	153.0	153.0	30.0	148.0	148.0
Total Split (%)	17.9%	17.9%	17.9%	5.8%	5.8%	14.6%	63.8%	63.8%	12.5%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 33 (14%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	30	165	25	15	20	185	1785	35	40	2465	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
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)	326	33	179	27	16	22	201	1940	38	43	2679	429
RTOR Reduction (vph)	0	0	91	0	0	21	0	0	12	0	0	170
Lane Group Flow (vph)	179	180	88	0	43	1	201	1940	26	43	2679	259
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4			3			2			6
Actuated Green, G (s)	33.0	33.0	33.0		7.7	7.7	29.4	165.2	165.2	9.1	144.9	144.9
Effective Green, g (s)	33.0	33.0	33.0		7.7	7.7	29.4	165.2	165.2	9.1	144.9	144.9
Actuated g/C Ratio	0.14	0.14	0.14		0.03	0.03	0.12	0.69	0.69	0.04	0.60	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	231	233	196		57	50	216	3500	957	67	3070	812
v/s Ratio Prot	c0.11	0.11			c0.02		c0.11	0.38		0.02	c0.53	
v/s Ratio Perm			0.06			0.00			0.02			0.19
v/c Ratio	0.77	0.77	0.45		0.75	0.01	0.93	0.55	0.03	0.64	0.87	0.32
Uniform Delay, d1	99.9	99.9	95.1		115.2	112.5	104.3	18.8	11.9	113.8	39.8	23.3
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.99	1.30	81.26	0.96	0.82	4.13
Incremental Delay, d2	14.9	14.6	1.6		38.8	0.0	37.9	0.5	0.0	9.7	2.5	0.7
Delay (s)	114.8	114.5	96.7		154.0	112.5	141.5	25.0	965.3	118.6	35.1	97.1
Level of Service	F	F	F		F	F	F	C	F	F	D	F
Approach Delay (s)		108.7			139.9			52.1			44.7	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	54.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	108.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	235	75	50	85	405	35	1385	5	420	1970	450
Turn Type	Split	NA	custom	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4 1	5	2		1	6	
Permitted Phases			3 5					2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0		10.0		10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	65.0	65.0		33.0		27.0	96.0	96.0	46.0	115.0	115.0
Total Split (%)	27.1%	27.1%		13.8%		11.3%	40.0%	40.0%	19.2%	47.9%	47.9%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 68 (28%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	75	50	10	85	405	35	1385	5	420	1970	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	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)	255	82	54	11	92	440	38	1505	5	457	2141	489
RTOR Reduction (vph)	0	0	45	0	0	147	0	0	2	0	0	144
Lane Group Flow (vph)	166	171	9	0	103	293	38	1505	3	457	2141	345
Turn Type	Split	NA	custom	Split	NA	pt+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases			3 5						2			6
Actuated Green, G (s)	29.3	29.3	39.8		22.9	66.0	10.5	125.7	125.7	37.1	152.3	152.3
Effective Green, g (s)	29.3	29.3	39.8		22.9	66.0	10.5	125.7	125.7	37.1	152.3	152.3
Actuated g/C Ratio	0.12	0.12	0.17		0.10	0.28	0.04	0.52	0.52	0.15	0.63	0.63
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	210	262		176	766	77	2663	829	530	3226	1004
v/s Ratio Prot	0.10	c0.10			c0.06	0.11	0.02	0.30		c0.13	c0.42	
v/s Ratio Perm			0.01						0.00			0.22
v/c Ratio	0.81	0.81	0.03		0.59	0.38	0.49	0.57	0.00	0.86	0.66	0.34
Uniform Delay, d1	102.6	102.7	84.0		104.0	70.5	112.2	38.7	27.3	99.0	27.7	20.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.75	1.62	1.00	1.39	0.29	0.07
Incremental Delay, d2	20.5	20.9	0.1		4.9	0.3	4.2	0.7	0.0	8.5	0.6	0.6
Delay (s)	123.1	123.6	84.0		108.9	70.8	88.7	63.3	27.3	145.9	8.7	2.0
Level of Service	F	F	F		F	E	F	E	C	F	A	A
Approach Delay (s)		117.9			78.0			63.8			27.9	
Approach LOS		F			E			E			C	

Intersection Summary				
HCM 2000 Control Delay	49.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	72.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1060	40	390	1525	255
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 134 (56%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 125
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1060	40	390	1525	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	266	332	223	38	375	266	228	1152	43	424	1540	277
RTOR Reduction (vph)	0	0	57	0	0	53	0	0	16	0	0	97
Lane Group Flow (vph)	194	404	166	38	375	213	228	1152	27	424	1540	180
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Effective Green, g (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Actuated g/C Ratio	0.14	0.14	0.22	0.21	0.21	0.35	0.08	0.41	0.62	0.14	0.47	0.47
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	224	467	346	367	386	1032	273	2091	979	473	2387	743
v/s Ratio Prot	c0.12	0.12		0.02	c0.20	0.04	0.07	0.23		c0.12	c0.30	
v/s Ratio Perm			0.10			0.03			0.02			0.11
v/c Ratio	0.87	0.87	0.48	0.10	0.97	0.21	0.84	0.55	0.03	0.90	0.65	0.24
Uniform Delay, d1	101.1	101.1	81.8	77.0	94.4	55.4	108.9	53.8	17.7	101.8	48.4	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	0.35	0.40
Incremental Delay, d2	26.9	14.9	0.4	0.0	38.0	0.0	18.5	1.1	0.0	15.3	1.0	0.6
Delay (s)	128.0	115.9	82.2	77.1	132.4	55.4	127.4	54.8	17.7	127.5	18.1	15.9
Level of Service	F	F	F	E	F	E	F	D	B	F	B	B
Approach Delay (s)		109.6			99.1			65.3			38.5	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	65.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	590	35	15	755	50	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	641	38	16	821	54	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			679		1103	340
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			679		1103	340
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		73	98
cM capacity (veh/h)			909		202	656

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	428	252	290	547	54	16
Volume Left	0	0	16	0	54	0
Volume Right	0	38	0	0	0	16
cSH	1700	1700	909	1700	202	656
Volume to Capacity	0.25	0.15	0.02	0.32	0.27	0.02
Queue Length 95th (ft)	0	0	1	0	26	2
Control Delay (s)	0.0	0.0	0.7	0.0	29.3	10.6
Lane LOS			A		D	B
Approach Delay (s)	0.0		0.2		25.0	
Approach LOS					C	

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		41.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	615	0	180	750	0	60
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	668	0	196	815	0	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			668		1467	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			668		1467	334
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		100	90
cM capacity (veh/h)			917		93	662

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	334	334	467	543	65
Volume Left	0	0	196	0	0
Volume Right	0	0	0	0	65
cSH	1700	1700	917	1700	662
Volume to Capacity	0.20	0.20	0.21	0.32	0.10
Queue Length 95th (ft)	0	0	20	0	8
Control Delay (s)	0.0	0.0	5.7	0.0	11.0
Lane LOS			A		B
Approach Delay (s)	0.0		2.6		11.0
Approach LOS					B

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization		49.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay		8.0	
Level of Service		A	
Intersection Capacity Utilization		25.7%	ICU Level of Service A
Analysis Period (min)		15	

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	670	670	745
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 87.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

4/23/2013

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	670	0	670	745	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	728	0	728	810	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	728	0	728	810	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	24.5		51.3	87.8		
Effective Green, g (s)	24.5		51.3	87.8		
Actuated g/C Ratio	0.28		0.58	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	987		1034	3539		
v/s Ratio Prot	c0.21		c0.41	0.23		
v/s Ratio Perm						
v/c Ratio	0.74		0.70	0.23		
Uniform Delay, d1	28.7		12.9	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	2.9		2.2	0.0		
Delay (s)	31.6		15.1	0.0		
Level of Service	C		B	A		
Approach Delay (s)	31.6			7.2	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	87.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	255	955	1460	550
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 77.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	255	955	1460	550	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	1038	1587	598	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	277	1038	1587	598	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	18.8	77.8	48.0	77.8		
Effective Green, g (s)	18.8	77.8	48.0	77.8		
Actuated g/C Ratio	0.24	1.00	0.62	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	427	3539	2183	1583		
v/s Ratio Prot	c0.16	0.29	c0.45			
v/s Ratio Perm				0.38		
v/c Ratio	0.65	0.29	0.73	0.38		
Uniform Delay, d1	26.5	0.0	10.3	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.4	0.0	1.2	0.7		
Delay (s)	29.8	0.0	11.6	0.7		
Level of Service	C	A	B	A		
Approach Delay (s)		6.3	8.6		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	11.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

4/23/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	715	485	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	777	527	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	543				978	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	543				978	272
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	87
cM capacity (veh/h)	1022				241	726

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	389	389	351	192	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	1022	1700	1700	1700	1700	241	726
Volume to Capacity	0.03	0.23	0.23	0.21	0.11	0.09	0.13
Queue Length 95th (ft)	2	0	0	0	0	7	11
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	21.4	10.7
Lane LOS	A					C	B
Approach Delay (s)	0.3			0.0		12.7	
Approach LOS						B	

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	425	45	5	295	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	462	49	5	321	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332			511			957	1035	255	780	1054	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			511			957	1035	255	780	1054	166
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			85	100	99	100	100	89
cM capacity (veh/h)	1225			1051			176	210	744	264	204	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	103	308	203	5	214	118	33	0	92
Volume Left	103	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	1225	1700	1700	1051	1700	1700	202	1700	849
Volume to Capacity	0.08	0.18	0.12	0.01	0.13	0.07	0.16	0.00	0.11
Queue Length 95th (ft)	7	0	0	0	0	0	14	0	9
Control Delay (s)	8.2	0.0	0.0	8.4	0.0	0.0	26.2	0.0	9.8
Lane LOS	A			A			D	A	A
Approach Delay (s)	1.4			0.1			26.2	9.8	
Approach LOS							D	A	

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization		29.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	245	40	5	220	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	266	43	5	239	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	250			310			804	864	155	707	880	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			310			804	864	155	707	880	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			90	98	100	100	100	92
cM capacity (veh/h)	1313			1248			229	254	863	287	249	902

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	178	132	5	159	91	27	0	71
Volume Left	158	0	0	5	0	0	22	0	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	1313	1700	1700	1248	1700	1700	233	1700	902
Volume to Capacity	0.12	0.10	0.08	0.00	0.09	0.05	0.12	0.00	0.08
Queue Length 95th (ft)	10	0	0	0	0	0	10	0	6
Control Delay (s)	8.1	0.0	0.0	7.9	0.0	0.0	22.5	0.0	9.3
Lane LOS	A			A			C	A	A
Approach Delay (s)	2.7			0.2			22.5	9.3	
Approach LOS							C	A	

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		27.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	105	25	5	120	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	114	27	5	130	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	141			141			568	530	71	454	538	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			141			568	530	71	454	538	71
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			95	100	100	100	100	88
cM capacity (veh/h)	1439			1439			334	412	977	456	408	977

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	76	65	5	87	54	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	1439	1700	1700	1439	1700	1700	334	1700	977
Volume to Capacity	0.09	0.04	0.04	0.00	0.05	0.03	0.05	0.00	0.12
Queue Length 95th (ft)	7	0	0	0	0	0	4	0	10
Control Delay (s)	7.7	0.0	0.0	7.5	0.0	0.0	16.3	0.0	9.2
Lane LOS	A			A			C	A	A
Approach Delay (s)	3.6			0.3			16.3	9.2	
Approach LOS							C	A	

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		23.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

4/23/2013

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	70	30	95	15	25	35
Sign Control	Free			Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	33	103	16	27	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		220	168	185	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		220	168	185	0
tC, single (s)	4.1		7.1	6.5	6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2		3.5	4.0	4.0	3.3
p0 queue free %	95		84	98	96	96
cM capacity (veh/h)	1623		664	690	676	1085

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	120	65
Volume Left	76	103	0
Volume Right	33	0	38
cSH	1623	667	867
Volume to Capacity	0.05	0.18	0.08
Queue Length 95th (ft)	4	16	6
Control Delay (s)	5.2	11.6	9.5
Lane LOS	A	B	A
Approach Delay (s)	5.2	11.6	9.5
Approach LOS		B	A

Intersection Summary				
Average Delay		8.8		
Intersection Capacity Utilization		25.1%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	430	0	435	475	595	555	790
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 84
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	430	0	435	475	595	0	0	555	790
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1550	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1550	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	467	0	473	516	647	0	0	603	859
RTOR Reduction (vph)	0	0	0	0	0	175	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	233	234	298	516	647	0	0	603	859
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				22.5	22.5	22.5	28.3	49.0			14.7	83.5
Effective Green, g (s)				22.5	22.5	22.5	28.3	49.0			14.7	83.5
Actuated g/C Ratio				0.27	0.27	0.27	0.34	0.59			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				452	452	417	599	2076			623	1583
v/s Ratio Prot							c0.29	0.18			c0.17	
v/s Ratio Perm				0.14	0.14	c0.19						0.54
v/c Ratio				0.52	0.52	0.72	0.86	0.31			0.97	0.54
Uniform Delay, d1				25.9	25.9	27.6	25.8	8.7			34.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.0	1.0	5.8	12.1	0.1			27.8	1.3
Delay (s)				26.9	26.9	33.4	37.9	8.8			62.0	1.3
Level of Service				C	C	C	D	A			E	A
Approach Delay (s)		0.0			30.1			21.7			26.4	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	5	325	425	190	570
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 92.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

4/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	430	5	325	0	0	0	0	425	220	190	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1775	1563					3330		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1775	1563					3330		1770	3539	
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)	467	5	353	0	0	0	0	462	239	207	620	0
RTOR Reduction (vph)	0	0	227	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	0	472	126	0	0	0	0	648	0	207	620	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.4	32.4					25.1		16.5	47.6	
Effective Green, g (s)		32.4	32.4					25.1		16.5	47.6	
Actuated g/C Ratio		0.35	0.35					0.27		0.18	0.52	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		625	550					908		317	1831	
v/s Ratio Prot								c0.19		c0.12	0.18	
v/s Ratio Perm		0.27	0.08									
v/c Ratio		0.76	0.23					0.71		0.65	0.34	
Uniform Delay, d1		26.3	21.0					30.2		35.1	13.0	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		5.2	0.2					2.7		4.8	0.1	
Delay (s)		31.5	21.2					32.9		39.9	13.1	
Level of Service		C	C					C		D	B	
Approach Delay (s)		27.1			0.0			32.9			19.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	715	0	40	430	60	265	10
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	50.0	50.0	50.0	30.0	60.0	30.0	30.0
Total Split (%)	45.5%	45.5%	45.5%	27.3%	54.5%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	715	0	40	430	60	0	0	265	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	722	0	43	434	61	0	0	268	11
RTOR Reduction (vph)	0	0	0	0	0	21	0	0	0	0	0	9
Lane Group Flow (vph)	0	0	0	361	361	22	434	61	0	0	268	2
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				55.3	55.3	55.3	19.1	42.7			19.6	19.6
Effective Green, g (s)				55.3	55.3	55.3	19.1	42.7			19.6	19.6
Actuated g/C Ratio				0.50	0.50	0.50	0.17	0.39			0.18	0.18
Clearance Time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				845	845	795	596	723			630	282
v/s Ratio Prot				c0.21	0.21		c0.13	0.03			c0.08	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.43	0.43	0.03	0.73	0.08			0.43	0.01
Uniform Delay, d1				17.3	17.3	13.8	43.0	21.3			40.2	37.2
Progression Factor				1.02	1.02	1.01	1.08	1.72			1.00	1.00
Incremental Delay, d2				1.6	0.3	0.1	4.4	0.0			0.5	0.0
Delay (s)				19.2	17.9	13.9	50.7	36.6			40.7	37.2
Level of Service				B	B	B	D	D			D	D
Approach Delay (s)		0.0			18.3			49.0			40.5	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	380	515	1305	115	980
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	30.0		46.0		34.0	80.0
Total Split (%)	27.3%		41.8%		30.9%	72.7%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	380	0	0	0	0	515	1305	115	980	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1794	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1794	1583					3539	2787	1770	3539	
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)	16	5	413	0	0	0	0	560	1418	125	1065	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	413	0	0	0	0	560	1418	125	1065	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		3.2	110.0					78.7	110.0	13.1	95.8	
Effective Green, g (s)		3.2	110.0					78.7	110.0	13.1	95.8	
Actuated g/C Ratio		0.03	1.00					0.72	1.00	0.12	0.87	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		52	1583					2531	2787	210	3082	
v/s Ratio Prot		0.01						0.16		0.07	0.30	
v/s Ratio Perm			0.26						c0.51			
v/c Ratio		0.40	0.26					0.22	0.51	0.60	0.35	
Uniform Delay, d1		52.5	0.0					5.3	0.0	45.9	1.3	
Progression Factor		1.00	1.00					1.00	1.00	1.06	0.64	
Incremental Delay, d2		5.1	0.4					0.2	0.7	4.3	0.3	
Delay (s)		57.5	0.4					5.5	0.7	53.1	1.1	
Level of Service		E	A					A	A	D	A	
Approach Delay (s)		3.2			0.0			2.0			6.6	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy

5/8/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	1955	1405	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	38	0	2125	1527	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1090	774	
pX, platoon unblocked	0.77					
vC, conflicting volume	2058	509	1582			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	853	509	1582			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	228	509	412			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	38	531	531	531	531	509	509	509	54
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	0	54
cSH	509	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.03
Queue Length 95th (ft)	6	0	0	0	0	0	0	0	0
Control Delay (s)	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B								
Approach Delay (s)	12.6	0.0				0.0			
Approach LOS	B								

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		37.1%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 145
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	310	614	87	185	212	76	250	1886	315	261	1223	190
RTOR Reduction (vph)	0	0	68	0	0	40	0	0	49	0	0	77
Lane Group Flow (vph)	310	614	19	185	212	36	250	1886	266	261	1223	113
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	18.1	32.0	32.0	14.1	28.0	49.6	18.1	64.3	83.4	16.6	62.8	85.9
Effective Green, g (s)	18.1	32.0	32.0	14.1	28.0	49.6	18.1	64.3	83.4	16.6	62.8	85.9
Actuated g/C Ratio	0.12	0.22	0.22	0.10	0.19	0.34	0.12	0.44	0.58	0.11	0.43	0.59
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	428	781	349	172	683	541	220	2254	910	393	2202	937
v/s Ratio Prot	0.09	c0.17		c0.10	0.06		c0.14	c0.37		0.08	0.24	
v/s Ratio Perm			0.01			0.02			0.17			0.07
v/c Ratio	0.72	0.79	0.06	1.08	0.31	0.07	1.14	0.84	0.29	0.66	0.56	0.12
Uniform Delay, d1	61.0	53.3	44.6	65.5	50.2	32.1	63.4	35.7	15.7	61.5	30.7	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	5.2	0.1	90.2	0.3	0.1	102.3	2.9	0.2	4.2	0.3	0.1
Delay (s)	67.0	58.5	44.6	155.6	50.5	32.2	165.7	38.6	15.9	65.7	31.0	13.0
Level of Service	E	E	D	F	D	C	F	D	B	E	C	B
Approach Delay (s)		59.9			88.7			48.6			34.4	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	49.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	45	95	405	130	1760	30	165	925	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	15.0	45.0		14.0	44.0		22.0	48.0		13.0	39.0	
Total Split (%)	12.5%	37.5%		11.7%	36.7%		18.3%	40.0%		10.8%	32.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 107.6
Natural Cycle: 85
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	45	95	405	130	1760	30	165	925	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	234	109	190	49	103	440	141	1913	33	179	1005	386
RTOR Reduction (vph)	0	0	70	0	0	56	0	0	16	0	0	180
Lane Group Flow (vph)	234	109	120	49	103	384	141	1913	17	179	1005	206
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	10.6	31.5	46.3	6.8	27.7	41.5	9.8	43.3	55.1	8.8	42.3	57.9
Effective Green, g (s)	10.6	31.5	46.3	6.8	27.7	41.5	9.8	43.3	55.1	8.8	42.3	57.9
Actuated g/C Ratio	0.10	0.29	0.43	0.06	0.26	0.38	0.09	0.40	0.51	0.08	0.39	0.53
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	335	541	676	111	476	606	310	2031	804	278	1984	845
v/s Ratio Prot	c0.07	c0.06		0.03	0.06		0.04	c0.38		0.05	0.20	
v/s Ratio Perm			0.08			c0.24			0.01			0.13
v/c Ratio	0.70	0.20	0.18	0.44	0.22	0.63	0.45	0.94	0.02	0.64	0.51	0.24
Uniform Delay, d1	47.4	29.0	19.2	49.0	31.8	27.3	46.8	31.3	13.2	48.3	25.1	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.2	0.1	2.8	0.2	2.2	1.1	9.5	0.0	5.0	0.2	0.2
Delay (s)	53.6	29.2	19.4	51.8	32.0	29.4	47.8	40.9	13.3	53.3	25.3	13.7
Level of Service	D	C	B	D	C	C	D	D	B	D	C	B
Approach Delay (s)		36.4			31.7			40.9			25.7	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	108.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/8/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	40	105	820	1280	75	240	810	125
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		47.0		45.0	45.0	28.0	73.0	73.0
Total Split (%)		39.2%		37.5%	37.5%	23.3%	60.8%	60.8%
Yellow Time (s)		3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)		1.0		2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0		5.0	5.0	4.0	5.0	5.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 117.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	105	0	820	0	1280	75	240	810	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0		4.0		5.0	5.0	4.0	5.0	5.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	1770	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	114	0	891	0	1391	82	261	880	136
RTOR Reduction (vph)	0	0	0	0	0	7	0	0	55	0	0	60
Lane Group Flow (vph)	0	0	43	114	0	884	0	1391	27	261	880	76
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			117.7	43.1		70.0		38.7	38.7	22.9	65.6	65.6
Effective Green, g (s)			117.7	43.1		70.0		38.7	38.7	22.9	65.6	65.6
Actuated g/C Ratio			1.00	0.37		0.59		0.33	0.33	0.19	0.56	0.56
Clearance Time (s)				4.0				5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	648		941		1671	520	344	2834	882
v/s Ratio Prot				0.06				c0.27		0.15	0.17	
v/s Ratio Perm			0.03			c0.56			0.02			0.05
v/c Ratio			0.03	0.18		0.94		0.83	0.05	0.76	0.31	0.09
Uniform Delay, d1			0.0	25.3		21.9		36.5	27.0	44.8	13.9	12.1
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.1		16.4		3.7	0.0	9.2	0.1	0.0
Delay (s)			0.0	25.4		38.3		40.2	27.0	54.0	14.0	12.2
Level of Service			A	C		D		D	C	D	B	B
Approach Delay (s)		0.0			36.8			39.5			22.0	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	117.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	175	220	605	185	665	195	655	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	21.0	54.0		16.0	49.0		19.0	51.0	19.0	51.0	
Total Split (%)	15.0%	38.6%		11.4%	35.0%		13.6%	36.4%	13.6%	36.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 118.1
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	175	220	605	185	665	55	195	655	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	5027		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	5027		3433	5085	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)	228	304	185	190	239	658	201	723	60	212	712	174
RTOR Reduction (vph)	0	0	29	0	0	39	0	7	0	0	0	97
Lane Group Flow (vph)	228	304	156	190	239	619	201	776	0	212	712	77
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.1	42.5	59.6	10.9	40.3	58.4	12.1	33.4		13.1	34.4	52.5
Effective Green, g (s)	13.1	42.5	59.6	10.9	40.3	58.4	12.1	33.4		13.1	34.4	52.5
Actuated g/C Ratio	0.11	0.36	0.51	0.09	0.34	0.50	0.10	0.28		0.11	0.29	0.45
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	381	671	800	317	636	784	352	1424		381	1483	704
v/s Ratio Prot	c0.07	0.16		0.06	0.13		0.06	c0.15		0.06	0.14	
v/s Ratio Perm			0.10			c0.39						0.05
v/c Ratio	0.60	0.45	0.19	0.60	0.38	0.79	0.57	0.54		0.56	0.48	0.11
Uniform Delay, d1	49.9	28.8	16.0	51.4	29.3	24.6	50.4	35.8		49.6	34.4	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.5	0.5	0.1	3.0	0.4	5.3	2.2	0.4		1.8	0.2	0.1
Delay (s)	52.4	29.3	16.1	54.4	29.7	30.0	52.7	36.2		51.4	34.6	19.1
Level of Service	D	C	B	D	C	C	D	D		D	C	B
Approach Delay (s)		33.3			34.2			39.6			35.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	117.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	37.0	37.0	10.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	31.0	55.0	55.0	20.0	44.0		15.0	49.0		26.0	60.0	
Total Split (%)	20.7%	36.7%	36.7%	13.3%	29.3%		10.0%	32.7%		17.3%	40.0%	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 100.3
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	554	190	38	196	582	272	22	92	38	462	130	402
RTOR Reduction (vph)	0	0	26	0	0	0	0	0	26	0	0	129
Lane Group Flow (vph)	554	190	12	196	582	272	22	92	12	462	130	273
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	23.2	32.9	32.9	11.3	21.0	47.5	2.8	16.0	33.3	20.5	33.7	62.9
Effective Green, g (s)	23.2	32.9	32.9	11.3	21.0	47.5	2.8	16.0	33.3	20.5	33.7	62.9
Actuated g/C Ratio	0.23	0.32	0.32	0.11	0.20	0.46	0.03	0.16	0.32	0.20	0.33	0.61
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	775	1133	507	377	1039	1289	48	551	513	685	1161	1706
v/s Ratio Prot	c0.16	0.05		0.06	c0.11	0.10	0.01	0.03		c0.13	0.04	c0.10
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.71	0.17	0.02	0.52	0.56	0.21	0.46	0.17	0.02	0.67	0.11	0.16
Uniform Delay, d1	36.7	25.1	23.9	43.1	36.7	16.4	49.2	37.6	23.6	38.0	24.1	8.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.1	0.0	1.2	0.7	0.1	6.8	0.1	0.0	2.6	0.0	0.0
Delay (s)	39.8	25.1	23.9	44.4	37.4	16.5	56.0	37.7	23.7	40.6	24.1	8.6
Level of Service	D	C	C	D	D	B	E	D	C	D	C	A
Approach Delay (s)		35.5			33.3			36.8			25.5	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/8/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	315	5	65	10	1260	40	740
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	14.0	52.0	16.0	54.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	12.7%	47.3%	14.5%	49.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	315	5	65	10	1260	195	40	740	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1688	1583	1770	3468		1770	3536	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1688	1583	1770	3468		1770	3536	
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	0	5	342	5	71	11	1370	212	43	804	5
RTOR Reduction (vph)	0	5	0	0	0	60	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	174	173	11	11	1574	0	43	809	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Effective Green, g (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.01	0.60		0.05	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		262	263	247	24	2090		91	2266	
v/s Ratio Prot		c0.00		c0.10	0.10		0.01	c0.45		c0.02	c0.23	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.66	0.66	0.04	0.46	0.75		0.47	0.36	
Uniform Delay, d1		54.2		43.7	43.6	39.4	53.8	15.9		50.7	9.2	
Progression Factor		1.00		1.00	1.00	1.00	1.41	0.44		1.00	1.00	
Incremental Delay, d2		0.1		6.2	5.8	0.1	10.1	2.0		3.8	0.4	
Delay (s)		54.3		49.9	49.5	39.5	85.9	8.9		54.5	9.6	
Level of Service		D		D	D	D	F	A		D	A	
Approach Delay (s)		54.3			47.9			9.4			11.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/8/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	505	25	1470	380	1070
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	33.0	33.0	77.0	77.0	77.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/8/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	505	25	1470	380	0	1070
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	27	1598	413	0	1163
RTOR Reduction (vph)	0	21	0	130	0	0
Lane Group Flow (vph)	549	6	1598	283	0	1163
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.5	22.5	75.5	75.5		75.5
Effective Green, g (s)	22.5	22.5	75.5	75.5		75.5
Actuated g/C Ratio	0.20	0.20	0.69	0.69		0.69
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	702	323	2429	1086		2429
v/s Ratio Prot	c0.16		c0.45			0.33
v/s Ratio Perm		0.00		0.18		
v/c Ratio	0.78	0.02	0.66	0.26		0.48
Uniform Delay, d1	41.4	34.9	9.9	6.6		8.1
Progression Factor	1.00	1.00	1.00	1.00		1.10
Incremental Delay, d2	5.7	0.0	1.4	0.6		0.6
Delay (s)	47.1	34.9	11.3	7.2		9.5
Level of Service	D	C	B	A		A
Approach Delay (s)	46.5		10.4			9.5
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/8/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1730	1205	435	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1880	1310	473	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	1783				2173	891
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1552				2016	491
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	356				43	440

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	627	627	627	873	909
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	473
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.51	0.53
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/8/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	165	1730	1205
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 59.4
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/8/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	165	1730	1205	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	179	1880	1310	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	179	1880	1310	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			11.5	59.4	35.9	
Effective Green, g (s)			11.5	59.4	35.9	
Actuated g/C Ratio			0.19	1.00	0.60	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			342	5085	2138	
v/s Ratio Prot			0.10	c0.37	c0.37	
v/s Ratio Perm						
v/c Ratio			0.52	0.37	0.61	
Uniform Delay, d1			21.5	0.0	7.4	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			1.4	0.0	0.5	
Delay (s)			22.9	0.0	7.9	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.0	7.9	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/8/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	475	170	870	710	1875
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 119.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	475	0	170	0	0	0	0	870	0	710	1875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	516	0	185	0	0	0	0	946	0	772	2038	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	516	0	185	0	0	0	0	946	0	772	2038	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.2		119.4					40.8		37.4	84.2	
Effective Green, g (s)	23.2		119.4					40.8		37.4	84.2	
Actuated g/C Ratio	0.19		1.00					0.34		0.31	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	667		1583					1209		1075	3585	
v/s Ratio Prot	c0.15							c0.27		c0.22	0.40	
v/s Ratio Perm			0.12									
v/c Ratio	0.77		0.12					0.78		0.72	0.57	
Uniform Delay, d1	45.6		0.0					35.3		36.3	8.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	5.6		0.2					3.4		2.3	0.2	
Delay (s)	51.2		0.2					38.7		38.6	8.9	
Level of Service	D		A					D		D	A	
Approach Delay (s)		37.7			0.0			38.7			17.0	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/8/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2495	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/8/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2495	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2712	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2712	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.77			
v/s Ratio Perm						
v/c Ratio			0.85			
Uniform Delay, d1			3.3			
Progression Factor			1.00			
Incremental Delay, d2			3.1			
Delay (s)			6.5			
Level of Service			A			
Approach Delay (s)	0.0		6.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/8/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	870	2495	0	2045	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	946	2712	0	2223	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.80			
vC, conflicting volume			3658		1687	473		
vC1, stage 1 conf vol					946			
vC2, stage 2 conf vol					741			
vCu, unblocked vol			3658		964	473		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			61		286	538		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	473	473	1356	1356	741	741	741
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1356	1356	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.80	0.80	0.44	0.44	0.44
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		90.6%	ICU Level of Service	E
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	135	0	3255	115	0	2050	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	147	0	3538	125	0	2071	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81		0.81					
vC, conflicting volume	3250	5611	690	4230	5611	1181	2071			3540		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2956	5872	0	4167	5872	1181	1499			3540		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	19	100			100		
cM capacity (veh/h)	1	0	878	1	0	182	359			68		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	147	1179	1179	1179	125	690	690	690	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	147	0	0	0	125	0	0	0	0
cSH	1700	182	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.81	0.69	0.69	0.69	0.07	0.41	0.41	0.41	0.00
Queue Length 95th (ft)	0	138	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	76.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	F								
Approach Delay (s)	0.0	76.2	0.0				0.0			
Approach LOS	A	F								

Intersection Summary				
Average Delay		1.9		
Intersection Capacity Utilization		77.9%	ICU Level of Service	D
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/8/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	25	30	105	5	175	40	3220	35	45	1565	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	30	15	105	5	175	40	3220	35	45	1565	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1750		1727	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1750		1318	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	27	33	16	114	5	190	43	3389	38	49	1581	109
RTOR Reduction (vph)	0	8	0	0	0	14	0	0	11	0	0	29
Lane Group Flow (vph)	27	41	0	114	5	176	43	3389	27	49	1581	80
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Effective Green, g (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.04	0.72	0.72	0.05	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	264		199	281	358	64	3659	1110	88	3726	1100
v/s Ratio Prot		0.02			0.00		0.02	c0.67		0.03	c0.31	
v/s Ratio Perm	0.02			c0.09		c0.11			0.02			0.05
v/c Ratio	0.13	0.16		0.57	0.02	0.49	0.67	0.93	0.02	0.56	0.42	0.07
Uniform Delay, d1	88.1	88.5		94.6	86.7	80.8	114.2	28.3	9.6	111.4	12.4	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.77	0.92	28.88	1.01	1.00	1.02
Incremental Delay, d2	0.3	0.3		3.9	0.0	1.1	10.5	2.3	0.0	7.4	0.4	0.1
Delay (s)	88.4	88.8		98.6	86.7	81.9	98.1	28.2	277.5	119.9	12.8	9.4
Level of Service	F	F		F	F	F	F	C	F	F	B	A
Approach Delay (s)		88.7			88.1			31.8			15.6	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0	47.0	10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	20.0	173.0	173.0	20.0	173.0	173.0
Total Split (%)	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	8.3%	72.1%	72.1%	8.3%	72.1%	72.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1853	1540		1758	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.97	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1801	1540		1305	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	43	65	163	16	168	49	3418	49	49	1636	5
RTOR Reduction (vph)	0	0	55	0	0	73	0	0	13	0	0	1
Lane Group Flow (vph)	0	48	10	0	179	95	49	3418	36	49	1636	4
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		36.5	36.5		36.5	36.5	11.5	173.0	173.0	11.5	173.0	173.0
Effective Green, g (s)		36.5	36.5		36.5	36.5	11.5	173.0	173.0	11.5	173.0	173.0
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.05	0.72	0.72	0.05	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		273	234		198	240	84	3665	1112	84	3665	1111
v/s Ratio Prot							c0.03	c0.67		0.03	0.32	
v/s Ratio Perm		0.03	0.01		c0.14	0.06			0.02			0.00
v/c Ratio		0.18	0.04		0.90	0.40	0.58	0.93	0.03	0.58	0.45	0.00
Uniform Delay, d1		88.6	86.8		100.0	91.8	111.9	28.5	9.6	111.9	13.8	9.4
Progression Factor		1.00	1.00		1.00	1.00	0.93	1.20	2.68	0.94	0.84	1.00
Incremental Delay, d2		0.3	0.1		38.2	1.1	4.7	2.9	0.0	9.2	0.4	0.0
Delay (s)		89.0	86.9		138.2	92.9	108.4	37.1	25.7	114.7	12.0	9.4
Level of Service		F	F		F	F	F	D	C	F	B	A
Approach Delay (s)		87.8			116.3			37.9			15.0	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/8/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3380	1795	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 9 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/8/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3380	1795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3674	1813	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3674	1813	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.72	0.36	
v/s Ratio Perm						
v/c Ratio				0.94	0.46	
Uniform Delay, d1				11.4	4.9	
Progression Factor				1.86	1.12	
Incremental Delay, d2				2.8	0.4	
Delay (s)				24.1	5.9	
Level of Service				C	A	
Approach Delay (s)	0.0			24.1	5.9	
Approach LOS	A			C	A	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/8/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	160	10	5	250	3065	15	5	1525	330
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0	14.0	46.0	166.0		11.0	131.0	
Total Split (%)	20.4%	20.4%		5.8%	5.8%	19.2%	69.2%		4.6%	54.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	160	10	10	5	250	3065	15	5	1525	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
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)	440	11	174	11	11	5	272	3332	16	5	1658	359
RTOR Reduction (vph)	0	0	35	0	0	5	0	0	4	0	0	69
Lane Group Flow (vph)	224	227	139	0	22	0	272	3332	12	5	1658	290
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	40.1	40.1	84.8		5.9	5.9	38.7	168.0	180.9	1.0	130.3	170.4
Effective Green, g (s)	40.1	40.1	84.8		5.9	5.9	38.7	168.0	180.9	1.0	130.3	170.4
Actuated g/C Ratio	0.17	0.17	0.35		0.02	0.02	0.16	0.70	0.75	0.00	0.54	0.71
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	280	282	514		44	38	285	3559	1083	7	2760	969
v/s Ratio Prot	0.13	c0.13			c0.01		c0.15	c0.66		0.00	0.33	
v/s Ratio Perm			0.10			0.00			0.01			0.21
v/c Ratio	0.80	0.80	0.27		0.50	0.00	0.95	0.94	0.01	0.71	0.60	0.30
Uniform Delay, d1	96.1	96.2	55.5		115.6	114.2	99.8	31.3	7.3	119.4	37.2	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.90	1.33	1.00	0.87	1.32	1.37
Incremental Delay, d2	15.0	15.3	0.3		3.2	0.0	26.6	3.4	0.0	135.4	0.9	0.2
Delay (s)	111.1	111.4	55.8		118.8	114.2	116.3	45.0	7.3	238.9	50.2	17.8
Level of Service	F	F	E		F	F	F	D	A	F	D	B
Approach Delay (s)		95.8			118.0			50.2			44.9	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	118.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/8/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	520	50	50	85	505	40	2095	5	285	1295	60
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	57.0	57.0		35.0		20.0	117.0	117.0	31.0	128.0	128.0
Total Split (%)	23.8%	23.8%		14.6%		8.3%	48.8%	48.8%	12.9%	53.3%	53.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 25 (10%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	50	50	15	85	505	40	2095	5	285	1295	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	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)	565	54	54	16	92	549	43	2277	5	310	1408	65
RTOR Reduction (vph)	0	0	41	0	0	34	0	0	3	0	0	30
Lane Group Flow (vph)	311	308	13	0	108	515	43	2277	2	310	1408	35
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	47.7	47.7	58.6		29.0	59.5	10.9	113.8	113.8	24.5	127.4	127.4
Effective Green, g (s)	47.7	47.7	58.6		29.0	59.5	10.9	113.8	113.8	24.5	127.4	127.4
Actuated g/C Ratio	0.20	0.20	0.24		0.12	0.25	0.05	0.47	0.47	0.10	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	337	386		223	690	80	2411	750	350	2699	840
v/s Ratio Prot	c0.18	0.18			0.06		0.02	c0.45		c0.09	0.28	
v/s Ratio Perm			0.01			c0.18			0.00			0.02
v/c Ratio	0.93	0.91	0.03		0.48	0.75	0.54	0.94	0.00	0.89	0.52	0.04
Uniform Delay, d1	94.5	94.1	69.1		98.5	83.3	112.1	60.1	33.2	106.4	36.5	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.08	0.75	1.00	1.43	0.52	0.34
Incremental Delay, d2	31.9	28.1	0.0		1.7	4.4	5.8	8.1	0.0	19.4	0.6	0.1
Delay (s)	126.4	122.3	69.2		100.2	87.7	127.4	53.0	33.2	171.9	19.5	9.3
Level of Service	F	F	E		F	F	F	D	C	F	B	A
Approach Delay (s)		119.9			89.8			54.3			45.7	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6 3
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	
Total Split (s)	47.0	47.0		52.0	52.0	52.0	25.0	113.0		28.0	116.0	
Total Split (%)	19.6%	19.6%		21.7%	21.7%	21.7%	10.4%	47.1%		11.7%	48.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	293	174	185	114	272	326	168	1630	54	196	1056	152
RTOR Reduction (vph)	0	0	52	0	0	49	0	0	16	0	0	42
Lane Group Flow (vph)	152	315	133	114	272	277	168	1630	38	196	1056	110
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Actuated Green, G (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Effective Green, g (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Actuated g/C Ratio	0.12	0.12	0.18	0.16	0.16	0.24	0.07	0.54	0.70	0.07	0.55	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	190	392	291	286	301	728	226	2752	1112	256	2796	1104
v/s Ratio Prot	0.09	c0.09		0.06	c0.15	0.06	0.05	c0.32		c0.06	0.21	
v/s Ratio Perm			0.08			0.04			0.02			0.07
v/c Ratio	0.80	0.80	0.46	0.40	0.90	0.38	0.74	0.59	0.03	0.77	0.38	0.10
Uniform Delay, d1	103.0	103.1	87.2	90.1	98.8	76.9	110.1	37.2	10.9	109.0	30.7	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.84	1.57	1.29
Incremental Delay, d2	19.9	10.7	0.4	0.3	28.0	0.1	11.0	0.9	0.0	10.3	0.3	0.0
Delay (s)	122.9	113.8	87.6	90.5	126.7	77.0	121.1	38.1	10.9	102.2	48.4	15.3
Level of Service	F	F	F	F	F	E	F	D	B	F	D	B
Approach Delay (s)		108.5			98.2			44.8			52.3	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	64.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1015	95	110	455	10	195
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1103	103	120	495	11	212
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked						
vC, conflicting volume			1207		1590	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1207		1590	552
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		86	56
cM capacity (veh/h)			574		78	478

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	552	552	103	120	247	247	223
Volume Left	0	0	0	120	0	0	11
Volume Right	0	0	103	0	0	0	212
cSH	1700	1700	1700	574	1700	1700	502
Volume to Capacity	0.32	0.32	0.06	0.21	0.15	0.15	0.44
Queue Length 95th (ft)	0	0	0	19	0	0	56
Control Delay (s)	0.0	0.0	0.0	12.9	0.0	0.0	20.4
Lane LOS				B			C
Approach Delay (s)	0.0			2.5			20.4
Approach LOS							C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	960	40	10	570	30	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1043	43	11	620	33	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1087		1397	543
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1087		1397	543
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		75	99
cM capacity (veh/h)			638		130	484

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	696	391	217	413	38
Volume Left	0	0	11	0	33
Volume Right	0	43	0	0	5
cSH	1700	1700	638	1700	145
Volume to Capacity	0.41	0.23	0.02	0.24	0.26
Queue Length 95th (ft)	0	0	1	0	25
Control Delay (s)	0.0	0.0	0.7	0.0	38.5
Lane LOS			A		E
Approach Delay (s)	0.0		0.3		38.5
Approach LOS					E

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	925	0	55	590	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1005	0	60	641	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			1005		1446	503
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1005		1446	503
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	92
cM capacity (veh/h)			685		112	514

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	503	503	274	428	43
Volume Left	0	0	60	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	685	1700	514
Volume to Capacity	0.30	0.30	0.09	0.25	0.08
Queue Length 95th (ft)	0	0	7	0	7
Control Delay (s)	0.0	0.0	3.2	0.0	12.6
Lane LOS			A		B
Approach Delay (s)	0.0		1.2		12.6
Approach LOS					B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.2		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	895	20	0	565	0	0	0	0	0	0	65
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	973	22	0	614	0	0	0	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	614			995			1361	1598	497	1101	1609	307
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	614			995			1361	1598	497	1101	1609	307
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	90
cM capacity (veh/h)	961			691			96	105	518	167	104	689

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	649	346	307	307	71
Volume Left	0	0	0	0	0
Volume Right	0	22	0	0	71
cSH	1700	1700	1700	1700	689
Volume to Capacity	0.38	0.20	0.18	0.18	0.10
Queue Length 95th (ft)	0	0	0	0	9
Control Delay (s)	0.0	0.0	0.0	0.0	10.8
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.8
Approach LOS					B

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		28.7%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/8/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	895	325	565
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 56.3
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	895	0	325	565	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	973	0	353	614	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	973	0	353	614	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	26.2		18.0	56.2		
Effective Green, g (s)	26.2		18.0	56.2		
Actuated g/C Ratio	0.47		0.32	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1649		566	3539		
v/s Ratio Prot	c0.27		c0.20	0.17		
v/s Ratio Perm						
v/c Ratio	0.59		0.62	0.17		
Uniform Delay, d1	11.0		16.2	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.6		2.1	0.0		
Delay (s)	11.6		18.4	0.0		
Level of Service	B		B	A		
Approach Delay (s)	11.6			6.7	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	56.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/8/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	295	1235	890	175
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 49.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/8/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	295	1235	890	175	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	321	1342	967	190	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	321	1342	967	190	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	14.7	49.8	24.1	49.8		
Effective Green, g (s)	14.7	49.8	24.1	49.8		
Actuated g/C Ratio	0.30	1.00	0.48	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	522	3539	1712	1583		
v/s Ratio Prot	c0.18	0.38	c0.27			
v/s Ratio Perm				0.12		
v/c Ratio	0.61	0.38	0.56	0.12		
Uniform Delay, d1	15.1	0.0	9.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.2	0.1	0.4	0.2		
Delay (s)	17.3	0.1	9.6	0.2		
Level of Service	B	A	A	A		
Approach Delay (s)		3.4	8.0		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	11.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/8/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	525	960	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	571	1043	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1065				1492	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1065				1492	533
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				73	94
cM capacity (veh/h)	650				101	492

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	285	285	696	370	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	650	1700	1700	1700	1700	101	492
Volume to Capacity	0.12	0.17	0.17	0.41	0.22	0.27	0.06
Queue Length 95th (ft)	10	0	0	0	0	25	4
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	53.4	12.8
Lane LOS	B					F	B
Approach Delay (s)	1.3			0.0		33.1	
Approach LOS						D	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	365	15	0	555	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	397	16	0	603	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	603			413			1120	1171	207	976	1179	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	603			413			1120	1171	207	976	1179	302
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			66	94	99	100	100	64
cM capacity (veh/h)	970			1142			97	175	800	182	173	694

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	264	149	0	402	201	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	970	1700	1700	1700	1700	1700	120	1700	694
Volume to Capacity	0.08	0.16	0.09	0.00	0.24	0.12	0.41	0.00	0.36
Queue Length 95th (ft)	7	0	0	0	0	0	43	0	41
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	54.0	0.0	13.1
Lane LOS	A						F	A	B
Approach Delay (s)	1.5			0.0			54.0	13.1	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.8	
Intersection Capacity Utilization		42.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	245	10	0	390	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	266	11	0	424	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	424			277			880	946	139	815	951	212
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			277			880	946	139	815	951	212
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			85	93	100	100	100	82
cM capacity (veh/h)	1132			1283			180	231	884	233	230	793

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	178	100	0	283	141	43	0	147
Volume Left	125	0	0	0	0	0	27	0	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	1132	1700	1700	1700	1700	1700	196	1700	793
Volume to Capacity	0.11	0.10	0.06	0.00	0.17	0.08	0.22	0.00	0.18
Queue Length 95th (ft)	9	0	0	0	0	0	20	0	17
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	0.0	28.5	0.0	10.6
Lane LOS	A						D	A	B
Approach Delay (s)	2.7			0.0			28.5	10.6	
Approach LOS							D	B	

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		32.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	145	5	0	265	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	158	5	0	288	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	293			163			620	649	82	571	649	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			163			620	649	82	571	649	147
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			93	97	100	100	100	86
cM capacity (veh/h)	1265			1413			303	357	962	371	357	874

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	105	58	0	192	101	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1265	1700	1700	1700	1700	1700	319	1700	874
Volume to Capacity	0.08	0.06	0.03	0.00	0.11	0.06	0.10	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	8	0	12
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	17.6	0.0	9.8
Lane LOS	A						C	A	A
Approach Delay (s)	3.0			0.0			17.6	9.8	
Approach LOS							C	A	

Intersection Summary			
Average Delay		3.6	
Intersection Capacity Utilization		27.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	80	10	0	150	0	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	87	11	0	163	0	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	163			98			397	386	49	364	391	82
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	163			98			397	386	49	364	391	82
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			91	90	100	100	98	91
cM capacity (veh/h)	1413			1493			464	522	1009	504	518	962

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	65	58	40	0	109	54	98	0	11	87
Volume Left	65	0	0	0	0	0	43	0	0	0
Volume Right	0	0	11	0	0	0	0	0	0	87
cSH	1413	1700	1700	1700	1700	1700	494	1700	518	962
Volume to Capacity	0.05	0.03	0.02	0.00	0.06	0.03	0.20	0.00	0.02	0.09
Queue Length 95th (ft)	4	0	0	0	0	0	18	0	2	7
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	14.1	0.0	12.1	9.1
Lane LOS	A						B	A	B	A
Approach Delay (s)	3.1			0.0			14.1		9.4	
Approach LOS							B		A	

Intersection Summary			
Average Delay		5.4	
Intersection Capacity Utilization		29.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	0	40	0	0	0	60	15	0	0	0	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	0	43	0	0	0	65	16	0	0	0	98
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			43			207	109	22	95	130	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			43			207	109	22	95	130	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			90	98	100	100	100	91
cM capacity (veh/h)	1622			1563			653	760	1050	846	739	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	0	43	0	0	0	82	0	98
Volume Left	43	0	0	0	0	0	65	0	0
Volume Right	0	0	43	0	0	0	0	0	98
cSH	1622	1700	1700	1700	1700	1700	672	1700	1084
Volume to Capacity	0.03	0.00	0.03	0.00	0.00	0.00	0.12	0.00	0.09
Queue Length 95th (ft)	2	0	0	0	0	0	10	0	7
Control Delay (s)	7.3	0.0	0.0	0.0	0.0	0.0	11.1	0.0	8.6
Lane LOS	A						B	A	A
Approach Delay (s)	3.6			0.0			11.1	8.6	
Approach LOS							B	A	

Intersection Summary			
Average Delay		7.8	
Intersection Capacity Utilization		16.4%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	375	0	190	350	660	335	730
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 67.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	375	0	190	350	660	0	0	335	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1553	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1553	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	408	0	207	380	717	0	0	364	793
RTOR Reduction (vph)	0	0	0	0	0	153	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	204	204	54	380	717	0	0	364	793
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Effective Green, g (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Actuated g/C Ratio				0.24	0.24	0.24	0.30	0.58			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				404	404	373	537	2052			661	1583
v/s Ratio Prot							c0.21	0.20			0.10	
v/s Ratio Perm				0.12	0.12	0.04						c0.50
v/c Ratio				0.50	0.50	0.15	0.71	0.35			0.55	0.50
Uniform Delay, d1				22.0	22.0	20.0	20.7	7.4			24.7	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.0	1.0	0.2	4.2	0.1			1.0	1.1
Delay (s)				23.0	23.0	20.2	24.9	7.5			25.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			22.0			13.5			8.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	525	415	245	495
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	66.0	66.0	42.0	32.0	74.0
Total Split (%)	47.1%	47.1%	30.0%	22.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 132.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	580	90	525	0	0	0	0	415	345	245	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3253		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3253		1770	3539	
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)	630	98	571	0	0	0	0	451	375	266	538	0
RTOR Reduction (vph)	0	0	146	0	0	0	0	108	0	0	0	0
Lane Group Flow (vph)	0	728	425	0	0	0	0	718	0	266	538	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		57.5	57.5					33.5		23.4	62.9	
Effective Green, g (s)		57.5	57.5					33.5		23.4	62.9	
Actuated g/C Ratio		0.43	0.43					0.25		0.18	0.48	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		775	678					823		312	1681	
v/s Ratio Prot								c0.22		c0.15	0.15	
v/s Ratio Perm		0.41	0.27									
v/c Ratio		0.94	0.63					0.87		0.85	0.32	
Uniform Delay, d1		35.8	29.1					47.4		52.8	21.5	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		18.9	1.8					10.1		19.6	0.1	
Delay (s)		54.7	30.9					57.5		72.4	21.6	
Level of Service		D	C					E		E	C	
Approach Delay (s)		44.2			0.0			57.5			38.4	
Approach LOS		D			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/8/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 85.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.39	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	723	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	967	543	114	54	33
RTOR Reduction (vph)	0	0	0	73	0	17
Lane Group Flow (vph)	22	967	543	41	54	16
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	30.9	30.9	30.9	30.9	42.2	42.2
Effective Green, g (s)	30.9	30.9	30.9	30.9	42.2	42.2
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.50	0.50
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	262	1285	1285	574	877	784
v/s Ratio Prot		c0.27	0.15		c0.03	
v/s Ratio Perm	0.03			0.03		0.01
v/c Ratio	0.08	0.75	0.42	0.07	0.06	0.02
Uniform Delay, d1	17.8	23.7	20.4	17.7	11.2	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.5	0.2	0.1	0.1	0.0
Delay (s)	17.9	26.3	20.6	17.8	11.3	11.0
Level of Service	B	C	C	B	B	B
Approach Delay (s)		26.1	20.1		11.2	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1425	5	20	480	70	140	30
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	55.0	55.0	55.0	25.0	55.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	22.7%	50.0%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1425	5	20	480	70	0	0	140	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1439	5	22	485	71	0	0	141	33
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	719	725	11	485	71	0	0	141	6
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				55.6	55.6	55.6	19.4	42.4			19.0	19.0
Effective Green, g (s)				55.6	55.6	55.6	19.4	42.4			19.0	19.0
Actuated g/C Ratio				0.51	0.51	0.51	0.18	0.39			0.17	0.17
Clearance Time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				849	852	800	605	718			611	273
v/s Ratio Prot				0.43	c0.43		c0.14	0.04			c0.04	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.85	0.85	0.01	0.80	0.10			0.23	0.02
Uniform Delay, d1				23.5	23.6	13.5	43.5	21.6			39.2	37.8
Progression Factor				1.01	1.01	1.00	1.02	1.56			1.00	1.00
Incremental Delay, d2				10.2	8.2	0.0	7.4	0.1			0.2	0.0
Delay (s)				33.9	31.9	13.6	51.9	33.7			39.4	37.8
Level of Service				C	C	B	D	C			D	D
Approach Delay (s)		0.0			32.6			49.6			39.1	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	350	585	1245	40	1585
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	26.0		66.0		18.0	84.0
Total Split (%)	23.6%		60.0%		16.4%	76.4%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	350	0	0	0	0	585	1245	40	1585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1779	1583					3539	2787	1770	3539	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1779	1583					3539	2787	1770	3539	
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)	87	5	380	0	0	0	0	636	1353	43	1723	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	380	0	0	0	0	636	1353	43	1723	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		9.7	110.0					79.6	110.0	5.7	89.3	
Effective Green, g (s)		9.7	110.0					79.6	110.0	5.7	89.3	
Actuated g/C Ratio		0.09	1.00					0.72	1.00	0.05	0.81	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		156	1583					2560	2787	91	2873	
v/s Ratio Prot		0.05						0.18		0.02	c0.49	
v/s Ratio Perm			0.24						c0.49			
v/c Ratio		0.59	0.24					0.25	0.49	0.47	0.60	
Uniform Delay, d1		48.2	0.0					5.1	0.0	50.7	3.8	
Progression Factor		1.00	1.00					1.00	1.00	0.90	1.17	
Incremental Delay, d2		5.6	0.4					0.2	0.6	2.7	0.7	
Delay (s)		53.8	0.4					5.4	0.6	48.1	5.1	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		10.8			0.0			2.1			6.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy

5/8/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	175	0	1825	1825	230
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	190	0	1984	1984	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1090	774	
pX, platoon unblocked	0.84	1.00	1.00			
vC, conflicting volume	2480	661	2234			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1823	661	2233			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	53	100			
cM capacity (veh/h)	58	405	229			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	190	496	496	496	496	661	661	661	250
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	190	0	0	0	0	0	0	0	250
cSH	405	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.47	0.29	0.29	0.29	0.29	0.39	0.39	0.39	0.15
Queue Length 95th (ft)	61	0	0	0	0	0	0	0	0
Control Delay (s)	21.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C								
Approach Delay (s)	21.5	0.0				0.0			
Approach LOS	C								

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		52.8%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	270	470	115	390	1440	220	250	1580	375
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 164.9
Natural Cycle: 180
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	270	470	115	390	1440	220	250	1580	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	424	582	272	293	511	125	424	1565	239	272	1717	408
RTOR Reduction (vph)	0	0	140	0	0	41	0	0	49	0	0	13
Lane Group Flow (vph)	424	582	132	293	511	84	424	1565	190	272	1717	395
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	22.2	38.4	38.4	14.1	30.3	53.9	18.2	75.6	94.7	18.6	76.0	103.2
Effective Green, g (s)	22.2	38.4	38.4	14.1	30.3	53.9	18.2	75.6	94.7	18.6	76.0	103.2
Actuated g/C Ratio	0.13	0.23	0.23	0.09	0.18	0.33	0.11	0.46	0.57	0.11	0.46	0.63
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	462	825	369	151	651	518	195	2334	910	387	2346	991
v/s Ratio Prot	c0.12	0.16		c0.17	c0.14		c0.24	0.31		0.08	c0.34	
v/s Ratio Perm			0.08			0.05			0.12			0.25
v/c Ratio	0.92	0.71	0.36	1.94	0.78	0.16	2.17	0.67	0.21	0.70	0.73	0.40
Uniform Delay, d1	70.3	58.0	52.8	75.3	64.1	39.4	73.2	34.8	16.9	70.4	36.1	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.0	2.8	0.6	446.5	6.2	0.1	545.0	0.8	0.1	5.7	1.2	0.3
Delay (s)	93.3	60.7	53.4	521.8	70.3	39.5	618.3	35.6	17.0	76.1	37.3	15.6
Level of Service	F	E	D	F	E	D	F	D	B	E	D	B
Approach Delay (s)		70.0			208.5			144.5			38.0	
Approach LOS		E			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	101.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	164.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	130	160	375	135	1440	60	365	1530	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	24.0	43.0		24.0	43.0		17.0	41.0		22.0	46.0	
Total Split (%)	18.5%	33.1%		18.5%	33.1%		13.1%	31.5%		16.9%	35.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 113.3
Natural Cycle: 85
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	130	160	375	135	1440	60	365	1530	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	353	250	391	141	174	408	147	1565	65	397	1663	370
RTOR Reduction (vph)	0	0	73	0	0	49	0	0	33	0	0	158
Lane Group Flow (vph)	353	250	318	141	174	359	147	1565	32	397	1663	212
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	16.6	27.7	42.8	14.2	25.3	47.0	10.1	36.5	55.7	16.7	43.1	64.7
Effective Green, g (s)	16.6	27.7	42.8	14.2	25.3	47.0	10.1	36.5	55.7	16.7	43.1	64.7
Actuated g/C Ratio	0.15	0.24	0.38	0.13	0.22	0.42	0.09	0.32	0.49	0.15	0.38	0.57
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	503	456	599	222	416	657	306	1641	779	506	1937	905
v/s Ratio Prot	c0.10	0.13		0.08	0.09		0.04	c0.31		c0.12	0.33	
v/s Ratio Perm			c0.20			0.23			0.02			0.13
v/c Ratio	0.70	0.55	0.53	0.64	0.42	0.55	0.48	0.95	0.04	0.78	0.86	0.23
Uniform Delay, d1	45.9	37.2	27.3	47.0	37.6	25.0	49.0	37.5	14.9	46.5	32.2	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4	1.4	0.9	5.8	0.7	0.9	1.2	12.9	0.0	7.8	4.0	0.1
Delay (s)	50.3	38.6	28.3	52.8	38.3	25.9	50.2	50.3	14.9	54.3	36.2	12.1
Level of Service	D	D	C	D	D	C	D	D	B	D	D	B
Approach Delay (s)		38.7			34.1			49.0			35.5	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	113.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/8/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	100	105	605	1085	305	635	1380	105
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		28.0		37.0	37.0	55.0	92.0	92.0
Total Split (%)		23.3%		30.8%	30.8%	45.8%	76.7%	76.7%
Yellow Time (s)		3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)		1.0		2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0		5.0	5.0	4.0	5.0	5.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 116.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	105	0	605	0	1085	305	635	1380	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0		4.0		5.0	5.0	4.0	5.0	5.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	1770	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	114	0	658	0	1179	332	690	1500	114
RTOR Reduction (vph)	0	0	0	0	0	6	0	0	242	0	0	32
Lane Group Flow (vph)	0	0	109	114	0	652	0	1179	90	690	1500	82
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			116.4	23.6		75.7		31.7	31.7	48.1	83.8	83.8
Effective Green, g (s)			116.4	23.6		75.7		31.7	31.7	48.1	83.8	83.8
Actuated g/C Ratio			1.00	0.20		0.65		0.27	0.27	0.41	0.72	0.72
Clearance Time (s)				4.0				5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	358		1029		1384	431	731	3660	1139
v/s Ratio Prot				0.06				c0.23		c0.39	0.29	
v/s Ratio Perm			0.07			c0.41			0.06			0.05
v/c Ratio			0.07	0.32		0.63		0.85	0.21	0.94	0.41	0.07
Uniform Delay, d1			0.0	39.5		12.1		40.1	32.7	32.9	6.5	4.8
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	0.5		1.3		5.3	0.2	20.6	0.1	0.0
Delay (s)			0.1	40.1		13.4		45.4	32.9	53.5	6.6	4.8
Level of Service			A	D		B		D	C	D	A	A
Approach Delay (s)		0.1			17.3			42.7			20.5	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	116.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	215	290	360	255	810	390	925	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	40.0	9.0	40.0	
Total Split (s)	19.0	40.0		19.0	40.0		20.0	40.0	21.0	41.0	
Total Split (%)	15.8%	33.3%		15.8%	33.3%		16.7%	33.3%	17.5%	34.2%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 108.1
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	215	290	360	255	810	340	390	925	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4860		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4860		3433	5085	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)	304	228	310	234	315	391	277	880	370	424	1005	359
RTOR Reduction (vph)	0	0	37	0	0	36	0	61	0	0	0	95
Lane Group Flow (vph)	304	228	273	234	315	355	277	1189	0	424	1005	264
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.6	25.9	45.4	12.4	24.7	47.1	13.5	33.3		16.4	36.2	55.8
Effective Green, g (s)	13.6	25.9	45.4	12.4	24.7	47.1	13.5	33.3		16.4	36.2	55.8
Actuated g/C Ratio	0.13	0.24	0.42	0.11	0.23	0.44	0.12	0.31		0.15	0.34	0.52
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	446	665	394	426	690	429	1498		521	1704	817
v/s Ratio Prot	c0.09	0.12		0.07	c0.17		0.08	c0.24		c0.12	c0.20	
v/s Ratio Perm			0.17			0.22						0.17
v/c Ratio	0.70	0.51	0.41	0.59	0.74	0.51	0.65	0.79		0.81	0.59	0.32
Uniform Delay, d1	45.3	35.6	21.9	45.4	38.7	22.1	45.0	34.2		44.3	29.7	15.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	1.0	0.4	2.4	6.6	0.7	3.3	3.0		9.4	0.5	0.2
Delay (s)	50.4	36.6	22.3	47.8	45.3	22.8	48.3	37.2		53.8	30.3	15.4
Level of Service	D	D	C	D	D	C	D	D		D	C	B
Approach Delay (s)		36.3			36.5			39.2			32.9	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	108.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	705	435	65	360	355	300	70	345	230	490	350	530
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	37.0	37.0	10.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	30.0	43.0	43.0	31.0	44.0		20.0	52.0		24.0	56.0	
Total Split (%)	20.0%	28.7%	28.7%	20.7%	29.3%		13.3%	34.7%		16.0%	37.3%	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 106.1
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	705	435	65	360	355	300	70	345	230	490	350	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	766	473	71	391	386	326	76	375	250	533	380	576
RTOR Reduction (vph)	0	0	54	0	0	0	0	0	35	0	0	156
Lane Group Flow (vph)	766	473	17	391	386	326	76	375	215	533	380	420
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	25.8	26.2	26.2	17.6	18.0	43.6	8.5	21.2	44.8	19.6	32.3	64.1
Effective Green, g (s)	25.8	26.2	26.2	17.6	18.0	43.6	8.5	21.2	44.8	19.6	32.3	64.1
Actuated g/C Ratio	0.24	0.25	0.25	0.17	0.17	0.41	0.08	0.20	0.42	0.18	0.30	0.60
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	830	869	389	566	858	1139	141	703	665	631	1072	1675
v/s Ratio Prot	c0.22	c0.13		0.11	0.08	0.12	0.04	c0.11		c0.16	0.11	0.15
v/s Ratio Perm			0.01						0.14			
v/c Ratio	0.92	0.54	0.04	0.69	0.45	0.29	0.54	0.53	0.32	0.84	0.35	0.25
Uniform Delay, d1	39.4	35.0	30.7	41.9	39.8	21.1	47.2	38.3	20.7	42.0	29.0	10.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.6	0.7	0.0	3.6	0.4	0.1	3.9	0.8	0.3	10.1	0.2	0.1
Delay (s)	55.0	35.7	30.7	45.6	40.2	21.2	51.1	39.0	21.0	52.1	29.2	10.1
Level of Service	E	D	C	D	D	C	D	D	C	D	C	B
Approach Delay (s)		46.7			36.5			33.9			30.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	106.6	Sum of lost time (s)	22.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/8/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	570	0	50	5	765	130	1240
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	16.0	47.0	21.0	52.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	14.5%	42.7%	19.1%	47.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	570	0	50	5	765	505	130	1240	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3328		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3328		1770	3539	
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	0	11	620	0	54	5	832	549	141	1348	0
RTOR Reduction (vph)	0	11	0	0	0	42	0	87	0	0	0	0
Lane Group Flow (vph)	0	0	0	310	310	12	5	1294	0	141	1348	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Effective Green, g (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.46		0.12	0.57	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		382	382	359	20	1539		214	2023	
v/s Ratio Prot		c0.00		c0.18	0.18		0.00	c0.39		c0.08	c0.38	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.81	0.81	0.03	0.25	0.84		0.66	0.67	
Uniform Delay, d1		54.2		40.3	40.3	33.1	53.9	26.0		46.2	16.3	
Progression Factor		1.00		1.00	1.00	1.00	1.40	0.68		1.00	1.00	
Incremental Delay, d2		0.3		12.3	12.3	0.0	5.6	5.0		7.1	1.8	
Delay (s)		54.5		52.6	52.6	33.1	81.0	22.7		53.3	18.0	
Level of Service		D		D	D	C	F	C		D	B	
Approach Delay (s)		54.5			51.0			22.9			21.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/8/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	405	25	1260	915	1870
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	26.0	26.0	84.0	84.0	84.0
Total Split (%)	23.6%	23.6%	76.4%	76.4%	76.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/8/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	405	25	1260	915	0	1870
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	440	27	1370	995	0	2033
RTOR Reduction (vph)	0	23	0	273	0	0
Lane Group Flow (vph)	440	4	1370	722	0	2033
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	18.2	18.2	79.8	79.8		79.8
Effective Green, g (s)	18.2	18.2	79.8	79.8		79.8
Actuated g/C Ratio	0.17	0.17	0.73	0.73		0.73
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	568	261	2567	1148		2567
v/s Ratio Prot	c0.13		0.39			c0.57
v/s Ratio Perm		0.00		0.46		
v/c Ratio	0.77	0.02	0.53	0.63		0.79
Uniform Delay, d1	43.9	38.4	6.8	7.6		9.7
Progression Factor	1.00	1.00	1.00	1.00		0.98
Incremental Delay, d2	6.5	0.0	0.8	2.6		2.1
Delay (s)	50.5	38.4	7.6	10.2		11.7
Level of Service	D	D	A	B		B
Approach Delay (s)	49.8		8.7			11.7
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/8/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2025	1510	675	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2201	1641	734	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.56				0.56	0.56
vC, conflicting volume	2375				2742	1188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1877				2536	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	176				12	603

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	734	734	734	1094	1281
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	734
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.64	0.75
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/8/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	120	2025	1510
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 70.6
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/8/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	120	2025	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	130	2201	1641	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	130	2201	1641	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			9.0	71.8	50.8	
Effective Green, g (s)			9.0	71.8	50.8	
Actuated g/C Ratio			0.13	1.00	0.71	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			221	5085	2503	
v/s Ratio Prot			0.07	c0.43	c0.46	
v/s Ratio Perm						
v/c Ratio			0.59	0.43	0.66	
Uniform Delay, d1			29.7	0.0	5.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.0	0.1	0.6	
Delay (s)			33.6	0.1	6.4	
Level of Service			C	A	A	
Approach Delay (s)	0.0			1.9	6.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/8/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	370	190	915	615	3165
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 159.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	0	190	0	0	0	0	915	0	615	3165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	402	0	207	0	0	0	0	995	0	668	3440	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	402	0	207	0	0	0	0	995	0	668	3440	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.8		159.9					83.2		34.9	124.1	
Effective Green, g (s)	23.8		159.9					83.2		34.9	124.1	
Actuated g/C Ratio	0.15		1.00					0.52		0.22	0.78	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	510		1583					1841		749	3946	
v/s Ratio Prot	c0.12							0.28		0.19	c0.68	
v/s Ratio Perm			0.13									
v/c Ratio	0.79		0.13					0.54		0.89	0.87	
Uniform Delay, d1	65.6		0.0					25.6		60.7	12.4	
Progression Factor	1.00		1.00					1.00		0.98	0.93	
Incremental Delay, d2	7.9		0.2					0.3		12.9	2.4	
Delay (s)	73.5		0.2					25.9		72.6	13.9	
Level of Service	E		A					C		E	B	
Approach Delay (s)		48.6			0.0			25.9			23.4	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	159.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/8/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1745	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/8/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1745	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1897	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1897	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.54			
v/s Ratio Perm						
v/c Ratio			0.60			
Uniform Delay, d1			1.7			
Progression Factor			1.00			
Incremental Delay, d2			0.8			
Delay (s)			2.5			
Level of Service			A			
Approach Delay (s)	0.0		2.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/8/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	915	1745	0	3355	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	995	1897	0	3647	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.24			
vC, conflicting volume			2891		2210	497		
vC1, stage 1 conf vol					995			
vC2, stage 2 conf vol					1216			
vCu, unblocked vol			2891		0	497		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			125		245	518		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	497	497	948	948	1216	1216	1216
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	948	948	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.29	0.56	0.56	0.72	0.72	0.72
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	110	0	2685	65	0	3360	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	120	0	2918	71	0	3394	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.26	0.26	0.26	0.26	0.26		0.26					
vC, conflicting volume	4367	6314	1131	4052	6314	975	3394			2920		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3997	11348	0	2808	11348	975	326			2920		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	52	100			100		
cM capacity (veh/h)	0	0	287	2	0	251	326			121		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	120	973	973	973	71	1131	1131	1131	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	120	0	0	0	71	0	0	0	0
cSH	1700	251	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.48	0.57	0.57	0.57	0.04	0.67	0.67	0.67	0.00
Queue Length 95th (ft)	0	60	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	31.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	D								
Approach Delay (s)	0.0	31.8	0.0				0.0			
Approach LOS	A	D								

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/8/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	120	100	40	5	110	35	1955	40	120	2920	130
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	100	35	40	5	110	35	1955	40	120	2920	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1738	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1773		794	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	130	109	38	43	5	120	38	2058	43	130	2949	141
RTOR Reduction (vph)	0	5	0	0	0	13	0	0	14	0	0	22
Lane Group Flow (vph)	130	142	0	43	5	107	38	2058	29	130	2949	119
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Effective Green, g (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.26	0.03	0.68	0.68	0.09	0.74	0.74
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	260		116	274	413	53	3481	1056	157	3781	1116
v/s Ratio Prot		0.08			0.00		0.02	0.40		c0.07	c0.58	
v/s Ratio Perm	c0.09			0.05		0.07			0.02			0.08
v/c Ratio	0.63	0.55		0.37	0.02	0.26	0.72	0.59	0.03	0.83	0.78	0.11
Uniform Delay, d1	96.2	94.9		92.3	87.5	70.2	115.4	20.1	12.2	107.5	18.8	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	0.96	6.87	1.00	1.00	1.00
Incremental Delay, d2	6.2	2.3		2.0	0.0	0.3	31.3	0.6	0.0	28.7	1.7	0.2
Delay (s)	102.4	97.2		94.3	87.6	70.6	125.5	19.8	83.6	136.2	20.4	8.8
Level of Service	F	F		F	F	E	F	B	F	F	C	A
Approach Delay (s)		99.7			77.2			22.9			24.6	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Detector Phase	4	4	4 5	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0		10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	22.0	149.0	149.0	44.0	171.0	171.0
Total Split (%)	19.6%	19.6%		19.6%	19.6%	19.6%	9.2%	62.1%	62.1%	18.3%	71.3%	71.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1858	1540		1775	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.99	1.00		0.56	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1837	1540		1024	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	87	98	38	11	114	65	2114	54	174	2919	22
RTOR Reduction (vph)	0	0	37	0	0	102	0	0	16	0	0	5
Lane Group Flow (vph)	0	92	61	0	49	12	65	2114	38	174	2919	17
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Actuated Green, G (s)		25.1	44.5		25.1	25.1	13.4	167.1	167.1	28.8	182.5	182.5
Effective Green, g (s)		25.1	44.5		25.1	25.1	13.4	167.1	167.1	28.8	182.5	182.5
Actuated g/C Ratio		0.10	0.19		0.10	0.10	0.06	0.70	0.70	0.12	0.76	0.76
Clearance Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		192	285		107	165	98	3540	1074	212	3866	1172
v/s Ratio Prot							0.04	0.42		c0.10	c0.57	
v/s Ratio Perm		c0.05	0.04		0.05	0.01			0.02			0.01
v/c Ratio		0.48	0.22		0.46	0.07	0.66	0.60	0.04	0.82	0.76	0.01
Uniform Delay, d1		101.3	82.9		101.1	96.9	111.1	19.0	11.3	103.1	16.2	7.0
Progression Factor		1.00	1.00		1.00	1.00	0.77	1.66	7.29	0.89	0.83	4.86
Incremental Delay, d2		1.9	0.4		3.1	0.2	13.8	0.7	0.1	15.2	0.9	0.0
Delay (s)		103.2	83.3		104.1	97.1	99.9	32.1	82.8	106.7	14.4	33.9
Level of Service		F	F		F	F	F	C	F	F	B	C
Approach Delay (s)		92.9			99.2			35.3			19.7	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/8/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2015	3150	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 21 (18%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/8/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2015	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2190	3182	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2190	3182	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.43	c0.63	
v/s Ratio Perm						
v/c Ratio				0.56	0.81	
Uniform Delay, d1				5.6	8.5	
Progression Factor				1.82	1.85	
Incremental Delay, d2				0.5	1.4	
Delay (s)				10.7	17.1	
Level of Service				B	B	
Approach Delay (s)	0.0			10.7	17.1	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/8/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	25	155	15	20	170	1615	35	40	2495	365
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0	14.0	36.0	159.0		18.0	141.0	
Total Split (%)	20.4%	20.4%		5.8%	5.8%	15.0%	66.3%		7.5%	58.8%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	25	155	25	15	20	170	1615	35	40	2495	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
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)	326	27	168	27	16	22	185	1755	38	43	2712	397
RTOR Reduction (vph)	0	0	31	0	0	21	0	0	10	0	0	66
Lane Group Flow (vph)	176	177	137	0	43	1	185	1755	28	43	2712	331
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	39.0	39.0	72.6		7.7	7.7	27.6	159.8	174.5	8.5	140.7	179.7
Effective Green, g (s)	39.0	39.0	72.6		7.7	7.7	27.6	159.8	174.5	8.5	140.7	179.7
Actuated g/C Ratio	0.16	0.16	0.30		0.03	0.03	0.12	0.67	0.73	0.04	0.59	0.75
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	273	275	440		57	50	203	3385	1045	62	2981	1022
v/s Ratio Prot	c0.10	0.10			c0.02		c0.10	0.35		0.02	c0.53	
v/s Ratio Perm			0.09			0.00			0.02			0.24
v/c Ratio	0.64	0.64	0.31		0.75	0.01	0.91	0.52	0.03	0.69	0.91	0.32
Uniform Delay, d1	94.0	94.0	64.4		115.2	112.5	105.0	20.5	9.1	114.5	44.0	10.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.90	1.29	2.88	0.89	1.36	1.26
Incremental Delay, d2	5.1	5.1	0.4		38.8	0.0	36.0	0.5	0.0	15.8	3.6	0.1
Delay (s)	99.2	99.1	64.8		154.0	112.5	131.0	26.8	26.3	118.1	63.4	12.7
Level of Service	F	F	E		F	F	F	C	C	F	E	B
Approach Delay (s)		88.1			139.9			36.5			57.7	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	54.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/8/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	225	70	50	80	360	40	1250	5	410	1995	455
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	60.0	60.0		47.0		14.0	87.0	87.0	46.0	119.0	119.0
Total Split (%)	25.0%	25.0%		19.6%		5.8%	36.3%	36.3%	19.2%	49.6%	49.6%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 235 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	70	50	10	80	360	40	1250	5	410	1995	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	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)	245	76	54	11	87	391	43	1359	5	446	2168	495
RTOR Reduction (vph)	0	0	46	0	0	140	0	0	2	0	0	138
Lane Group Flow (vph)	159	162	8	0	98	251	43	1359	3	446	2168	357
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	28.2	28.2	36.1		20.9	63.5	7.9	129.3	129.3	36.6	158.0	158.0
Effective Green, g (s)	28.2	28.2	36.1		20.9	63.5	7.9	129.3	129.3	36.6	158.0	158.0
Actuated g/C Ratio	0.12	0.12	0.15		0.09	0.26	0.03	0.54	0.54	0.15	0.66	0.66
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	197	202	238		161	737	58	2739	852	523	3347	1042
v/s Ratio Prot	c0.09	0.09			c0.05		0.02	0.27		c0.13	c0.43	
v/s Ratio Perm			0.01			0.09			0.00			0.23
v/c Ratio	0.81	0.80	0.03		0.61	0.34	0.74	0.50	0.00	0.85	0.65	0.34
Uniform Delay, d1	103.2	103.2	87.1		105.6	71.3	115.0	34.8	25.6	99.1	24.4	18.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.87	1.04	1.00	1.04	1.03	2.32
Incremental Delay, d2	20.9	20.0	0.1		6.4	0.3	36.9	0.6	0.0	7.6	0.5	0.5
Delay (s)	124.2	123.2	87.1		112.0	71.6	137.2	36.7	25.6	110.6	25.8	42.5
Level of Service	F	F	F		F	E	F	D	C	F	C	D
Approach Delay (s)		118.4			79.7			39.7			40.6	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/8/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	31.0
Total Split (s)	51.0	51.0		61.0	61.0	61.0	28.0	80.0		48.0	100.0	100.0
Total Split (%)	21.3%	21.3%		25.4%	25.4%	25.4%	11.7%	33.3%		20.0%	41.7%	41.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	239	293	201	33	283	201	190	1038	38	408	1480	266
RTOR Reduction (vph)	0	0	58	0	0	103	0	0	14	0	0	80
Lane Group Flow (vph)	172	360	143	33	283	98	190	1038	24	408	1480	186
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	31.3	31.3	48.9	41.0	41.0	73.9	17.6	109.8	150.8	32.9	125.1	125.1
Effective Green, g (s)	31.3	31.3	48.9	41.0	41.0	73.9	17.6	109.8	150.8	32.9	125.1	125.1
Actuated g/C Ratio	0.13	0.13	0.20	0.17	0.17	0.31	0.07	0.46	0.63	0.14	0.52	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	209	438	322	302	318	927	251	2326	994	470	2650	825
v/s Ratio Prot	0.11	c0.11		0.02	c0.15	0.02	0.06	0.20		c0.12	c0.29	
v/s Ratio Perm			0.09			0.02			0.02			0.12
v/c Ratio	0.82	0.82	0.44	0.11	0.89	0.11	0.76	0.45	0.02	0.87	0.56	0.22
Uniform Delay, d1	101.7	101.6	83.6	84.1	97.3	59.4	109.1	44.4	16.8	101.4	38.8	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	0.95	1.19
Incremental Delay, d2	21.3	11.2	0.4	0.1	24.1	0.0	11.0	0.6	0.0	12.1	0.7	0.5
Delay (s)	123.0	112.9	84.0	84.1	121.4	59.4	120.1	45.0	16.8	147.3	37.3	37.7
Level of Service	F	F	F	F	F	E	F	D	B	F	D	D
Approach Delay (s)		107.3			94.9			55.4			58.2	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	770	235	300	870	15	130
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	837	255	326	946	16	141
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked					0.97	
vC, conflicting volume			1092		1962	418
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1092		1927	418
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			49		41	76
cM capacity (veh/h)			635		27	583

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	418	418	255	326	473	473	158
Volume Left	0	0	0	326	0	0	16
Volume Right	0	0	255	0	0	0	141
cSH	1700	1700	1700	635	1700	1700	266
Volume to Capacity	0.25	0.25	0.15	0.51	0.28	0.28	0.59
Queue Length 95th (ft)	0	0	0	74	0	0	87
Control Delay (s)	0.0	0.0	0.0	16.5	0.0	0.0	37.9
Lane LOS				C			E
Approach Delay (s)	0.0			4.2			37.9
Approach LOS							E

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	845	30	15	1130	40	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	918	33	16	1228	43	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			951		1582	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			951		1582	476
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		55	97
cM capacity (veh/h)			718		97	536

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	612	339	426	819	60
Volume Left	0	0	16	0	43
Volume Right	0	33	0	0	16
cSH	1700	1700	718	1700	125
Volume to Capacity	0.36	0.20	0.02	0.48	0.48
Queue Length 95th (ft)	0	0	2	0	54
Control Delay (s)	0.0	0.0	0.7	0.0	57.6
Lane LOS			A		F
Approach Delay (s)	0.0		0.2		57.6
Approach LOS					F

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	865	0	170	1125	0	55
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	940	0	185	1223	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			940		1921	470
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			940		1921	470
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			75		100	89
cM capacity (veh/h)			725		44	540

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	470	470	592	815	60
Volume Left	0	0	185	0	0
Volume Right	0	0	0	0	60
cSH	1700	1700	725	1700	540
Volume to Capacity	0.28	0.28	0.25	0.48	0.11
Queue Length 95th (ft)	0	0	25	0	9
Control Delay (s)	0.0	0.0	6.3	0.0	12.5
Lane LOS			A		B
Approach Delay (s)	0.0		2.7		12.5
Approach LOS					B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	915	15	0	1135	0	0	0	0	0	0	205
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	995	16	0	1234	0	0	0	0	0	0	223
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	1234			1011			1842	2236	505	1731	2245	617
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1234			1011			1842	2236	505	1731	2245	617
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	49
cM capacity (veh/h)	560			681			23	42	512	57	41	433

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	663	348	617	617	223
Volume Left	0	0	0	0	0
Volume Right	0	16	0	0	223
cSH	1700	1700	1700	1700	433
Volume to Capacity	0.39	0.20	0.36	0.36	0.51
Queue Length 95th (ft)	0	0	0	0	72
Control Delay (s)	0.0	0.0	0.0	0.0	21.8
Lane LOS					C
Approach Delay (s)	0.0		0.0		21.8
Approach LOS					C

Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		50.7%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/8/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	915	655	1135
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 99.6
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/8/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	915	0	655	1135	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	995	0	712	1234	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	995	0	712	1234	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	35.4		52.2	99.6		
Effective Green, g (s)	35.4		52.2	99.6		
Actuated g/C Ratio	0.36		0.52	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1257		927	3539		
v/s Ratio Prot	c0.28		c0.40	0.35		
v/s Ratio Perm						
v/c Ratio	0.79		0.77	0.35		
Uniform Delay, d1	28.8		18.9	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	3.5		3.9	0.1		
Delay (s)	32.3		22.7	0.1		
Level of Service	C		C	A		
Approach Delay (s)	32.3			8.4	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/8/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	290	1255	1790	515
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 100.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/8/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	290	1255	1790	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	1364	1946	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	315	1364	1946	560	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	23.8	100.3	65.5	100.3		
Effective Green, g (s)	23.8	100.3	65.5	100.3		
Actuated g/C Ratio	0.24	1.00	0.65	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	420	3539	2311	1583		
v/s Ratio Prot	c0.18	0.39	c0.55			
v/s Ratio Perm				0.35		
v/c Ratio	0.75	0.39	0.84	0.35		
Uniform Delay, d1	35.5	0.0	13.4	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	7.4	0.1	3.0	0.6		
Delay (s)	42.8	0.1	16.4	0.6		
Level of Service	D	A	B	A		
Approach Delay (s)		8.1	12.9		0.0	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.3	Sum of lost time (s)	11.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/8/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	980	700	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1065	761	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	777				1356	389
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777				1356	389
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				84	85
cM capacity (veh/h)	835				136	610

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	533	533	507	270	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	835	1700	1700	1700	1700	136	610
Volume to Capacity	0.03	0.31	0.31	0.30	0.16	0.16	0.15
Queue Length 95th (ft)	3	0	0	0	0	14	13
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	36.5	12.0
Lane LOS	A					E	B
Approach Delay (s)	0.2			0.0		16.6	
Approach LOS						C	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	690	45	5	510	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	750	49	5	554	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565			799			1361	1557	399	1158	1576	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565			799			1361	1557	399	1158	1576	283
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			68	100	99	100	100	87
cM capacity (veh/h)	1003			819			85	99	600	137	97	714

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	103	500	299	5	370	196	33	0	92
Volume Left	103	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	1003	1700	1700	819	1700	1700	100	1700	714
Volume to Capacity	0.10	0.29	0.18	0.01	0.22	0.12	0.33	0.00	0.13
Queue Length 95th (ft)	9	0	0	1	0	0	32	0	11
Control Delay (s)	9.0	0.0	0.0	9.4	0.0	0.0	57.9	0.0	10.8
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.0			0.1			57.9	10.8	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		37.2%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	510	40	5	435	10	20	5	0	5	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	554	43	5	473	11	22	5	0	5	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			598			1209	1386	299	1084	1402	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			598			1209	1386	299	1084	1402	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	85			99			80	95	100	96	100	91
cM capacity (veh/h)	1075			975			111	120	697	146	118	759

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	370	228	5	315	168	27	5	71
Volume Left	158	0	0	5	0	0	22	5	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	1075	1700	1700	975	1700	1700	113	146	759
Volume to Capacity	0.15	0.22	0.13	0.01	0.19	0.10	0.24	0.04	0.09
Queue Length 95th (ft)	13	0	0	0	0	0	22	3	8
Control Delay (s)	8.9	0.0	0.0	8.7	0.0	0.0	46.8	30.6	10.2
Lane LOS	A			A			E	D	B
Approach Delay (s)	1.9			0.1			46.8	11.7	
Approach LOS							E	B	

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		38.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	370	25	5	335	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	402	27	5	364	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	375			429			973	1052	215	832	1060	188
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	375			429			973	1052	215	832	1060	188
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			90	100	100	100	100	86
cM capacity (veh/h)	1180			1127			163	200	790	240	198	823

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	268	161	5	243	132	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	1180	1700	1700	1127	1700	1700	163	1700	823
Volume to Capacity	0.11	0.16	0.09	0.00	0.14	0.08	0.10	0.00	0.14
Queue Length 95th (ft)	9	0	0	0	0	0	8	0	12
Control Delay (s)	8.4	0.0	0.0	8.2	0.0	0.0	29.5	0.0	10.1
Lane LOS	A			A			D	A	B
Approach Delay (s)	1.9			0.1			29.5	10.1	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		29.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	210	45	0	215	0	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	228	49	0	234	0	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	234			277			671	736	139	606	761	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			277			671	736	139	606	761	117
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			64	95	100	100	91	96
cM capacity (veh/h)	1331			1283			284	312	884	340	302	913

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	125	152	125	0	156	78	120	0	27	38
Volume Left	125	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	0	0	0	0	38
cSH	1331	1700	1700	1700	1700	1700	287	1700	302	913
Volume to Capacity	0.09	0.09	0.07	0.00	0.09	0.05	0.42	0.00	0.09	0.04
Queue Length 95th (ft)	8	0	0	0	0	0	49	0	7	3
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	0.0	26.2	0.0	18.1	9.1
Lane LOS	A						D	A	C	A
Approach Delay (s)	2.5			0.0			26.2		12.9	
Approach LOS							D		B	

Intersection Summary			
Average Delay		6.1	
Intersection Capacity Utilization		35.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	0	100	0	0	0	75	15	0	0	0	140
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	0	109	0	0	0	82	16	0	0	0	152
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			109			457	304	54	258	359	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			109			457	304	54	258	359	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			79	97	100	100	100	86
cM capacity (veh/h)	1622			1480			394	561	1001	620	523	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	0	109	0	0	0	98	0	152
Volume Left	125	0	0	0	0	0	82	0	0
Volume Right	0	0	109	0	0	0	0	0	152
cSH	1622	1700	1700	1700	1700	1700	415	1700	1084
Volume to Capacity	0.08	0.00	0.06	0.00	0.00	0.00	0.24	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	23	0	12
Control Delay (s)	7.4	0.0	0.0	0.0	0.0	0.0	16.3	0.0	8.9
Lane LOS	A						C	A	A
Approach Delay (s)	4.0			0.0			16.3	8.9	
Approach LOS							C	A	

Intersection Summary			
Average Delay		8.0	
Intersection Capacity Utilization		20.3%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	440	0	475	395	530	455	725
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 79.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	440	0	475	395	530	0	0	455	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1551	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1551	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	0	516	429	576	0	0	495	788
RTOR Reduction (vph)	0	0	0	0	0	204	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	239	239	312	429	576	0	0	495	788
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Effective Green, g (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Actuated g/C Ratio				0.28	0.28	0.28	0.31	0.57			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				468	468	431	539	2015			667	1583
v/s Ratio Prot							c0.24	0.16			c0.14	
v/s Ratio Perm				0.14	0.14	c0.20						0.50
v/c Ratio				0.51	0.51	0.72	0.80	0.29			0.74	0.50
Uniform Delay, d1				24.0	24.0	25.8	25.2	8.7			30.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.9	0.9	5.9	8.0	0.1			4.5	1.1
Delay (s)				24.9	24.9	31.7	33.2	8.8			34.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			28.4			19.2			14.1	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	420	450	225	585
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 98.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/8/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	10	420	0	0	0	0	450	255	225	585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3316		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3316		1770	3539	
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)	478	11	457	0	0	0	0	489	277	245	636	0
RTOR Reduction (vph)	0	0	228	0	0	0	0	62	0	0	0	0
Lane Group Flow (vph)	0	489	229	0	0	0	0	704	0	245	636	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.5	32.5					28.4		19.4	53.8	
Effective Green, g (s)		32.5	32.5					28.4		19.4	53.8	
Actuated g/C Ratio		0.33	0.33					0.29		0.20	0.55	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		587	516					958		349	1936	
v/s Ratio Prot								c0.21		c0.14	0.18	
v/s Ratio Perm		0.28	0.15									
v/c Ratio		0.83	0.44					0.74		0.70	0.33	
Uniform Delay, d1		30.4	25.8					31.6		36.8	12.3	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		9.8	0.6					3.0		6.3	0.1	
Delay (s)		40.2	26.4					34.5		43.0	12.4	
Level of Service		D	C					C		D	B	
Approach Delay (s)		33.6			0.0			34.5			20.9	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/8/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	735	495	295	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 85.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	735	495	295	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	432	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	886	799	538	321	103
RTOR Reduction (vph)	0	0	0	341	0	52
Lane Group Flow (vph)	43	886	799	197	321	51
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	31.3	31.3	31.3	31.3	42.3	42.3
Effective Green, g (s)	31.3	31.3	31.3	31.3	42.3	42.3
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.49	0.49
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	1294	1294	578	874	782
v/s Ratio Prot		c0.25	0.23		c0.18	
v/s Ratio Perm	0.10			0.12		0.03
v/c Ratio	0.27	0.68	0.62	0.34	0.37	0.07
Uniform Delay, d1	19.1	23.0	22.2	19.7	13.4	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.5	0.9	0.4	1.2	0.2
Delay (s)	20.1	24.5	23.1	20.0	14.6	11.5
Level of Service	C	C	C	C	B	B
Approach Delay (s)		24.3	21.9		13.8	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	85.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 with Mitigation AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	715	0	40	430	60	265	10
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	50.0	50.0	50.0	22.0	50.0	28.0	28.0
Total Split (%)	50.0%	50.0%	50.0%	22.0%	50.0%	28.0%	28.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	715	0	40	430	60	0	0	265	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	722	0	43	434	61	0	0	268	11
RTOR Reduction (vph)	0	0	0	0	0	23	0	0	0	0	0	9
Lane Group Flow (vph)	0	0	0	361	361	20	434	61	0	0	268	2
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				47.5	47.5	47.5	16.0	40.5			19.5	19.5
Effective Green, g (s)				47.5	47.5	47.5	16.0	40.5			19.5	19.5
Actuated g/C Ratio				0.48	0.48	0.48	0.16	0.40			0.20	0.20
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				798	798	751	549	754			690	308
v/s Ratio Prot				c0.21	0.21		c0.13	0.03			c0.08	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.45	0.45	0.03	0.79	0.08			0.39	0.01
Uniform Delay, d1				17.6	17.6	14.0	40.4	18.3			35.1	32.4
Progression Factor				1.00	1.00	1.00	1.00	1.66			1.00	1.00
Incremental Delay, d2				1.8	0.4	0.1	7.5	0.0			0.4	0.0
Delay (s)				19.4	18.0	14.0	48.0	30.3			35.4	32.5
Level of Service				B	B	B	D	C			D	C
Approach Delay (s)		0.0			18.4			45.8			35.3	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	380	515	1305	115	980
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		8.0	36.0
Total Split (s)	15.0		61.0		24.0	85.0
Total Split (%)	15.0%		61.0%		24.0%	85.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	380	0	0	0	0	515	1305	115	980	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1794	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1794	1583					3539	2787	1770	3539	
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)	16	5	413	0	0	0	0	560	1418	125	1065	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	413	0	0	0	0	560	1418	125	1065	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		3.2	100.0					68.5	100.0	12.3	84.8	
Effective Green, g (s)		3.2	100.0					68.5	100.0	12.3	84.8	
Actuated g/C Ratio		0.03	1.00					0.68	1.00	0.12	0.85	
Clearance Time (s)		6.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		57	1583					2424	2787	217	3001	
v/s Ratio Prot		0.01						0.16		0.07	0.30	
v/s Ratio Perm			0.26						c0.51			
v/c Ratio		0.37	0.26					0.23	0.51	0.58	0.35	
Uniform Delay, d1		47.4	0.0					5.9	0.0	41.4	1.7	
Progression Factor		1.00	1.00					1.00	1.00	1.06	0.61	
Incremental Delay, d2		4.0	0.4					0.2	0.7	3.5	0.3	
Delay (s)		51.4	0.4					6.1	0.7	47.3	1.3	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		2.9			0.0			2.2			6.1	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	1955	1405	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	38	0	1975	1419	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.70					
vC, conflicting volume	2077	473	1474			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1019	473	1474			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	162	538	453			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	38	658	658	658	473	473	473	54
Volume Left	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	54
cSH	538	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.39	0.39	0.39	0.28	0.28	0.28	0.03
Queue Length 95th (ft)	6	0	0	0	0	0	0	0
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	12.2	0.0			0.0			
Approach LOS	B							

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	8.0	43.0		8.0	43.0		8.0	43.0		8.0	43.0	
Total Split (s)	21.0	45.0		19.0	43.0		21.0	56.0		20.0	55.0	
Total Split (%)	15.0%	32.1%		13.6%	30.7%		15.0%	40.0%		14.3%	39.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 118.1
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	310	614	87	185	212	76	250	1886	315	261	1223	190
RTOR Reduction (vph)	0	0	30	0	0	32	0	0	24	0	0	75
Lane Group Flow (vph)	310	614	57	185	212	44	250	1886	291	261	1223	115
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	15.0	23.2	41.7	11.6	19.8	38.4	13.5	51.6	68.2	13.6	51.7	71.7
Effective Green, g (s)	15.0	23.2	41.7	11.6	19.8	38.4	13.5	51.6	68.2	13.6	51.7	71.7
Actuated g/C Ratio	0.13	0.20	0.35	0.10	0.17	0.33	0.11	0.44	0.58	0.12	0.44	0.61
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	436	999	559	337	853	515	392	2223	914	395	2227	961
v/s Ratio Prot	c0.09	c0.12		0.05	0.04		0.07	c0.37		c0.08	0.24	
v/s Ratio Perm			0.04			0.03			0.18			0.07
v/c Ratio	0.71	0.61	0.10	0.55	0.25	0.09	0.64	0.85	0.32	0.66	0.55	0.12
Uniform Delay, d1	49.4	43.3	25.6	50.7	42.6	27.6	49.9	29.7	12.9	50.0	24.5	9.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	1.1	0.1	1.8	0.2	0.1	3.4	3.2	0.2	4.1	0.3	0.1
Delay (s)	54.8	44.4	25.7	52.5	42.8	27.7	53.3	32.9	13.1	54.1	24.8	9.9
Level of Service	D	D	C	D	D	C	D	C	B	D	C	A
Approach Delay (s)		46.0			44.2			32.4			27.7	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	45	95	405	130	1760	30	165	925	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	8.0	44.0		8.0	44.0		8.0	36.0		8.0	36.0	
Total Split (s)	15.0	45.0		14.0	44.0		22.0	48.0		13.0	39.0	
Total Split (%)	12.5%	37.5%		11.7%	36.7%		18.3%	40.0%		10.8%	32.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 107.6
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	45	95	405	130	1760	30	165	925	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	234	109	190	49	103	440	141	1913	33	179	1005	386
RTOR Reduction (vph)	0	0	70	0	0	56	0	0	16	0	0	180
Lane Group Flow (vph)	234	109	120	49	103	384	141	1913	17	179	1005	206
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	10.6	31.5	46.3	6.8	27.7	41.5	9.8	43.3	55.1	8.8	42.3	57.9
Effective Green, g (s)	10.6	31.5	46.3	6.8	27.7	41.5	9.8	43.3	55.1	8.8	42.3	57.9
Actuated g/C Ratio	0.10	0.29	0.43	0.06	0.26	0.38	0.09	0.40	0.51	0.08	0.39	0.53
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	335	541	676	111	476	606	310	2031	804	278	1984	845
v/s Ratio Prot	c0.07	c0.06		0.03	0.06		0.04	c0.38		0.05	0.20	
v/s Ratio Perm			0.08			c0.24			0.01			0.13
v/c Ratio	0.70	0.20	0.18	0.44	0.22	0.63	0.45	0.94	0.02	0.64	0.51	0.24
Uniform Delay, d1	47.4	29.0	19.2	49.0	31.8	27.3	46.8	31.3	13.2	48.3	25.1	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.2	0.1	2.8	0.2	2.2	1.1	9.5	0.0	5.0	0.2	0.2
Delay (s)	53.6	29.2	19.4	51.8	32.0	29.4	47.8	40.9	13.3	53.3	25.3	13.7
Level of Service	D	C	B	D	C	C	D	D	B	D	C	B
Approach Delay (s)		36.4			31.7			40.9			25.7	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	108.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	40	105	820	1280	75	240	810	125
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		44.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		49.0		55.0	55.0	36.0	91.0	91.0
Total Split (%)		35.0%		39.3%	39.3%	25.7%	65.0%	65.0%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 137.6
Natural Cycle: 95
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	105	0	820	0	1280	75	240	810	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	114	0	891	0	1391	82	261	880	136
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	54	0	0	54
Lane Group Flow (vph)	0	0	43	114	0	881	0	1391	28	261	880	82
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			137.6	43.0		79.0		46.6	46.6	30.0	82.6	82.6
Effective Green, g (s)			137.6	43.0		79.0		46.6	46.6	30.0	82.6	82.6
Actuated g/C Ratio			1.00	0.31		0.57		0.34	0.34	0.22	0.60	0.60
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	553		908		1722	536	748	3052	950
v/s Ratio Prot				0.06				c0.27		0.08	0.17	
v/s Ratio Perm			0.03			c0.56			0.02			0.05
v/c Ratio			0.03	0.21		0.97		0.81	0.05	0.35	0.29	0.09
Uniform Delay, d1			0.0	34.8		28.2		41.4	30.6	45.5	13.3	11.6
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.2		22.8		2.9	0.0	0.3	0.1	0.0
Delay (s)			0.0	34.9		51.0		44.3	30.7	45.8	13.3	11.6
Level of Service			A	C		D		D	C	D	B	B
Approach Delay (s)		0.0			49.2			43.6			19.8	
Approach LOS		A			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	137.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	175	220	605	185	665	195	655	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	10.0	4.0	10.0	
Minimum Split (s)	8.0	40.0		8.0	40.0		8.0	40.0	8.0	40.0	
Total Split (s)	18.0	43.0		15.0	40.0		20.0	41.0	26.0	47.0	
Total Split (%)	14.4%	34.4%		12.0%	32.0%		16.0%	32.8%	20.8%	37.6%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 125
Actuated Cycle Length: 101.4
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	175	220	605	185	665	55	195	655	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	5027		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	5027		3433	5085	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)	228	304	185	190	239	658	201	723	60	212	712	174
RTOR Reduction (vph)	0	0	48	0	0	47	0	8	0	0	0	98
Lane Group Flow (vph)	228	304	137	190	239	611	201	775	0	212	712	76
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	11.7	32.7	50.2	10.1	31.1	51.6	11.5	23.4		14.5	26.4	44.1
Effective Green, g (s)	11.7	32.7	50.2	10.1	31.1	51.6	11.5	23.4		14.5	26.4	44.1
Actuated g/C Ratio	0.12	0.32	0.50	0.10	0.31	0.51	0.11	0.23		0.14	0.26	0.44
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	398	604	789	344	575	811	392	1168		494	1333	693
v/s Ratio Prot	c0.07	0.16		0.06	0.13		0.06	c0.15		0.06	c0.14	
v/s Ratio Perm			0.09			c0.39						0.05
v/c Ratio	0.57	0.50	0.17	0.55	0.42	0.75	0.51	0.66		0.43	0.53	0.11
Uniform Delay, d1	42.1	27.4	13.9	43.1	27.6	19.5	42.0	35.1		39.3	31.9	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	0.7	0.1	1.9	0.5	4.0	1.1	1.4		0.6	0.4	0.1
Delay (s)	44.1	28.1	14.0	45.1	28.1	23.5	43.1	36.5		39.9	32.3	16.8
Level of Service	D	C	B	D	C	C	D	D		D	C	B
Approach Delay (s)		29.6			28.3			37.9			31.3	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	43.0		9.0	43.0		9.0	43.0		9.0	44.0	
Total Split (s)	32.0	47.0		29.0	44.0		17.0	44.0		20.0	47.0	
Total Split (%)	22.9%	33.6%		20.7%	31.4%		12.1%	31.4%		14.3%	33.6%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 87.5
Natural Cycle: 125
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	554	190	38	196	582	272	22	92	38	462	130	402
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	27	0	0	187
Lane Group Flow (vph)	554	190	18	196	582	272	22	92	11	462	130	215
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Actuated Green, G (s)	20.9	29.8	40.2	11.3	20.2	41.5	5.4	9.8	26.1	16.3	20.7	46.6
Effective Green, g (s)	20.9	29.8	40.2	11.3	20.2	41.5	5.4	9.8	26.1	16.3	20.7	46.6
Actuated g/C Ratio	0.24	0.34	0.46	0.13	0.23	0.48	0.06	0.11	0.30	0.19	0.24	0.53
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	822	1209	729	444	1177	1326	109	397	473	641	840	1489
v/s Ratio Prot	c0.16	0.05		0.06	c0.11	0.10	0.01	c0.03		c0.13	0.04	0.08
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.67	0.16	0.02	0.44	0.49	0.21	0.20	0.23	0.02	0.72	0.15	0.14
Uniform Delay, d1	30.1	20.0	12.8	35.0	29.1	13.3	38.9	35.3	21.6	33.3	26.3	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.1	0.0	0.7	0.3	0.1	0.9	0.3	0.0	4.0	0.1	0.0
Delay (s)	32.3	20.0	12.8	35.7	29.4	13.3	39.8	35.6	21.6	37.3	26.4	10.3
Level of Service	C	C	B	D	C	B	D	D	C	D	C	B
Approach Delay (s)		28.3			26.4			32.7			25.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	315	5	65	10	1260	40	740
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	14.0	52.0	16.0	54.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	12.7%	47.3%	14.5%	49.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	315	5	65	10	1260	195	40	740	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1688	1583	1770	3468		1770	3536	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1688	1583	1770	3468		1770	3536	
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	0	5	342	5	71	11	1370	212	43	804	5
RTOR Reduction (vph)	0	5	0	0	0	60	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	174	173	11	11	1574	0	43	809	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Effective Green, g (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.01	0.60		0.05	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		262	263	247	24	2090		91	2266	
v/s Ratio Prot		c0.00		c0.10	0.10		0.01	c0.45		c0.02	c0.23	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.66	0.66	0.04	0.46	0.75		0.47	0.36	
Uniform Delay, d1		54.2		43.7	43.6	39.4	53.8	15.9		50.7	9.2	
Progression Factor		1.00		1.00	1.00	1.00	1.41	0.44		1.00	1.00	
Incremental Delay, d2		0.1		6.2	5.8	0.1	10.1	2.0		3.8	0.4	
Delay (s)		54.3		49.9	49.5	39.5	85.9	8.9		54.5	9.6	
Level of Service		D		D	D	D	F	A		D	A	
Approach Delay (s)		54.3			47.9			9.4			11.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	505	25	1470	380	1070
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	33.0	33.0	77.0	77.0	77.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	505	25	1470	380	0	1070
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	27	1598	413	0	1163
RTOR Reduction (vph)	0	21	0	130	0	0
Lane Group Flow (vph)	549	6	1598	283	0	1163
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.5	22.5	75.5	75.5		75.5
Effective Green, g (s)	22.5	22.5	75.5	75.5		75.5
Actuated g/C Ratio	0.20	0.20	0.69	0.69		0.69
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	702	323	2429	1086		2429
v/s Ratio Prot	c0.16		c0.45			0.33
v/s Ratio Perm		0.00		0.18		
v/c Ratio	0.78	0.02	0.66	0.26		0.48
Uniform Delay, d1	41.4	34.9	9.9	6.6		8.1
Progression Factor	1.00	1.00	1.00	1.00		1.10
Incremental Delay, d2	5.7	0.0	1.4	0.6		0.6
Delay (s)	47.1	34.9	11.3	7.2		9.5
Level of Service	D	C	B	A		A
Approach Delay (s)	46.5		10.4			9.5
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1730	1205	435	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1880	1310	473	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	1783				2173	891
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1552				2016	491
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	356				43	440

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	627	627	627	873	909
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	473
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.51	0.53
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	165	1730	1205
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 59.4
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	165	1730	1205	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	179	1880	1310	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	179	1880	1310	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			11.5	59.4	35.9	
Effective Green, g (s)			11.5	59.4	35.9	
Actuated g/C Ratio			0.19	1.00	0.60	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			342	5085	2138	
v/s Ratio Prot			0.10	c0.37	c0.37	
v/s Ratio Perm						
v/c Ratio			0.52	0.37	0.61	
Uniform Delay, d1			21.5	0.0	7.4	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			1.4	0.0	0.5	
Delay (s)			22.9	0.0	7.9	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.0	7.9	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	475	170	870	710	1875
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 119.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	475	0	170	0	0	0	0	870	0	710	1875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	516	0	185	0	0	0	0	946	0	772	2038	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	516	0	185	0	0	0	0	946	0	772	2038	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.2		119.4					40.8		37.4	84.2	
Effective Green, g (s)	23.2		119.4					40.8		37.4	84.2	
Actuated g/C Ratio	0.19		1.00					0.34		0.31	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	667		1583					1209		1075	3585	
v/s Ratio Prot	c0.15							c0.27		c0.22	0.40	
v/s Ratio Perm			0.12									
v/c Ratio	0.77		0.12					0.78		0.72	0.57	
Uniform Delay, d1	45.6		0.0					35.3		36.3	8.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	5.6		0.2					3.4		2.3	0.2	
Delay (s)	51.2		0.2					38.7		38.6	8.9	
Level of Service	D		A					D		D	A	
Approach Delay (s)		37.7			0.0			38.7			17.0	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2495	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2495	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2712	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2712	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.77			
v/s Ratio Perm						
v/c Ratio			0.85			
Uniform Delay, d1			3.3			
Progression Factor			1.00			
Incremental Delay, d2			3.1			
Delay (s)			6.5			
Level of Service			A			
Approach Delay (s)	0.0		6.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	870	2495	0	2045	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	946	2712	0	2223	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.80			
vC, conflicting volume			3658		1687	473		
vC1, stage 1 conf vol					946			
vC2, stage 2 conf vol					741			
vCu, unblocked vol			3658		964	473		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			61		286	538		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	473	473	1356	1356	741	741	741
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1356	1356	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.80	0.80	0.44	0.44	0.44
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		90.6%	ICU Level of Service	E
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	135	0	3255	115	0	2050	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	147	0	3538	125	0	2071	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81		0.81					
vC, conflicting volume	3250	5611	690	4230	5611	1181	2071			3540		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2956	5872	0	4167	5872	1181	1499			3540		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	19	100			100		
cM capacity (veh/h)	1	0	878	1	0	182	359			68		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	147	1179	1179	1179	125	690	690	690	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	147	0	0	0	125	0	0	0	0
cSH	1700	182	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.81	0.69	0.69	0.69	0.07	0.41	0.41	0.41	0.00
Queue Length 95th (ft)	0	138	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	76.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	F								
Approach Delay (s)	0.0	76.2	0.0				0.0			
Approach LOS	A	F								

Intersection Summary				
Average Delay		1.9		
Intersection Capacity Utilization		77.9%	ICU Level of Service	D
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	25	30	105	5	175	40	3220	35	45	1565	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	30	15	105	5	175	40	3220	35	45	1565	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1750		1727	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1750		1318	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	27	33	16	114	5	190	43	3389	38	49	1581	109
RTOR Reduction (vph)	0	8	0	0	0	14	0	0	11	0	0	29
Lane Group Flow (vph)	27	41	0	114	5	176	43	3389	27	49	1581	80
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Effective Green, g (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.04	0.72	0.72	0.05	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	264		199	281	358	64	3659	1110	88	3726	1100
v/s Ratio Prot		0.02			0.00		0.02	c0.67		0.03	c0.31	
v/s Ratio Perm	0.02			c0.09		c0.11			0.02			0.05
v/c Ratio	0.13	0.16		0.57	0.02	0.49	0.67	0.93	0.02	0.56	0.42	0.07
Uniform Delay, d1	88.1	88.5		94.6	86.7	80.8	114.2	28.3	9.6	111.4	12.4	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.75	0.89	32.83	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3		3.9	0.0	1.1	10.5	2.3	0.0	7.4	0.4	0.1
Delay (s)	88.4	88.8		98.6	86.7	81.9	95.8	27.4	315.4	118.8	12.8	9.2
Level of Service	F	F		F	F	F	F	C	F	F	B	A
Approach Delay (s)		88.7			88.1			31.4			15.5	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0	47.0	10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	24.0	151.0	151.0	42.0	169.0	169.0
Total Split (%)	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	10.0%	62.9%	62.9%	17.5%	70.4%	70.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1853	1540		1758	1583	1770	5085	1543	1770	5085	1558
Flt Permitted		0.97	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1801	1540		1305	1583	1770	5085	1543	1770	5085	1558
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	43	65	163	16	168	49	3418	49	49	1636	5
RTOR Reduction (vph)	0	0	55	0	0	142	0	0	14	0	0	1
Lane Group Flow (vph)	0	48	10	0	179	26	49	3418	35	49	1636	4
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		36.5	36.5		36.5	36.5	12.0	172.5	172.5	12.0	172.5	172.5
Effective Green, g (s)		36.5	36.5		36.5	36.5	12.0	172.5	172.5	12.0	172.5	172.5
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.05	0.72	0.72	0.05	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		273	234		198	240	88	3654	1109	88	3654	1119
v/s Ratio Prot							c0.03	c0.67		0.03	0.32	
v/s Ratio Perm		0.03	0.01		c0.14	0.02			0.02			0.00
v/c Ratio		0.18	0.04		0.90	0.11	0.56	0.94	0.03	0.56	0.45	0.00
Uniform Delay, d1		88.6	86.8		100.0	87.7	111.4	29.0	9.7	111.4	14.0	9.5
Progression Factor		1.00	1.00		1.00	1.00	0.95	0.98	3.34	0.94	0.84	1.00
Incremental Delay, d2		0.3	0.1		38.2	0.2	3.5	3.0	0.0	6.9	0.4	0.0
Delay (s)		89.0	86.9		138.2	87.9	109.4	31.5	32.4	111.8	12.2	9.5
Level of Service		F	F		F	F	F	C	C	F	B	A
Approach Delay (s)		87.8			113.8			32.6			15.1	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3380	1795	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3380	1795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3674	1813	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3674	1813	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.72	0.36	
v/s Ratio Perm						
v/c Ratio				0.94	0.46	
Uniform Delay, d1				11.4	4.9	
Progression Factor				1.35	0.94	
Incremental Delay, d2				2.8	0.4	
Delay (s)				18.3	5.0	
Level of Service				B	A	
Approach Delay (s)	0.0			18.3	5.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	160	10	5	250	3065	15	5	1525	330
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0	14.0	46.0	165.0		12.0	131.0	
Total Split (%)	20.4%	20.4%		5.8%	5.8%	19.2%	68.8%		5.0%	54.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	160	10	10	5	250	3065	15	5	1525	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
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)	440	11	174	11	11	5	272	3332	16	5	1658	359
RTOR Reduction (vph)	0	0	35	0	0	5	0	0	4	0	0	69
Lane Group Flow (vph)	224	227	139	0	22	0	272	3332	12	5	1658	290
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	40.1	40.1	84.8		5.9	5.9	38.7	167.8	180.7	1.2	130.3	170.4
Effective Green, g (s)	40.1	40.1	84.8		5.9	5.9	38.7	167.8	180.7	1.2	130.3	170.4
Actuated g/C Ratio	0.17	0.17	0.35		0.02	0.02	0.16	0.70	0.75	0.00	0.54	0.71
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	280	282	514		44	38	285	3555	1082	8	2760	969
v/s Ratio Prot	0.13	c0.13			c0.01		c0.15	c0.66		0.00	0.33	
v/s Ratio Perm			0.10			0.00			0.01			0.21
v/c Ratio	0.80	0.80	0.27		0.50	0.00	0.95	0.94	0.01	0.62	0.60	0.30
Uniform Delay, d1	96.1	96.2	55.5		115.6	114.2	99.8	31.5	7.4	119.2	37.2	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.97	1.02	1.00	0.80	1.15	1.25
Incremental Delay, d2	15.0	15.3	0.3		3.2	0.0	26.3	3.4	0.0	72.9	0.9	0.2
Delay (s)	111.1	111.4	55.8		118.8	114.2	123.3	35.5	7.4	168.3	43.6	16.1
Level of Service	F	F	E		F	F	F	D	A	F	D	B
Approach Delay (s)		95.8			118.0			42.0			39.0	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	118.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	520	50	50	85	505	40	2095	5	285	1295	60
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	57.0	57.0		35.0		20.0	113.0	113.0	35.0	128.0	128.0
Total Split (%)	23.8%	23.8%		14.6%		8.3%	47.1%	47.1%	14.6%	53.3%	53.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	50	50	15	85	505	40	2095	5	285	1295	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	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)	565	54	54	16	92	549	43	2277	5	310	1408	65
RTOR Reduction (vph)	0	0	41	0	0	33	0	0	3	0	0	30
Lane Group Flow (vph)	311	308	13	0	108	516	43	2277	2	310	1408	35
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	47.7	47.7	58.6		29.0	61.9	10.9	111.4	111.4	26.9	127.4	127.4
Effective Green, g (s)	47.7	47.7	58.6		29.0	61.9	10.9	111.4	111.4	26.9	127.4	127.4
Actuated g/C Ratio	0.20	0.20	0.24		0.12	0.26	0.05	0.46	0.46	0.11	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	337	386		223	718	80	2360	734	384	2699	840
v/s Ratio Prot	c0.18	0.18			0.06		0.02	c0.45		c0.09	0.28	
v/s Ratio Perm			0.01			c0.19			0.00			0.02
v/c Ratio	0.93	0.91	0.03		0.48	0.72	0.54	0.96	0.00	0.81	0.52	0.04
Uniform Delay, d1	94.5	94.1	69.1		98.5	81.1	112.1	62.4	34.5	104.0	36.5	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.74	1.00	1.30	0.43	0.19
Incremental Delay, d2	31.9	28.1	0.0		1.7	3.4	5.8	10.6	0.0	10.0	0.6	0.1
Delay (s)	126.4	122.3	69.2		100.2	84.5	117.7	56.8	34.5	144.8	16.4	5.1
Level of Service	F	F	E		F	F	F	E	C	F	B	A
Approach Delay (s)		119.9			87.1			57.9			38.4	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	62.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6 3
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	
Total Split (s)	47.0	47.0		52.0	52.0	52.0	25.0	113.0		28.0	116.0	
Total Split (%)	19.6%	19.6%		21.7%	21.7%	21.7%	10.4%	47.1%		11.7%	48.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	293	174	185	114	272	326	168	1630	54	196	1056	152
RTOR Reduction (vph)	0	0	52	0	0	49	0	0	16	0	0	42
Lane Group Flow (vph)	152	315	133	114	272	277	168	1630	38	196	1056	110
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Actuated Green, G (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Effective Green, g (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Actuated g/C Ratio	0.12	0.12	0.18	0.16	0.16	0.24	0.07	0.54	0.70	0.07	0.55	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	190	392	291	286	301	728	226	2752	1112	256	2796	1104
v/s Ratio Prot	0.09	c0.09		0.06	c0.15	0.06	0.05	c0.32		c0.06	0.21	
v/s Ratio Perm			0.08			0.04			0.02			0.07
v/c Ratio	0.80	0.80	0.46	0.40	0.90	0.38	0.74	0.59	0.03	0.77	0.38	0.10
Uniform Delay, d1	103.0	103.1	87.2	90.1	98.8	76.9	110.1	37.2	10.9	109.0	30.7	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.42	0.98
Incremental Delay, d2	19.9	10.7	0.4	0.3	28.0	0.1	11.0	0.9	0.0	10.3	0.3	0.0
Delay (s)	122.9	113.8	87.6	90.5	126.7	77.0	121.1	38.1	10.9	114.3	43.9	11.6
Level of Service	F	F	F	F	F	E	F	D	B	F	D	B
Approach Delay (s)		108.5			98.2			44.8			50.2	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	63.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1015	95	110	455	10	195
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1103	103	120	495	11	212
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked						
vC, conflicting volume			1207		1590	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1207		1590	552
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		86	56
cM capacity (veh/h)			574		78	478

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	552	552	103	120	247	247	223
Volume Left	0	0	0	120	0	0	11
Volume Right	0	0	103	0	0	0	212
cSH	1700	1700	1700	574	1700	1700	502
Volume to Capacity	0.32	0.32	0.06	0.21	0.15	0.15	0.44
Queue Length 95th (ft)	0	0	0	19	0	0	56
Control Delay (s)	0.0	0.0	0.0	12.9	0.0	0.0	20.4
Lane LOS				B			C
Approach Delay (s)	0.0			2.5			20.4
Approach LOS							C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	960	40	10	570	30	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1043	43	11	620	33	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1043		1397	543
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1043		1397	543
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		75	99
cM capacity (veh/h)			662		130	484

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	696	391	217	413	38
Volume Left	0	0	11	0	33
Volume Right	0	43	0	0	5
cSH	1700	1700	662	1700	145
Volume to Capacity	0.41	0.23	0.02	0.24	0.26
Queue Length 95th (ft)	0	0	1	0	25
Control Delay (s)	0.0	0.0	0.7	0.0	38.4
Lane LOS			A		E
Approach Delay (s)	0.0		0.2		38.4
Approach LOS					E

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	925	0	55	590	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1005	0	60	641	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			1005		1446	503
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1005		1446	503
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	92
cM capacity (veh/h)			685		112	514

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	503	503	274	428	43
Volume Left	0	0	60	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	685	1700	514
Volume to Capacity	0.30	0.30	0.09	0.25	0.08
Queue Length 95th (ft)	0	0	7	0	7
Control Delay (s)	0.0	0.0	3.2	0.0	12.6
Lane LOS			A		B
Approach Delay (s)	0.0		1.2		12.6
Approach LOS					B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.2		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	895	325	565
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 56.3
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	895	0	325	565	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	973	0	353	614	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	973	0	353	614	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	26.2		18.0	56.2		
Effective Green, g (s)	26.2		18.0	56.2		
Actuated g/C Ratio	0.47		0.32	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1649		566	3539		
v/s Ratio Prot	c0.27		c0.20	0.17		
v/s Ratio Perm						
v/c Ratio	0.59		0.62	0.17		
Uniform Delay, d1	11.0		16.2	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.6		2.1	0.0		
Delay (s)	11.6		18.4	0.0		
Level of Service	B		B	A		
Approach Delay (s)	11.6			6.7	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	56.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	295	1235	890	175
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 49.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	295	1235	890	175	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	321	1342	967	190	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	321	1342	967	190	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	14.7	49.8	24.1	49.8		
Effective Green, g (s)	14.7	49.8	24.1	49.8		
Actuated g/C Ratio	0.30	1.00	0.48	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	522	3539	1712	1583		
v/s Ratio Prot	c0.18	0.38	c0.27			
v/s Ratio Perm				0.12		
v/c Ratio	0.61	0.38	0.56	0.12		
Uniform Delay, d1	15.1	0.0	9.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.2	0.1	0.4	0.2		
Delay (s)	17.3	0.1	9.6	0.2		
Level of Service	B	A	A	A		
Approach Delay (s)		3.4	8.0		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	11.0
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	525	960	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	571	1043	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1065				1492	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1065				1492	533
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				73	94
cM capacity (veh/h)	650				101	492

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	285	285	696	370	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	650	1700	1700	1700	1700	101	492
Volume to Capacity	0.12	0.17	0.17	0.41	0.22	0.27	0.06
Queue Length 95th (ft)	10	0	0	0	0	25	4
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	53.4	12.8
Lane LOS	B					F	B
Approach Delay (s)	1.3			0.0		33.1	
Approach LOS						D	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	365	15	0	555	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	397	16	0	603	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	603			413			1120	1171	207	976	1179	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	603			413			1120	1171	207	976	1179	302
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			66	94	99	100	100	64
cM capacity (veh/h)	970			1142			97	175	800	182	173	694

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	264	149	0	402	201	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	970	1700	1700	1700	1700	1700	120	1700	694
Volume to Capacity	0.08	0.16	0.09	0.00	0.24	0.12	0.41	0.00	0.36
Queue Length 95th (ft)	7	0	0	0	0	0	43	0	41
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	54.0	0.0	13.1
Lane LOS	A						F	A	B
Approach Delay (s)	1.5			0.0			54.0	13.1	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.8	
Intersection Capacity Utilization		42.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	245	10	0	390	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	266	11	0	424	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	424			277			880	946	139	815	951	212
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			277			880	946	139	815	951	212
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			85	93	100	100	100	82
cM capacity (veh/h)	1132			1283			180	231	884	233	230	793

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	178	100	0	283	141	43	0	147
Volume Left	125	0	0	0	0	0	27	0	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	1132	1700	1700	1700	1700	1700	196	1700	793
Volume to Capacity	0.11	0.10	0.06	0.00	0.17	0.08	0.22	0.00	0.18
Queue Length 95th (ft)	9	0	0	0	0	0	20	0	17
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	0.0	28.5	0.0	10.6
Lane LOS	A						D	A	B
Approach Delay (s)	2.7			0.0			28.5	10.6	
Approach LOS							D	B	

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		32.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	145	5	0	265	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	158	5	0	288	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	293			163			620	649	82	571	649	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			163			620	649	82	571	649	147
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			93	97	100	100	100	86
cM capacity (veh/h)	1265			1413			303	357	962	371	357	874

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	105	58	0	192	101	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1265	1700	1700	1700	1700	1700	319	1700	874
Volume to Capacity	0.08	0.06	0.03	0.00	0.11	0.06	0.10	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	8	0	12
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	17.6	0.0	9.8
Lane LOS	A						C	A	A
Approach Delay (s)	3.0			0.0			17.6	9.8	
Approach LOS							C	A	

Intersection Summary			
Average Delay		3.6	
Intersection Capacity Utilization		27.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	80	10	0	150	0	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	87	11	0	163	0	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	163			98			397	386	49	364	391	82
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	163			98			397	386	49	364	391	82
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			91	90	100	100	98	91
cM capacity (veh/h)	1413			1493			464	522	1009	504	518	962

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	65	58	40	0	109	54	98	0	11	87
Volume Left	65	0	0	0	0	0	43	0	0	0
Volume Right	0	0	11	0	0	0	0	0	0	87
cSH	1413	1700	1700	1700	1700	1700	494	1700	518	962
Volume to Capacity	0.05	0.03	0.02	0.00	0.06	0.03	0.20	0.00	0.02	0.09
Queue Length 95th (ft)	4	0	0	0	0	0	18	0	2	7
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	14.1	0.0	12.1	9.1
Lane LOS	A						B	A	B	A
Approach Delay (s)	3.1			0.0			14.1		9.4	
Approach LOS							B		A	

Intersection Summary			
Average Delay		5.4	
Intersection Capacity Utilization		29.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	0	40	0	0	0	60	15	0	0	0	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	0	43	0	0	0	65	16	0	0	0	98
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			43			207	109	22	95	130	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			43			207	109	22	95	130	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			90	98	100	100	100	91
cM capacity (veh/h)	1622			1563			653	760	1050	846	739	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	0	43	0	0	0	82	0	98
Volume Left	43	0	0	0	0	0	65	0	0
Volume Right	0	0	43	0	0	0	0	0	98
cSH	1622	1700	1700	1700	1700	1700	672	1700	1084
Volume to Capacity	0.03	0.00	0.03	0.00	0.00	0.00	0.12	0.00	0.09
Queue Length 95th (ft)	2	0	0	0	0	0	10	0	7
Control Delay (s)	7.3	0.0	0.0	0.0	0.0	0.0	11.1	0.0	8.6
Lane LOS	A						B	A	A
Approach Delay (s)	3.6			0.0			11.1	8.6	
Approach LOS							B	A	

Intersection Summary			
Average Delay		7.8	
Intersection Capacity Utilization		16.4%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	375	0	190	350	660	335	730
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 67.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	375	0	190	350	660	0	0	335	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1553	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1553	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	408	0	207	380	717	0	0	364	793
RTOR Reduction (vph)	0	0	0	0	0	153	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	204	204	54	380	717	0	0	364	793
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Effective Green, g (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Actuated g/C Ratio				0.24	0.24	0.24	0.30	0.58			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				404	404	373	537	2052			661	1583
v/s Ratio Prot							c0.21	0.20			0.10	
v/s Ratio Perm				0.12	0.12	0.04						c0.50
v/c Ratio				0.50	0.50	0.15	0.71	0.35			0.55	0.50
Uniform Delay, d1				22.0	22.0	20.0	20.7	7.4			24.7	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.0	1.0	0.2	4.2	0.1			1.0	1.1
Delay (s)				23.0	23.0	20.2	24.9	7.5			25.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			22.0			13.5			8.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	525	415	245	495
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	63.0	63.0	49.0	38.0	87.0
Total Split (%)	42.0%	42.0%	32.7%	25.3%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 136.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	580	90	525	0	0	0	0	415	345	245	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3252		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3252		1770	3539	
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)	630	98	571	0	0	0	0	451	375	266	538	0
RTOR Reduction (vph)	0	0	173	0	0	0	0	103	0	0	0	0
Lane Group Flow (vph)	0	728	398	0	0	0	0	723	0	266	538	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		57.5	57.5					36.2		25.0	67.2	
Effective Green, g (s)		57.5	57.5					36.2		25.0	67.2	
Actuated g/C Ratio		0.42	0.42					0.26		0.18	0.49	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		750	657					861		323	1739	
v/s Ratio Prot								c0.22		c0.15	0.15	
v/s Ratio Perm		0.41	0.25									
v/c Ratio		0.97	0.61					0.84		0.82	0.31	
Uniform Delay, d1		38.8	30.8					47.5		53.7	20.8	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		25.7	1.6					7.2		15.5	0.1	
Delay (s)		64.4	32.4					54.8		69.2	20.9	
Level of Service		E	C					D		E	C	
Approach Delay (s)		50.3			0.0			54.8			36.9	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	136.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 85.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.39	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	723	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	967	543	114	54	33
RTOR Reduction (vph)	0	0	0	73	0	17
Lane Group Flow (vph)	22	967	543	41	54	16
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	30.9	30.9	30.9	30.9	42.2	42.2
Effective Green, g (s)	30.9	30.9	30.9	30.9	42.2	42.2
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.50	0.50
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	262	1285	1285	574	877	784
v/s Ratio Prot		c0.27	0.15		c0.03	
v/s Ratio Perm	0.03			0.03		0.01
v/c Ratio	0.08	0.75	0.42	0.07	0.06	0.02
Uniform Delay, d1	17.8	23.7	20.4	17.7	11.2	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.5	0.2	0.1	0.1	0.0
Delay (s)	17.9	26.3	20.6	17.8	11.3	11.0
Level of Service	B	C	C	B	B	B
Approach Delay (s)		26.1	20.1		11.2	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 with Mitigation PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1425	5	20	480	70	140	30
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	56.0	56.0	56.0	26.0	54.0	28.0	28.0
Total Split (%)	50.9%	50.9%	50.9%	23.6%	49.1%	25.5%	25.5%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1425	5	20	480	70	0	0	140	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1439	5	22	485	71	0	0	141	33
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	719	725	11	485	71	0	0	141	6
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				54.6	54.6	54.6	19.4	43.4			19.0	19.0
Effective Green, g (s)				54.6	54.6	54.6	19.4	43.4			19.0	19.0
Actuated g/C Ratio				0.50	0.50	0.50	0.18	0.39			0.17	0.17
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				834	836	785	605	735			611	273
v/s Ratio Prot				0.43	c0.43		c0.14	0.04			c0.04	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.86	0.87	0.01	0.80	0.10			0.23	0.02
Uniform Delay, d1				24.4	24.5	14.0	43.5	21.0			39.2	37.8
Progression Factor				1.01	1.01	1.00	1.02	1.58			1.00	1.00
Incremental Delay, d2				11.4	9.4	0.0	7.4	0.1			0.2	0.0
Delay (s)				36.0	34.1	14.1	51.6	33.2			39.4	37.8
Level of Service				D	C	B	D	C			D	D
Approach Delay (s)		0.0			34.7			49.3			39.1	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	350	585	1245	40	1585
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		8.0	36.0
Total Split (s)	22.0		73.0		15.0	88.0
Total Split (%)	20.0%		66.4%		13.6%	80.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	350	0	0	0	0	585	1245	40	1585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1779	1583					3539	2787	1770	3539	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1779	1583					3539	2787	1770	3539	
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)	87	5	380	0	0	0	0	636	1353	43	1723	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	380	0	0	0	0	636	1353	43	1723	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		9.6	110.0					78.7	110.0	5.7	88.4	
Effective Green, g (s)		9.6	110.0					78.7	110.0	5.7	88.4	
Actuated g/C Ratio		0.09	1.00					0.72	1.00	0.05	0.80	
Clearance Time (s)		6.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		155	1583					2531	2787	91	2844	
v/s Ratio Prot		0.05						0.18		0.02	c0.49	
v/s Ratio Perm			0.24						c0.49			
v/c Ratio		0.59	0.24					0.25	0.49	0.47	0.61	
Uniform Delay, d1		48.3	0.0					5.4	0.0	50.7	4.1	
Progression Factor		1.00	1.00					1.00	1.00	0.90	1.20	
Incremental Delay, d2		6.0	0.4					0.2	0.6	2.6	0.7	
Delay (s)		54.3	0.4					5.7	0.6	48.4	5.6	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		10.9			0.0			2.2			6.6	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	175	0	1825	1825	230
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	190	0	1843	1843	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.76					
vC, conflicting volume	2458	614	2093			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1820	614	2093			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	56	100			
cM capacity (veh/h)	53	434	260			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	190	614	614	614	614	614	614	250
Volume Left	0	0	0	0	0	0	0	0
Volume Right	190	0	0	0	0	0	0	250
cSH	434	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.44	0.36	0.36	0.36	0.36	0.36	0.36	0.15
Queue Length 95th (ft)	55	0	0	0	0	0	0	0
Control Delay (s)	19.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C							
Approach Delay (s)	19.6	0.0			0.0			
Approach LOS	C							

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	270	470	115	390	1440	220	250	1580	375
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	8.0	44.0		8.0	44.0		8.0	44.0		8.0	44.0	
Total Split (s)	25.0	44.0		25.0	44.0		25.0	49.0		22.0	46.0	
Total Split (%)	17.9%	31.4%		17.9%	31.4%		17.9%	35.0%		15.7%	32.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 118.6
Natural Cycle: 125
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	270	470	115	390	1440	220	250	1580	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	424	582	272	293	511	125	424	1565	239	272	1717	408
RTOR Reduction (vph)	0	0	28	0	0	31	0	0	29	0	0	33
Lane Group Flow (vph)	424	582	244	293	511	94	424	1565	210	272	1717	375
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	19.2	24.7	48.6	15.4	20.9	40.2	18.9	46.1	66.5	14.3	41.5	65.7
Effective Green, g (s)	19.2	24.7	48.6	15.4	20.9	40.2	18.9	46.1	66.5	14.3	41.5	65.7
Actuated g/C Ratio	0.16	0.21	0.41	0.13	0.18	0.34	0.16	0.39	0.56	0.12	0.35	0.55
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	556	1059	649	446	896	537	547	1978	888	414	1780	877
v/s Ratio Prot	c0.12	c0.11		0.09	0.10		c0.12	0.31		0.08	c0.34	
v/s Ratio Perm			0.15			0.06			0.13			0.24
v/c Ratio	0.76	0.55	0.38	0.66	0.57	0.17	0.78	0.79	0.24	0.66	0.96	0.43
Uniform Delay, d1	47.5	41.9	24.4	49.0	44.7	27.5	47.8	32.0	13.2	49.8	37.8	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.1	0.6	0.4	3.5	0.9	0.2	6.8	2.2	0.1	3.7	13.8	0.3
Delay (s)	53.6	42.5	24.7	52.5	45.6	27.7	54.5	34.2	13.3	53.5	51.6	15.8
Level of Service	D	D	C	D	D	C	D	C	B	D	D	B
Approach Delay (s)		42.4			45.3			35.8			45.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	118.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	130	160	375	135	1440	60	365	1530	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	8.0	43.0		8.0	43.0		8.0	33.0		8.0	33.0	
Total Split (s)	23.0	43.0		23.0	43.0		24.0	41.0		23.0	40.0	
Total Split (%)	17.7%	33.1%		17.7%	33.1%		18.5%	31.5%		17.7%	30.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 115.1
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	130	160	375	135	1440	60	365	1530	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	353	250	391	141	174	408	147	1565	65	397	1663	370
RTOR Reduction (vph)	0	0	67	0	0	29	0	0	27	0	0	162
Lane Group Flow (vph)	353	250	324	141	174	379	147	1565	38	397	1663	208
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	16.4	29.1	44.6	14.1	26.8	49.0	10.5	36.5	55.6	17.2	43.2	64.6
Effective Green, g (s)	16.4	29.1	44.6	14.1	26.8	49.0	10.5	36.5	55.6	17.2	43.2	64.6
Actuated g/C Ratio	0.14	0.25	0.39	0.12	0.23	0.43	0.09	0.32	0.48	0.15	0.38	0.56
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	490	471	614	217	434	675	313	1615	766	513	1911	890
v/s Ratio Prot	c0.10	0.13		0.08	0.09		0.04	c0.31		c0.12	0.33	
v/s Ratio Perm			c0.20			0.24			0.02			0.13
v/c Ratio	0.72	0.53	0.53	0.65	0.40	0.56	0.47	0.97	0.05	0.77	0.87	0.23
Uniform Delay, d1	47.1	37.0	27.0	48.0	37.3	24.9	49.6	38.6	15.7	47.0	33.3	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	1.2	0.8	6.6	0.6	1.1	1.1	15.5	0.0	7.2	4.6	0.1
Delay (s)	52.2	38.2	27.9	54.6	37.9	25.9	50.7	54.1	15.7	54.1	37.9	12.8
Level of Service	D	D	C	D	D	C	D	D	B	D	D	B
Approach Delay (s)		39.1			34.4			52.4			36.7	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	114.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	100	105	605	1085	305	635	1380	105
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		44.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		44.0		37.0	37.0	39.0	76.0	76.0
Total Split (%)		36.7%		30.8%	30.8%	32.5%	63.3%	63.3%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 109.6
Natural Cycle: 105
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	105	0	605	0	1085	305	635	1380	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	114	0	658	0	1179	332	690	1500	114
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	237	0	0	46
Lane Group Flow (vph)	0	0	109	114	0	647	0	1179	95	690	1500	68
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			109.4	32.5		66.2		31.2	31.2	27.7	64.9	64.9
Effective Green, g (s)			109.4	32.5		66.2		31.2	31.2	27.7	64.9	64.9
Actuated g/C Ratio			1.00	0.30		0.61		0.29	0.29	0.25	0.59	0.59
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	525		957		1450	451	869	3016	939
v/s Ratio Prot				0.06				c0.23		c0.20	0.29	
v/s Ratio Perm			0.07			c0.41			0.06			0.04
v/c Ratio			0.07	0.22		0.68		0.81	0.21	0.79	0.50	0.07
Uniform Delay, d1			0.0	28.9		14.4		36.4	29.7	38.2	12.8	9.5
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	0.2		1.9		3.6	0.2	5.0	0.1	0.0
Delay (s)			0.1	29.1		16.3		40.0	30.0	43.2	13.0	9.5
Level of Service			A	C		B		D	C	D	B	A
Approach Delay (s)		0.1			18.2			37.8			21.9	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	109.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	215	290	360	255	810	390	925	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	10.0	4.0	10.0	
Minimum Split (s)	8.0	40.0		8.0	40.0		8.0	40.0	8.0	40.0	
Total Split (s)	18.0	43.0		15.0	40.0		20.0	41.0	26.0	47.0	
Total Split (%)	14.4%	34.4%		12.0%	32.0%		16.0%	32.8%	20.8%	37.6%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 125
Actuated Cycle Length: 110.8
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	215	290	360	255	810	340	390	925	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4860		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4860		3433	5085	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)	304	228	310	234	315	391	277	880	370	424	1005	359
RTOR Reduction (vph)	0	0	55	0	0	53	0	59	0	0	0	87
Lane Group Flow (vph)	304	228	255	234	315	338	277	1191	0	424	1005	272
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.4	27.7	47.4	10.8	25.1	49.7	13.7	33.4		18.6	38.3	57.7
Effective Green, g (s)	13.4	27.7	47.4	10.8	25.1	49.7	13.7	33.4		18.6	38.3	57.7
Actuated g/C Ratio	0.12	0.25	0.43	0.10	0.23	0.45	0.12	0.30		0.17	0.35	0.52
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	416	467	679	335	423	711	425	1468		577	1762	826
v/s Ratio Prot	c0.09	c0.12		0.07	c0.17		0.08	c0.25		c0.12	0.20	
v/s Ratio Perm			0.16			0.21						0.17
v/c Ratio	0.73	0.49	0.38	0.70	0.74	0.48	0.65	0.81		0.73	0.57	0.33
Uniform Delay, d1	46.8	35.3	21.5	48.3	39.7	21.3	46.1	35.6		43.6	29.4	15.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.5	0.8	0.4	6.2	7.0	0.5	3.6	3.5		4.8	0.4	0.2
Delay (s)	53.3	36.2	21.8	54.5	46.7	21.8	49.7	39.2		48.4	29.8	15.5
Level of Service	D	D	C	D	D	C	D	D		D	C	B
Approach Delay (s)		37.1			38.3			41.1			31.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	705	435	65	360	355	300	70	345	230	490	350	530
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	44.0		10.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	29.0	44.0		29.0	44.0		17.0	44.0		23.0	50.0	
Total Split (%)	20.7%	31.4%		20.7%	31.4%		12.1%	31.4%		16.4%	35.7%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 100.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	705	435	65	360	355	300	70	345	230	490	350	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	766	473	71	391	386	326	76	375	250	533	380	576
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	56	0	0	160
Lane Group Flow (vph)	766	473	28	391	386	326	76	375	194	533	380	416
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Actuated Green, G (s)	24.8	25.4	39.8	16.8	17.4	41.0	9.4	19.0	40.8	18.6	28.2	58.0
Effective Green, g (s)	24.8	25.4	39.8	16.8	17.4	41.0	9.4	19.0	40.8	18.6	28.2	58.0
Actuated g/C Ratio	0.25	0.25	0.40	0.17	0.17	0.41	0.09	0.19	0.41	0.19	0.28	0.58
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	853	900	631	577	886	1144	166	673	647	639	999	1619
v/s Ratio Prot	c0.22	c0.13		0.11	0.08	0.12	0.04	c0.11		c0.16	0.11	0.15
v/s Ratio Perm			0.02						0.12			
v/c Ratio	0.90	0.53	0.04	0.68	0.44	0.28	0.46	0.56	0.30	0.83	0.38	0.26
Uniform Delay, d1	36.3	32.0	18.4	39.0	36.8	19.6	42.8	36.6	19.9	39.1	28.8	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.1	0.6	0.0	3.2	0.3	0.1	2.0	1.0	0.3	9.2	0.2	0.1
Delay (s)	48.4	32.6	18.4	42.1	37.2	19.8	44.8	37.6	20.1	48.3	29.0	10.4
Level of Service	D	C	B	D	D	B	D	D	C	D	C	B
Approach Delay (s)		41.1			33.8			32.2			28.7	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	570	0	50	5	765	130	1240
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	16.0	47.0	21.0	52.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	14.5%	42.7%	19.1%	47.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	570	0	50	5	765	505	130	1240	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3328		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3328		1770	3539	
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	0	11	620	0	54	5	832	549	141	1348	0
RTOR Reduction (vph)	0	11	0	0	0	42	0	87	0	0	0	0
Lane Group Flow (vph)	0	0	0	310	310	12	5	1294	0	141	1348	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Effective Green, g (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.46		0.12	0.57	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		382	382	359	20	1539		214	2023	
v/s Ratio Prot		c0.00		c0.18	0.18		0.00	c0.39		c0.08	c0.38	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.81	0.81	0.03	0.25	0.84		0.66	0.67	
Uniform Delay, d1		54.2		40.3	40.3	33.1	53.9	26.0		46.2	16.3	
Progression Factor		1.00		1.00	1.00	1.00	1.40	0.68		1.00	1.00	
Incremental Delay, d2		0.3		12.3	12.3	0.0	5.6	5.0		7.1	1.8	
Delay (s)		54.5		52.6	52.6	33.1	81.0	22.7		53.3	18.0	
Level of Service		D		D	D	C	F	C		D	B	
Approach Delay (s)		54.5			51.0			22.9			21.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	405	25	1260	915	1870
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	26.0	26.0	84.0	84.0	84.0
Total Split (%)	23.6%	23.6%	76.4%	76.4%	76.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	405	25	1260	915	0	1870
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	440	27	1370	995	0	2033
RTOR Reduction (vph)	0	23	0	273	0	0
Lane Group Flow (vph)	440	4	1370	722	0	2033
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	18.2	18.2	79.8	79.8		79.8
Effective Green, g (s)	18.2	18.2	79.8	79.8		79.8
Actuated g/C Ratio	0.17	0.17	0.73	0.73		0.73
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	568	261	2567	1148		2567
v/s Ratio Prot	c0.13		0.39			c0.57
v/s Ratio Perm		0.00		0.46		
v/c Ratio	0.77	0.02	0.53	0.63		0.79
Uniform Delay, d1	43.9	38.4	6.8	7.6		9.7
Progression Factor	1.00	1.00	1.00	1.00		0.98
Incremental Delay, d2	6.5	0.0	0.8	2.6		2.1
Delay (s)	50.5	38.4	7.6	10.2		11.7
Level of Service	D	D	A	B		B
Approach Delay (s)	49.8		8.7			11.7
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2025	1510	675	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2201	1641	734	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.56				0.56	0.56
vC, conflicting volume	2375				2742	1188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1877				2536	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	176				12	603

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	734	734	734	1094	1281
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	734
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.64	0.75
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	120	2025	1510
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 70.6
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	120	2025	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	130	2201	1641	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	130	2201	1641	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			9.0	71.8	50.8	
Effective Green, g (s)			9.0	71.8	50.8	
Actuated g/C Ratio			0.13	1.00	0.71	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			221	5085	2503	
v/s Ratio Prot			0.07	c0.43	c0.46	
v/s Ratio Perm						
v/c Ratio			0.59	0.43	0.66	
Uniform Delay, d1			29.7	0.0	5.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.0	0.1	0.6	
Delay (s)			33.6	0.1	6.4	
Level of Service			C	A	A	
Approach Delay (s)	0.0			1.9	6.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	370	190	915	615	3165
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 159.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	0	190	0	0	0	0	915	0	615	3165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	402	0	207	0	0	0	0	995	0	668	3440	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	402	0	207	0	0	0	0	995	0	668	3440	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.8		159.9					83.2		34.9	124.1	
Effective Green, g (s)	23.8		159.9					83.2		34.9	124.1	
Actuated g/C Ratio	0.15		1.00					0.52		0.22	0.78	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	510		1583					1841		749	3946	
v/s Ratio Prot	c0.12							0.28		0.19	c0.68	
v/s Ratio Perm			0.13									
v/c Ratio	0.79		0.13					0.54		0.89	0.87	
Uniform Delay, d1	65.6		0.0					25.6		60.7	12.4	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	7.9		0.2					0.3		12.9	2.4	
Delay (s)	73.5		0.2					25.9		73.5	14.8	
Level of Service	E		A					C		E	B	
Approach Delay (s)		48.6			0.0			25.9			24.3	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	159.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1745	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1745	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1897	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1897	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.54			
v/s Ratio Perm						
v/c Ratio			0.60			
Uniform Delay, d1			1.7			
Progression Factor			1.00			
Incremental Delay, d2			0.8			
Delay (s)			2.5			
Level of Service			A			
Approach Delay (s)	0.0		2.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	915	1745	0	3355	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	995	1897	0	3647	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.24			
vC, conflicting volume			2891		2210	497		
vC1, stage 1 conf vol					995			
vC2, stage 2 conf vol					1216			
vCu, unblocked vol			2891		0	497		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			125		245	518		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	497	497	948	948	1216	1216	1216
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	948	948	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.29	0.56	0.56	0.72	0.72	0.72
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	110	0	2685	65	0	3360	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	120	0	2918	71	0	3394	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.26	0.26	0.26	0.26	0.26		0.26					
vC, conflicting volume	4367	6314	1131	4052	6314	975	3394			2920		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3997	11348	0	2808	11348	975	326			2920		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	52	100			100		
cM capacity (veh/h)	0	0	287	2	0	251	326			121		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	120	973	973	973	71	1131	1131	1131	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	120	0	0	0	71	0	0	0	0
cSH	1700	251	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.48	0.57	0.57	0.57	0.04	0.67	0.67	0.67	0.00
Queue Length 95th (ft)	0	60	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	31.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	D								
Approach Delay (s)	0.0	31.8	0.0				0.0			
Approach LOS	A	D								

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	120	100	40	5	110	35	1955	40	120	2920	130
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	100	35	40	5	110	35	1955	40	120	2920	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1738	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1773		794	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	130	109	38	43	5	120	38	2058	43	130	2949	141
RTOR Reduction (vph)	0	5	0	0	0	13	0	0	14	0	0	22
Lane Group Flow (vph)	130	142	0	43	5	107	38	2058	29	130	2949	119
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Effective Green, g (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.26	0.03	0.68	0.68	0.09	0.74	0.74
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	260		116	274	413	53	3481	1056	157	3781	1116
v/s Ratio Prot		0.08			0.00		0.02	0.40		c0.07	c0.58	
v/s Ratio Perm	c0.09			0.05		0.07			0.02			0.08
v/c Ratio	0.63	0.55		0.37	0.02	0.26	0.72	0.59	0.03	0.83	0.78	0.11
Uniform Delay, d1	96.2	94.9		92.3	87.5	70.2	115.4	20.1	12.2	107.5	18.8	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.76	0.98	7.02	1.00	1.00	1.00
Incremental Delay, d2	6.2	2.3		2.0	0.0	0.3	31.3	0.6	0.0	28.7	1.7	0.2
Delay (s)	102.4	97.2		94.3	87.6	70.6	119.4	20.2	85.5	136.2	20.4	8.8
Level of Service	F	F		F	F	E	F	C	F	F	C	A
Approach Delay (s)		99.7			77.2			23.3			24.6	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Detector Phase	4	4	4 5	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0		10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	24.0	148.0	148.0	45.0	169.0	169.0
Total Split (%)	19.6%	19.6%		19.6%	19.6%	19.6%	10.0%	61.7%	61.7%	18.8%	70.4%	70.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1858	1540		1775	1583	1770	5085	1543	1770	5085	1558
Flt Permitted		0.99	1.00		0.56	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1837	1540		1024	1583	1770	5085	1543	1770	5085	1558
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	87	98	38	11	114	65	2114	54	174	2919	22
RTOR Reduction (vph)	0	0	37	0	0	102	0	0	16	0	0	5
Lane Group Flow (vph)	0	92	61	0	49	12	65	2114	38	174	2919	17
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Actuated Green, G (s)		25.1	45.0		25.1	25.1	13.9	167.1	167.1	28.8	182.0	182.0
Effective Green, g (s)		25.1	45.0		25.1	25.1	13.9	167.1	167.1	28.8	182.0	182.0
Actuated g/C Ratio		0.10	0.19		0.10	0.10	0.06	0.70	0.70	0.12	0.76	0.76
Clearance Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		192	288		107	165	102	3540	1074	212	3856	1181
v/s Ratio Prot							0.04	0.42		c0.10	c0.57	
v/s Ratio Perm		c0.05	0.04		0.05	0.01			0.02			0.01
v/c Ratio		0.48	0.21		0.46	0.07	0.64	0.60	0.04	0.82	0.76	0.01
Uniform Delay, d1		101.3	82.5		101.1	96.9	110.6	19.0	11.3	103.1	16.5	7.1
Progression Factor		1.00	1.00		1.00	1.00	0.83	1.09	4.76	0.89	0.83	4.68
Incremental Delay, d2		1.9	0.4		3.1	0.2	10.9	0.7	0.1	15.2	0.9	0.0
Delay (s)		103.2	82.9		104.1	97.1	102.8	21.3	54.1	106.7	14.5	33.1
Level of Service		F	F		F	F	F	C	D	F	B	C
Approach Delay (s)		92.7			99.2			24.5			19.8	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2015	3150	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2015	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2190	3182	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2190	3182	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.43	c0.63	
v/s Ratio Perm						
v/c Ratio				0.56	0.81	
Uniform Delay, d1				5.6	8.5	
Progression Factor				1.08	1.30	
Incremental Delay, d2				0.5	1.4	
Delay (s)				6.5	12.4	
Level of Service				A	B	
Approach Delay (s)	0.0			6.5	12.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	25	155	15	20	170	1615	35	40	2495	365
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		15.0	15.0	36.0	156.0		20.0	140.0	
Total Split (%)	20.4%	20.4%		6.3%	6.3%	15.0%	65.0%		8.3%	58.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	25	155	25	15	20	170	1615	35	40	2495	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
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)	326	27	168	27	16	22	185	1755	38	43	2712	397
RTOR Reduction (vph)	0	0	31	0	0	21	0	0	10	0	0	72
Lane Group Flow (vph)	176	177	137	0	43	1	185	1755	28	43	2712	325
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	39.0	39.0	72.6		8.4	8.4	27.6	158.7	174.1	8.9	140.0	179.0
Effective Green, g (s)	39.0	39.0	72.6		8.4	8.4	27.6	158.7	174.1	8.9	140.0	179.0
Actuated g/C Ratio	0.16	0.16	0.30		0.04	0.04	0.12	0.66	0.73	0.04	0.58	0.75
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	273	275	440		63	55	203	3362	1043	65	2966	1018
v/s Ratio Prot	c0.10	0.10			c0.02		c0.10	0.35		0.02	c0.53	
v/s Ratio Perm			0.09			0.00			0.02			0.24
v/c Ratio	0.64	0.64	0.31		0.68	0.01	0.91	0.52	0.03	0.66	0.91	0.32
Uniform Delay, d1	94.0	94.0	64.4		114.5	111.8	105.0	21.0	9.2	114.1	44.6	10.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.92	1.31	3.12	0.85	1.13	1.99
Incremental Delay, d2	5.1	5.1	0.4		21.6	0.0	35.6	0.5	0.0	11.8	3.8	0.1
Delay (s)	99.2	99.1	64.8		136.0	111.8	131.7	28.0	28.7	108.8	54.4	20.3
Level of Service	F	F	E		F	F	F	C	C	F	D	C
Approach Delay (s)		88.1			127.9			37.7			50.8	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	225	70	50	80	360	40	1250	5	410	1995	455
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	50.0	50.0		35.0		20.0	110.0	110.0	45.0	135.0	135.0
Total Split (%)	20.8%	20.8%		14.6%		8.3%	45.8%	45.8%	18.8%	56.3%	56.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	70	50	10	80	360	40	1250	5	410	1995	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	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)	245	76	54	11	87	391	43	1359	5	446	2168	495
RTOR Reduction (vph)	0	0	45	0	0	84	0	0	2	0	0	171
Lane Group Flow (vph)	159	162	9	0	98	307	43	1359	3	446	2168	324
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	28.0	28.0	38.9		24.9	67.1	10.9	125.9	125.9	36.2	151.2	151.2
Effective Green, g (s)	28.0	28.0	38.9		24.9	67.1	10.9	125.9	125.9	36.2	151.2	151.2
Actuated g/C Ratio	0.12	0.12	0.16		0.10	0.28	0.05	0.52	0.52	0.15	0.63	0.63
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	196	201	256		192	779	80	2667	830	517	3203	997
v/s Ratio Prot	c0.09	0.09			c0.05		0.02	0.27		c0.13	c0.43	
v/s Ratio Perm			0.01			0.11			0.00			0.20
v/c Ratio	0.81	0.81	0.03		0.51	0.39	0.54	0.51	0.00	0.86	0.68	0.33
Uniform Delay, d1	103.4	103.4	84.7		101.8	70.0	112.1	37.0	27.2	99.5	28.6	20.7
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.84	0.90	1.00	1.11	0.91	2.53
Incremental Delay, d2	21.8	20.5	0.1		2.3	0.3	6.2	0.6	0.0	8.2	0.6	0.5
Delay (s)	125.3	123.8	84.8		104.1	70.3	100.4	34.1	27.2	118.2	26.8	52.7
Level of Service	F	F	F		F	E	F	C	C	F	C	D
Approach Delay (s)		118.8			77.1			36.1			44.1	
Approach LOS		F			E			D			D	

Intersection Summary				
HCM 2000 Control Delay	50.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	72.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	31.0
Total Split (s)	47.0	47.0		57.0	57.0	57.0	27.0	93.0		43.0	109.0	109.0
Total Split (%)	19.6%	19.6%		23.8%	23.8%	23.8%	11.3%	38.8%		17.9%	45.4%	45.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	239	293	201	33	283	201	190	1038	38	408	1480	266
RTOR Reduction (vph)	0	0	58	0	0	86	0	0	14	0	0	85
Lane Group Flow (vph)	172	360	143	33	283	115	190	1038	24	408	1480	181
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	31.2	31.2	48.6	40.8	40.8	73.1	17.4	110.7	151.5	32.3	125.6	125.6
Effective Green, g (s)	31.2	31.2	48.6	40.8	40.8	73.1	17.4	110.7	151.5	32.3	125.6	125.6
Actuated g/C Ratio	0.13	0.13	0.20	0.17	0.17	0.30	0.07	0.46	0.63	0.13	0.52	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	209	436	320	300	316	918	248	2345	999	462	2661	828
v/s Ratio Prot	0.11	c0.11		0.02	c0.15	0.02	0.06	0.20		c0.12	c0.29	
v/s Ratio Perm			0.09			0.02			0.02			0.11
v/c Ratio	0.82	0.83	0.45	0.11	0.90	0.13	0.77	0.44	0.02	0.88	0.56	0.22
Uniform Delay, d1	101.7	101.7	83.9	84.2	97.5	60.3	109.3	43.8	16.6	102.0	38.5	30.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.24	0.99	1.43
Incremental Delay, d2	21.3	11.5	0.4	0.1	25.4	0.0	12.0	0.6	0.0	13.6	0.6	0.5
Delay (s)	123.1	113.3	84.3	84.3	122.9	60.4	121.3	44.4	16.6	140.4	38.8	44.6
Level of Service	F	F	F	F	F	E	F	D	B	F	D	D
Approach Delay (s)		107.6			96.1			55.1			58.8	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	770	235	300	870	15	130
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	837	255	326	946	16	141
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked					0.97	
vC, conflicting volume			1092		1962	418
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1092		1927	418
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			49		41	76
cM capacity (veh/h)			635		27	583

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	418	418	255	326	473	473	158
Volume Left	0	0	0	326	0	0	16
Volume Right	0	0	255	0	0	0	141
cSH	1700	1700	1700	635	1700	1700	266
Volume to Capacity	0.25	0.25	0.15	0.51	0.28	0.28	0.59
Queue Length 95th (ft)	0	0	0	74	0	0	87
Control Delay (s)	0.0	0.0	0.0	16.5	0.0	0.0	37.9
Lane LOS				C			E
Approach Delay (s)	0.0			4.2			37.9
Approach LOS							E

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	845	30	15	1130	40	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	918	33	16	1228	43	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			951		1582	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			951		1582	476
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		55	97
cM capacity (veh/h)			718		97	536

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	612	339	426	819	60
Volume Left	0	0	16	0	43
Volume Right	0	33	0	0	16
cSH	1700	1700	718	1700	125
Volume to Capacity	0.36	0.20	0.02	0.48	0.48
Queue Length 95th (ft)	0	0	2	0	54
Control Delay (s)	0.0	0.0	0.7	0.0	57.6
Lane LOS			A		F
Approach Delay (s)	0.0		0.2		57.6
Approach LOS					F

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	865	0	170	1125	0	55
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	940	0	185	1223	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			940		1921	470
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			940		1921	470
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			75		100	89
cM capacity (veh/h)			725		44	540

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	470	470	592	815	60
Volume Left	0	0	185	0	0
Volume Right	0	0	0	0	60
cSH	1700	1700	725	1700	540
Volume to Capacity	0.28	0.28	0.25	0.48	0.11
Queue Length 95th (ft)	0	0	25	0	9
Control Delay (s)	0.0	0.0	6.3	0.0	12.5
Lane LOS			A		B
Approach Delay (s)	0.0		2.7		12.5
Approach LOS					B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	915	655	1135
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 99.6
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	915	0	655	1135	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	995	0	712	1234	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	995	0	712	1234	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	35.4		52.2	99.6		
Effective Green, g (s)	35.4		52.2	99.6		
Actuated g/C Ratio	0.36		0.52	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1257		927	3539		
v/s Ratio Prot	c0.28		c0.40	0.35		
v/s Ratio Perm						
v/c Ratio	0.79		0.77	0.35		
Uniform Delay, d1	28.8		18.9	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	3.5		3.9	0.1		
Delay (s)	32.3		22.7	0.1		
Level of Service	C		C	A		
Approach Delay (s)	32.3			8.4	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	290	1255	1790	515
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 100.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	290	1255	1790	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	1364	1946	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	315	1364	1946	560	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	23.8	100.3	65.5	100.3		
Effective Green, g (s)	23.8	100.3	65.5	100.3		
Actuated g/C Ratio	0.24	1.00	0.65	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	420	3539	2311	1583		
v/s Ratio Prot	c0.18	0.39	c0.55			
v/s Ratio Perm				0.35		
v/c Ratio	0.75	0.39	0.84	0.35		
Uniform Delay, d1	35.5	0.0	13.4	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	7.4	0.1	3.0	0.6		
Delay (s)	42.8	0.1	16.4	0.6		
Level of Service	D	A	B	A		
Approach Delay (s)		8.1	12.9		0.0	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.3	Sum of lost time (s)	11.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	980	700	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1065	761	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	777				1356	389
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777				1356	389
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				84	85
cM capacity (veh/h)	835				136	610

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	533	533	507	270	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	835	1700	1700	1700	1700	136	610
Volume to Capacity	0.03	0.31	0.31	0.30	0.16	0.16	0.15
Queue Length 95th (ft)	3	0	0	0	0	14	13
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	36.5	12.0
Lane LOS	A					E	B
Approach Delay (s)	0.2			0.0		16.6	
Approach LOS						C	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	690	45	5	510	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	750	49	5	554	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565			799			1361	1557	399	1158	1576	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565			799			1361	1557	399	1158	1576	283
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			68	100	99	100	100	87
cM capacity (veh/h)	1003			819			85	99	600	137	97	714

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	103	500	299	5	370	196	33	0	92
Volume Left	103	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	1003	1700	1700	819	1700	1700	100	1700	714
Volume to Capacity	0.10	0.29	0.18	0.01	0.22	0.12	0.33	0.00	0.13
Queue Length 95th (ft)	9	0	0	1	0	0	32	0	11
Control Delay (s)	9.0	0.0	0.0	9.4	0.0	0.0	57.9	0.0	10.8
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.0			0.1			57.9	10.8	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		37.2%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	510	40	5	435	10	20	5	0	5	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	554	43	5	473	11	22	5	0	5	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			598			1209	1386	299	1084	1402	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			598			1209	1386	299	1084	1402	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	85			99			80	95	100	96	100	91
cM capacity (veh/h)	1075			975			111	120	697	146	118	759

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	370	228	5	315	168	27	5	71
Volume Left	158	0	0	5	0	0	22	5	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	1075	1700	1700	975	1700	1700	113	146	759
Volume to Capacity	0.15	0.22	0.13	0.01	0.19	0.10	0.24	0.04	0.09
Queue Length 95th (ft)	13	0	0	0	0	0	22	3	8
Control Delay (s)	8.9	0.0	0.0	8.7	0.0	0.0	46.8	30.6	10.2
Lane LOS	A			A			E	D	B
Approach Delay (s)	1.9			0.1			46.8	11.7	
Approach LOS							E	B	

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		38.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	370	25	5	335	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	402	27	5	364	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	375			429			973	1052	215	832	1060	188
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	375			429			973	1052	215	832	1060	188
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			90	100	100	100	100	86
cM capacity (veh/h)	1180			1127			163	200	790	240	198	823

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	268	161	5	243	132	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	1180	1700	1700	1127	1700	1700	163	1700	823
Volume to Capacity	0.11	0.16	0.09	0.00	0.14	0.08	0.10	0.00	0.14
Queue Length 95th (ft)	9	0	0	0	0	0	8	0	12
Control Delay (s)	8.4	0.0	0.0	8.2	0.0	0.0	29.5	0.0	10.1
Lane LOS	A			A			D	A	B
Approach Delay (s)	1.9			0.1			29.5	10.1	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		29.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	210	45	0	215	0	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	228	49	0	234	0	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	234			277			671	736	139	606	761	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			277			671	736	139	606	761	117
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			64	95	100	100	91	96
cM capacity (veh/h)	1331			1283			284	312	884	340	302	913

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	125	152	125	0	156	78	120	0	27	38
Volume Left	125	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	0	0	0	0	38
cSH	1331	1700	1700	1700	1700	1700	287	1700	302	913
Volume to Capacity	0.09	0.09	0.07	0.00	0.09	0.05	0.42	0.00	0.09	0.04
Queue Length 95th (ft)	8	0	0	0	0	0	49	0	7	3
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	0.0	26.2	0.0	18.1	9.1
Lane LOS	A						D	A	C	A
Approach Delay (s)	2.5			0.0			26.2		12.9	
Approach LOS							D		B	

Intersection Summary			
Average Delay		6.1	
Intersection Capacity Utilization		35.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	0	100	0	0	0	75	15	0	0	0	140
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	0	109	0	0	0	82	16	0	0	0	152
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			109			457	304	54	258	359	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			109			457	304	54	258	359	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			79	97	100	100	100	86
cM capacity (veh/h)	1622			1480			394	561	1001	620	523	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	0	109	0	0	0	98	0	152
Volume Left	125	0	0	0	0	0	82	0	0
Volume Right	0	0	109	0	0	0	0	0	152
cSH	1622	1700	1700	1700	1700	1700	415	1700	1084
Volume to Capacity	0.08	0.00	0.06	0.00	0.00	0.00	0.24	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	23	0	12
Control Delay (s)	7.4	0.0	0.0	0.0	0.0	0.0	16.3	0.0	8.9
Lane LOS	A						C	A	A
Approach Delay (s)	4.0			0.0			16.3	8.9	
Approach LOS							C	A	

Intersection Summary			
Average Delay		8.0	
Intersection Capacity Utilization		20.3%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	440	0	475	395	530	455	725
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 79.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	440	0	475	395	530	0	0	455	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1551	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1551	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	0	516	429	576	0	0	495	788
RTOR Reduction (vph)	0	0	0	0	0	204	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	239	239	312	429	576	0	0	495	788
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Effective Green, g (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Actuated g/C Ratio				0.28	0.28	0.28	0.31	0.57			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				468	468	431	539	2015			667	1583
v/s Ratio Prot							c0.24	0.16			c0.14	
v/s Ratio Perm				0.14	0.14	c0.20						0.50
v/c Ratio				0.51	0.51	0.72	0.80	0.29			0.74	0.50
Uniform Delay, d1				24.0	24.0	25.8	25.2	8.7			30.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.9	0.9	5.9	8.0	0.1			4.5	1.1
Delay (s)				24.9	24.9	31.7	33.2	8.8			34.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			28.4			19.2			14.1	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	420	450	225	585
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	63.0	63.0	49.0	38.0	87.0
Total Split (%)	42.0%	42.0%	32.7%	25.3%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 113.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	10	420	0	0	0	0	450	255	225	585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3314		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3314		1770	3539	
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)	478	11	457	0	0	0	0	489	277	245	636	0
RTOR Reduction (vph)	0	0	151	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	0	489	306	0	0	0	0	713	0	245	636	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		40.3	40.3					32.5		22.0	60.5	
Effective Green, g (s)		40.3	40.3					32.5		22.0	60.5	
Actuated g/C Ratio		0.36	0.36					0.29		0.20	0.54	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		634	558					954		345	1898	
v/s Ratio Prot								c0.22		c0.14	0.18	
v/s Ratio Perm		0.28	0.20									
v/c Ratio		0.77	0.55					0.75		0.71	0.34	
Uniform Delay, d1		32.2	29.0					36.4		42.4	14.8	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		5.8	1.1					3.2		6.7	0.1	
Delay (s)		37.9	30.1					39.7		49.2	14.9	
Level of Service		D	C					D		D	B	
Approach Delay (s)		34.1			0.0			39.7			24.4	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	112.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	735	495	295	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 85.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	735	495	295	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	432	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	886	799	538	321	103
RTOR Reduction (vph)	0	0	0	341	0	52
Lane Group Flow (vph)	43	886	799	197	321	51
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	31.3	31.3	31.3	31.3	42.3	42.3
Effective Green, g (s)	31.3	31.3	31.3	31.3	42.3	42.3
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.49	0.49
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	1294	1294	578	874	782
v/s Ratio Prot		c0.25	0.23		c0.18	
v/s Ratio Perm	0.10			0.12		0.03
v/c Ratio	0.27	0.68	0.62	0.34	0.37	0.07
Uniform Delay, d1	19.1	23.0	22.2	19.7	13.4	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.5	0.9	0.4	1.2	0.2
Delay (s)	20.1	24.5	23.1	20.0	14.6	11.5
Level of Service	C	C	C	C	B	B
Approach Delay (s)		24.3	21.9		13.8	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	85.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

• Year 2035 AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1495	0	180	645	350	895	60
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	63.0	63.0	63.0	29.0	57.0	28.0	28.0
Total Split (%)	52.5%	52.5%	52.5%	24.2%	47.5%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1495	0	180	645	350	0	0	895	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1510	0	196	652	354	0	0	904	65
RTOR Reduction (vph)	0	0	0	0	0	103	0	0	0	0	0	53
Lane Group Flow (vph)	0	0	0	755	755	93	652	354	0	0	904	12
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				57.0	57.0	57.0	24.0	51.0			22.0	22.0
Effective Green, g (s)				57.0	57.0	57.0	24.0	51.0			22.0	22.0
Actuated g/C Ratio				0.48	0.48	0.48	0.20	0.42			0.18	0.18
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				798	798	751	686	791			648	290
v/s Ratio Prot				c0.45	0.45		c0.19	0.19			c0.26	
v/s Ratio Perm						0.06						0.01
v/c Ratio				0.95	0.95	0.12	0.95	0.45			1.40	0.04
Uniform Delay, d1				30.0	30.0	17.6	47.4	24.5			49.0	40.3
Progression Factor				1.00	1.00	1.00	0.80	1.52			1.00	1.00
Incremental Delay, d2				21.2	19.7	0.3	19.7	0.3			187.1	0.1
Delay (s)				51.2	49.8	17.9	57.8	37.5			236.1	40.4
Level of Service				D	D	B	E	D			F	D
Approach Delay (s)		0.0			46.7			50.6			223.0	
Approach LOS		A			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	94.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	605	1020	1935	425	1965
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	32.0		51.0		37.0	88.0
Total Split (%)	26.7%		42.5%		30.8%	73.3%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	5	605	0	0	0	0	1020	1935	425	1965	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1790	1583					3539	2787	1770	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	5	658	0	0	0	0	1109	2103	462	2136	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	658	0	0	0	0	1109	2103	462	2136	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		5.0	120.0					58.9	120.0	39.1	103.0	
Effective Green, g (s)		5.0	120.0					58.9	120.0	39.1	103.0	
Actuated g/C Ratio		0.04	1.00					0.49	1.00	0.33	0.86	
Clearance Time (s)		6.0						6.0		5.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		74	1583					1737	2787	576	3037	
v/s Ratio Prot		0.02						0.31		0.26	0.60	
v/s Ratio Perm			0.42						c0.75			
v/c Ratio		0.36	0.42					0.64	0.75	0.80	0.70	
Uniform Delay, d1		56.0	0.0					22.7	0.0	36.9	3.0	
Progression Factor		1.00	1.00					1.00	1.00	1.27	0.90	
Incremental Delay, d2		3.0	0.8					1.8	2.0	0.8	0.1	
Delay (s)		59.0	0.8					24.5	2.0	47.6	2.8	
Level of Service		E	A					C	A	D	A	
Approach Delay (s)		3.1			0.0			9.7			10.8	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	3050	2520	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	38	0	3081	2545	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.64	0.94	0.94			
vC, conflicting volume	3572	848	2600			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2464	632	2487			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	100			
cM capacity (veh/h)	16	399	171			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	38	1027	1027	1027	848	848	848	54
Volume Left	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	54
cSH	399	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.10	0.60	0.60	0.60	0.50	0.50	0.50	0.03
Queue Length 95th (ft)	8	0	0	0	0	0	0	0
Control Delay (s)	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	15.0	0.0			0.0			
Approach LOS	B							

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		62.3%	ICU Level of Service B
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	820	120	225	455	730	345	1890	410	735	1555	265
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	30.0	50.0	50.0	24.0	44.0		40.0	105.0		61.0	126.0	
Total Split (%)	12.5%	20.8%	20.8%	10.0%	18.3%		16.7%	43.8%		25.4%	52.5%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Natural Cycle: 180
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	820	120	225	455	730	345	1890	410	735	1555	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	478	891	130	245	495	793	375	2054	446	799	1690	288
RTOR Reduction (vph)	0	0	102	0	0	24	0	0	29	0	0	13
Lane Group Flow (vph)	478	891	28	245	495	769	375	2054	417	799	1690	275
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	24.0	44.0	44.0	18.0	38.0	100.0	30.8	99.0	123.0	56.0	124.2	154.2
Effective Green, g (s)	24.0	44.0	44.0	18.0	38.0	100.0	30.8	99.0	123.0	56.0	124.2	154.2
Actuated g/C Ratio	0.10	0.18	0.18	0.08	0.16	0.42	0.13	0.41	0.51	0.23	0.52	0.64
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	343	932	290	257	805	659	440	2097	811	801	2631	1017
v/s Ratio Prot	c0.14	c0.18		0.07	0.10		0.11	c0.40		0.23	0.33	
v/s Ratio Perm			0.02			c0.49			0.26			0.17
v/c Ratio	1.39	0.96	0.10	0.95	0.61	1.17	0.85	0.98	0.51	1.00	0.64	0.27
Uniform Delay, d1	108.0	97.0	81.5	110.6	94.2	70.0	102.4	69.5	38.7	91.9	41.8	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	194.1	19.5	0.1	43.1	1.4	90.9	14.7	14.9	0.6	30.9	0.5	0.1
Delay (s)	302.1	116.5	81.6	153.7	95.6	160.9	117.1	84.4	39.3	122.9	42.4	18.7
Level of Service	F	F	F	F	F	F	F	F	D	F	D	B
Approach Delay (s)		172.7			138.7			81.7			63.1	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	101.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	110	175	30	65	375	80	2300	65	225	1375	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	21.0	44.0		12.0	35.0		21.0	102.0		22.0	103.0	
Total Split (%)	11.7%	24.4%		6.7%	19.4%		11.7%	56.7%		12.2%	57.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	110	175	30	65	375	80	2300	65	225	1375	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	234	120	190	33	71	408	87	2500	71	245	1495	386
RTOR Reduction (vph)	0	0	39	0	0	65	0	0	28	0	0	120
Lane Group Flow (vph)	234	120	151	33	71	343	87	2500	43	245	1495	266
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	14.7	38.0	53.9	5.9	29.2	50.8	9.9	96.5	108.4	15.6	103.2	123.9
Effective Green, g (s)	14.7	38.0	53.9	5.9	29.2	50.8	9.9	96.5	108.4	15.6	103.2	123.9
Actuated g/C Ratio	0.08	0.21	0.30	0.03	0.16	0.28	0.06	0.54	0.60	0.09	0.57	0.69
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	393	474	58	302	446	188	2726	953	297	2915	1089
v/s Ratio Prot	c0.07	0.06		0.02	0.04		0.03	c0.49		c0.07	0.29	
v/s Ratio Perm			0.10			c0.22			0.03			0.17
v/c Ratio	0.84	0.31	0.32	0.57	0.24	0.77	0.46	0.92	0.04	0.82	0.51	0.24
Uniform Delay, d1	81.5	59.9	48.8	85.8	65.7	59.2	82.5	38.1	14.6	80.9	23.2	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.9	0.4	0.4	12.2	0.4	7.8	1.8	6.3	0.0	16.8	0.6	0.1
Delay (s)	100.4	60.3	49.2	98.0	66.1	67.0	84.3	44.4	14.7	97.6	23.9	10.6
Level of Service	F	E	D	F	E	E	F	D	B	F	C	B
Approach Delay (s)		73.7			68.9			44.9			30.0	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	40	100	715	1785	135	210	1215	125
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		49.0		55.0	55.0	36.0	91.0	91.0
Total Split (%)		35.0%		39.3%	39.3%	25.7%	65.0%	65.0%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 135.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	100	0	715	0	1785	135	210	1215	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	109	0	777	0	1940	147	228	1321	136
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	94	0	0	55
Lane Group Flow (vph)	0	0	43	109	0	767	0	1940	53	228	1321	81
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			135.0	43.0		73.9		49.1	49.1	24.9	80.0	80.0
Effective Green, g (s)			135.0	43.0		73.9		49.1	49.1	24.9	80.0	80.0
Actuated g/C Ratio			1.00	0.32		0.55		0.36	0.36	0.18	0.59	0.59
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	563		866		1849	575	633	3013	938
v/s Ratio Prot				0.06				c0.38		0.07	0.26	
v/s Ratio Perm			0.03			c0.48			0.03			0.05
v/c Ratio			0.03	0.19		0.89		1.05	0.09	0.36	0.44	0.09
Uniform Delay, d1			0.0	33.4		26.8		42.9	28.3	48.1	15.1	11.8
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.2		10.7		35.2	0.1	0.4	0.1	0.0
Delay (s)			0.0	33.6		37.5		78.2	28.4	48.4	15.2	11.8
Level of Service			A	C		D		E	C	D	B	B
Approach Delay (s)		0.0			37.1			74.6			19.5	
Approach LOS		A			D			E			B	

Intersection Summary			
HCM 2000 Control Delay	47.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	210	215	830	185	835	320	875	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	26.0	40.0		26.0	40.0		24.0	51.0	33.0	60.0	
Total Split (%)	17.3%	26.7%		17.3%	26.7%		16.0%	34.0%	22.0%	40.0%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 143.8
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	210	215	830	185	835	140	320	875	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4976		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4976		3433	5085	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)	228	304	185	228	234	902	201	908	152	348	951	174
RTOR Reduction (vph)	0	0	60	0	0	31	0	15	0	0	0	77
Lane Group Flow (vph)	228	304	125	228	234	871	201	1045	0	348	951	97
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	14.8	34.0	53.7	14.8	34.0	68.0	13.7	45.0		28.0	59.3	80.1
Effective Green, g (s)	14.8	34.0	53.7	14.8	34.0	68.0	13.7	45.0		28.0	59.3	80.1
Actuated g/C Ratio	0.10	0.24	0.37	0.10	0.24	0.47	0.10	0.31		0.19	0.41	0.56
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	353	440	591	353	440	748	327	1557		668	2096	881
v/s Ratio Prot	c0.07	0.16		0.07	0.13		0.06	c0.21		0.10	0.19	
v/s Ratio Perm			0.08			c0.55						0.06
v/c Ratio	0.65	0.69	0.21	0.65	0.53	1.17	0.61	0.67		0.52	0.45	0.11
Uniform Delay, d1	62.0	50.1	30.7	62.0	47.9	37.9	62.5	43.0		51.9	30.5	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.0	4.6	0.2	4.0	1.2	88.5	3.4	1.2		0.7	0.2	0.1
Delay (s)	66.0	54.7	30.8	66.0	49.2	126.4	65.9	44.1		52.6	30.7	15.1
Level of Service	E	D	C	E	D	F	E	D		D	C	B
Approach Delay (s)		52.2			103.1			47.6			34.0	
Approach LOS		D			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	59.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	143.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	109.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	730	175	35	180	985	325	20	110	35	540	150	430
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	52.0	52.0	52.0	44.0	44.0		11.0	46.0		38.0	73.0	
Total Split (%)	28.9%	28.9%	28.9%	24.4%	24.4%		6.1%	25.6%		21.1%	40.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 169.1
Natural Cycle: 155
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	730	175	35	180	985	325	20	110	35	540	150	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	793	190	38	196	1071	353	22	120	38	587	163	467
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	25	0	0	39
Lane Group Flow (vph)	793	190	14	196	1071	353	22	120	13	587	163	428
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	44.2	63.9	63.9	18.8	38.5	76.8	3.4	33.1	57.9	32.3	62.0	112.2
Effective Green, g (s)	44.2	63.9	63.9	18.8	38.5	76.8	3.4	33.1	57.9	32.3	62.0	112.2
Actuated g/C Ratio	0.26	0.37	0.37	0.11	0.23	0.45	0.02	0.19	0.34	0.19	0.36	0.66
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	886	1321	591	377	1144	1250	35	684	535	648	1282	1827
v/s Ratio Prot	c0.23	0.05		0.06	c0.21	0.13	0.01	0.03		c0.17	0.05	c0.15
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.90	0.14	0.02	0.52	0.94	0.28	0.63	0.18	0.02	0.91	0.13	0.23
Uniform Delay, d1	61.2	35.5	33.9	71.9	65.1	29.8	83.2	57.6	37.8	67.9	36.5	12.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	0.1	0.0	1.2	13.8	0.1	30.3	0.1	0.0	16.2	0.0	0.1
Delay (s)	72.7	35.5	33.9	73.1	78.9	29.9	113.6	57.7	37.8	84.1	36.5	12.0
Level of Service	E	D	C	E	E	C	F	E	D	F	D	B
Approach Delay (s)		64.3			67.5			60.3			50.1	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	61.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	171.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	380	5	75	10	1775	40	970
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	380	5	75	10	1775	215	40	970	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1687	1583	1770	3482		1770	3537	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1687	1583	1770	3482		1770	3537	
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	0	5	413	5	82	11	1929	234	43	1054	5
RTOR Reduction (vph)	0	5	0	0	0	69	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	211	207	13	11	2160	0	43	1059	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		1.1		28.9	28.9	28.9	3.2	121.4		8.6	126.8	
Effective Green, g (s)		1.1		28.9	28.9	28.9	3.2	121.4		8.6	126.8	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.02	0.67		0.05	0.70	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		9		269	270	254	31	2348		84	2491	
v/s Ratio Prot		c0.00		c0.13	0.12		0.01	c0.62		c0.02	0.30	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.78	0.77	0.05	0.35	0.92		0.51	0.43	
Uniform Delay, d1		88.9		72.6	72.3	64.0	87.4	25.1		83.7	11.2	
Progression Factor		1.00		1.00	1.00	1.00	1.36	0.32		1.00	1.00	
Incremental Delay, d2		0.1		13.9	12.2	0.1	3.7	4.2		5.2	0.5	
Delay (s)		89.1		86.4	84.6	64.0	122.2	12.1		88.8	11.8	
Level of Service		F		F	F	E	F	B		F	B	
Approach Delay (s)		89.1			82.0			12.7			14.8	
Approach LOS		F			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	520	25	2005	415	1380
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	520	25	2005	415	0	1380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	565	27	2179	451	0	1500
RTOR Reduction (vph)	0	7	0	60	0	0
Lane Group Flow (vph)	565	20	2179	391	0	1500
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	35.5	35.5	132.5	132.5		132.5
Effective Green, g (s)	35.5	35.5	132.5	132.5		132.5
Actuated g/C Ratio	0.20	0.20	0.74	0.74		0.74
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	677	312	2605	1165		2605
v/s Ratio Prot	c0.16		c0.62			0.42
v/s Ratio Perm		0.01		0.25		
v/c Ratio	0.83	0.06	0.84	0.34		0.58
Uniform Delay, d1	69.4	58.7	16.3	8.3		10.9
Progression Factor	1.00	1.00	1.00	1.00		1.14
Incremental Delay, d2	8.7	0.1	3.4	0.8		0.9
Delay (s)	78.2	58.8	19.7	9.1		13.3
Level of Service	E	E	B	A		B
Approach Delay (s)	77.3		17.9			13.3
Approach LOS	E		B			B

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2250	1420	545	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2446	1543	592	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	2136				2655	1068
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1914				2566	572
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	243				17	369

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	815	815	815	1029	1107
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	592
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.48	0.48	0.48	0.61	0.65
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	230	2250	1420
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 70.3
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	230	2250	1420	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	250	2446	1543	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	250	2446	1543	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			14.6	70.2	43.6	
Effective Green, g (s)			14.6	70.2	43.6	
Actuated g/C Ratio			0.21	1.00	0.62	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			368	5085	2198	
v/s Ratio Prot			c0.14	0.48	c0.44	
v/s Ratio Perm						
v/c Ratio			0.68	0.48	0.70	
Uniform Delay, d1			25.6	0.0	8.9	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.9	0.1	1.0	
Delay (s)			30.6	0.1	10.0	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.9	10.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	70.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	535	250	1330	625	2520
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 156.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	535	0	250	0	0	0	0	1330	0	625	2520	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	582	0	272	0	0	0	0	1446	0	679	2739	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	582	0	272	0	0	0	0	1446	0	679	2739	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	30.6		156.0					72.7		34.7	113.4	
Effective Green, g (s)	30.6		156.0					72.7		34.7	113.4	
Actuated g/C Ratio	0.20		1.00					0.47		0.22	0.73	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	673		1583					1649		763	3696	
v/s Ratio Prot	c0.17							c0.41		c0.20	0.54	
v/s Ratio Perm			0.17									
v/c Ratio	0.86		0.17					0.88		0.89	0.74	
Uniform Delay, d1	60.7		0.0					37.6		58.8	12.6	
Progression Factor	1.00		1.00					1.00		0.99	0.98	
Incremental Delay, d2	11.2		0.2					5.6		12.3	0.8	
Delay (s)	71.9		0.2					43.2		70.7	13.2	
Level of Service	E		A					D		E	B	
Approach Delay (s)		49.1			0.0			43.2			24.6	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	156.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2710	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 170
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2710	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2946	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2946	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.83			
v/s Ratio Perm						
v/c Ratio			0.93			
Uniform Delay, d1			4.6			
Progression Factor			1.00			
Incremental Delay, d2			6.0			
Delay (s)			10.7			
Level of Service			B			
Approach Delay (s)	0.0		10.7			0.0
Approach LOS	A		B			A

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	1330	2710	0	2770	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	1446	2946	0	3011	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.65			
vC, conflicting volume			4391		2449	723		
vC1, stage 1 conf vol					1446			
vC2, stage 2 conf vol					1004			
vCu, unblocked vol			4391		1365	723		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			30		155	369		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	723	723	1473	1473	1004	1004	1004
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1473	1473	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.87	0.87	0.59	0.59	0.59
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		98.1%	ICU Level of Service	F
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	20	0	0	145	0	3745	125	0	2620	155
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	22	0	0	158	0	4071	136	0	2646	168
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.68	0.68	0.68	0.68	0.68		0.68					
vC, conflicting volume	4003	6719	882	4955	6888	1359	2815			4073		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3765	7786	0	5174	8036	1359	2005			4073		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	97	100	100	0	100			100		
cM capacity (veh/h)	0	0	732	0	0	138	190			41		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	22	158	1357	1357	1357	136	882	882	882	168
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	22	158	0	0	0	136	0	0	0	168
cSH	732	138	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	1.14	0.80	0.80	0.80	0.08	0.52	0.52	0.52	0.10
Queue Length 95th (ft)	2	225	0	0	0	0	0	0	0	0
Control Delay (s)	10.1	182.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	F								
Approach Delay (s)	10.1	182.2	0.0				0.0			
Approach LOS	B	F								

Intersection Summary				
Average Delay		4.0		
Intersection Capacity Utilization		88.0%	ICU Level of Service	E
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	20	35	135	5	165	65	3410	30	40	1985	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	35	20	135	5	165	65	3410	30	40	1985	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1736		1728	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1736		1271	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	22	38	22	147	5	179	71	3589	33	43	2005	109
RTOR Reduction (vph)	0	9	0	0	0	14	0	0	9	0	0	27
Lane Group Flow (vph)	22	51	0	147	5	165	71	3589	24	43	2005	82
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Effective Green, g (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.05	0.72	0.72	0.05	0.71	0.71
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	267		195	287	357	92	3661	1110	82	3633	1070
v/s Ratio Prot		0.03			0.00		c0.04	c0.71		0.02	0.39	
v/s Ratio Perm	0.02			c0.12		0.10			0.02			0.05
v/c Ratio	0.10	0.19		0.75	0.02	0.46	0.77	0.98	0.02	0.52	0.55	0.08
Uniform Delay, d1	87.2	88.4		97.1	86.1	80.3	112.3	32.0	9.6	111.8	16.1	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.78	1.05	1.00	1.00	1.02	1.08
Incremental Delay, d2	0.2	0.3		15.2	0.0	1.0	3.7	1.8	0.0	5.9	0.6	0.1
Delay (s)	87.4	88.8		112.3	86.1	81.3	91.0	35.4	9.6	118.2	17.1	11.3
Level of Service	F	F		F	F	F	F	D	A	F	B	B
Approach Delay (s)		88.4			95.1			36.3			18.9	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	150	225	190	15	150	140	3025	45	45	1930	130
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	66.0	66.0	66.0	66.0	66.0	66.0	23.0	159.0	159.0	15.0	151.0	151.0
Total Split (%)	27.5%	27.5%	27.5%	27.5%	27.5%	27.5%	9.6%	66.3%	66.3%	6.3%	62.9%	62.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	150	225	190	15	150	140	3025	45	45	1930	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1800	1533		1780	1583	1770	5085	1551	1770	5085	1560
Flt Permitted		0.45	1.00		0.06	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		832	1533		120	1583	1770	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	370	163	245	207	16	163	152	3288	49	49	1949	141
RTOR Reduction (vph)	0	0	62	0	0	55	0	0	15	0	0	56
Lane Group Flow (vph)	0	533	183	0	223	108	152	3288	34	49	1949	85
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		60.0	60.0		60.0	60.0	17.0	152.2	152.2	8.8	144.0	144.0
Effective Green, g (s)		60.0	60.0		60.0	60.0	17.0	152.2	152.2	8.8	144.0	144.0
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.07	0.63	0.63	0.04	0.60	0.60
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		208	383		30	395	125	3224	983	64	3051	936
v/s Ratio Prot							c0.09	c0.65		0.03	0.38	
v/s Ratio Perm		0.64	0.12		c1.86	0.07			0.02			0.05
v/c Ratio		2.56	0.48		7.43	0.27	1.22	1.02	0.03	0.77	0.64	0.09
Uniform Delay, d1		90.0	76.6		90.0	72.5	111.5	43.9	16.4	114.6	31.1	20.3
Progression Factor		1.00	1.00		1.00	1.00	0.88	1.18	1.59	1.01	0.71	0.46
Incremental Delay, d2		717.0	0.9		2962.7	0.4	125.5	16.1	0.0	36.0	0.9	0.2
Delay (s)		807.0	77.6		3052.7	72.8	223.4	67.7	26.2	151.2	22.9	9.5
Level of Service		F	E		F	E	F	E	C	F	C	A
Approach Delay (s)		577.3			1794.4			73.9			25.0	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	213.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.79		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	120.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3410	2265	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3410	2265	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3707	2288	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3707	2288	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.73	0.45	
v/s Ratio Perm						
v/c Ratio				0.95	0.58	
Uniform Delay, d1				11.7	5.8	
Progression Factor				1.20	1.20	
Incremental Delay, d2				3.1	0.1	
Delay (s)				17.2	7.0	
Level of Service				B	A	
Approach Delay (s)	0.0			17.2	7.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	210	10	5	360	3100	15	5	1960	480
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2			6
Detector Phase	4	4	4 5	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0		11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0		14.0	14.0	40.0	153.0	153.0	30.0	143.0	143.0
Total Split (%)	17.9%	17.9%		5.8%	5.8%	16.7%	63.8%	63.8%	12.5%	59.6%	59.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	210	10	10	5	360	3100	15	5	1960	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
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)	440	11	228	11	11	5	391	3370	16	5	2130	522
RTOR Reduction (vph)	0	0	30	0	0	5	0	0	5	0	0	229
Lane Group Flow (vph)	224	227	198	0	22	0	391	3370	11	5	2130	293
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2			6
Actuated Green, G (s)	35.6	35.6	80.3		5.9	5.9	38.7	172.2	172.2	1.3	134.8	134.8
Effective Green, g (s)	35.6	35.6	80.3		5.9	5.9	38.7	172.2	172.2	1.3	134.8	134.8
Actuated g/C Ratio	0.15	0.15	0.33		0.02	0.02	0.16	0.72	0.72	0.01	0.56	0.56
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	249	250	478		44	38	285	3648	998	9	2856	756
v/s Ratio Prot	0.13	c0.13			c0.01		c0.22	c0.66		0.00	0.42	
v/s Ratio Perm			0.14			0.00			0.01			0.22
v/c Ratio	0.90	0.91	0.41		0.50	0.00	1.37	0.92	0.01	0.56	0.75	0.39
Uniform Delay, d1	100.4	100.6	61.7		115.6	114.2	100.7	28.4	9.7	119.1	39.7	29.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.87	1.64	1.00	1.06	0.62	1.73
Incremental Delay, d2	31.5	33.1	0.6		3.2	0.0	178.1	2.7	0.0	32.8	1.6	1.3
Delay (s)	131.9	133.7	62.3		118.8	114.2	265.4	49.3	9.7	158.7	26.3	52.2
Level of Service	F	F	E		F	F	F	D	A	F	C	D
Approach Delay (s)		109.1			118.0			71.5			31.6	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	60.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	113.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	485	45	45	85	515	40	2235	5	350	1705	75
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0		10.0		10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	65.0	65.0		33.0		27.0	110.0	110.0	32.0	115.0	115.0
Total Split (%)	27.1%	27.1%		13.8%		11.3%	45.8%	45.8%	13.3%	47.9%	47.9%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	45	45	15	85	515	40	2235	5	350	1705	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	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)	527	49	49	16	92	560	43	2429	5	380	1853	82
RTOR Reduction (vph)	0	0	34	0	0	34	0	0	3	0	0	35
Lane Group Flow (vph)	285	291	15	0	108	526	43	2429	2	380	1853	47
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	47.0	47.0	58.2		27.0	59.0	11.2	115.0	115.0	26.0	129.8	129.8
Effective Green, g (s)	47.0	47.0	58.2		27.0	59.0	11.2	115.0	115.0	26.0	129.8	129.8
Actuated g/C Ratio	0.20	0.20	0.24		0.11	0.25	0.05	0.48	0.48	0.11	0.54	0.54
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	329	332	383		208	685	82	2436	758	371	2750	856
v/s Ratio Prot	0.17	c0.17			0.06		0.02	c0.48		c0.11	0.36	
v/s Ratio Perm			0.01			c0.19			0.00			0.03
v/c Ratio	0.87	0.88	0.04		0.52	0.77	0.52	1.00	0.00	1.02	0.67	0.06
Uniform Delay, d1	93.5	93.7	69.5		100.4	84.1	111.8	62.3	32.6	107.0	39.8	26.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.36	0.86	1.00	1.39	0.30	0.06
Incremental Delay, d2	20.5	21.9	0.0		2.2	5.2	4.4	15.0	0.0	45.2	0.9	0.1
Delay (s)	114.0	115.6	69.6		102.6	89.3	156.4	68.5	32.6	194.2	12.9	1.6
Level of Service	F	F	E		F	F	F	E	C	F	B	A
Approach Delay (s)		111.2			91.5			70.0			42.3	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	66.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1625	65	220	1420	170
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1625	65	220	1420	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	353	212	223	125	304	364	179	1766	71	239	1434	185
RTOR Reduction (vph)	0	0	58	0	0	33	0	0	23	0	0	64
Lane Group Flow (vph)	184	381	165	125	304	331	179	1766	48	239	1434	121
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	32.1	32.1	48.9	43.2	43.2	64.3	16.8	118.6	161.8	21.1	122.9	122.9
Effective Green, g (s)	32.1	32.1	48.9	43.2	43.2	64.3	16.8	118.6	161.8	21.1	122.9	122.9
Actuated g/C Ratio	0.13	0.13	0.20	0.18	0.18	0.27	0.07	0.49	0.67	0.09	0.51	0.51
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	215	443	322	318	335	816	240	2512	1067	301	2603	810
v/s Ratio Prot	0.11	c0.11		0.07	c0.16	0.07	0.05	c0.35		c0.07	c0.28	
v/s Ratio Perm			0.10			0.05			0.03			0.08
v/c Ratio	0.86	0.86	0.51	0.39	0.91	0.41	0.75	0.70	0.04	0.79	0.55	0.15
Uniform Delay, d1	101.7	101.8	84.9	86.8	96.4	72.2	109.5	47.0	13.1	107.3	39.8	30.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.58	2.17	4.37
Incremental Delay, d2	25.9	15.1	0.6	0.3	26.4	0.1	10.5	1.7	0.0	9.7	0.6	0.3
Delay (s)	127.6	116.8	85.5	87.1	122.9	72.3	120.0	48.7	13.1	72.4	86.9	135.4
Level of Service	F	F	F	F	F	E	F	D	B	E	F	F
Approach Delay (s)		110.5			94.0			53.8			89.8	
Approach LOS		F			F			D			F	

Intersection Summary				
HCM 2000 Control Delay	80.1	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	83.1%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1835	45	20	1355	35	70	15	25	35	15	150
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	28.0	28.0	28.0	26.0	26.0	26.0
Total Split (s)	24.0	76.0	76.0	16.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	63.3%	63.3%	13.3%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1835	45	20	1355	35	70	15	25	35	15	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1789	1583		1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.73	1.00		0.78	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1352	1583		1455	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)	168	1995	49	22	1473	38	76	16	27	38	16	163
RTOR Reduction (vph)	0	0	16	0	0	16	0	0	23	0	0	134
Lane Group Flow (vph)	168	1995	33	22	1473	22	0	92	4	0	54	29
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.1	80.1	80.1	4.8	70.8	70.8		19.1	19.1		21.1	21.1
Effective Green, g (s)	16.1	80.1	80.1	4.8	70.8	70.8		19.1	19.1		21.1	21.1
Actuated g/C Ratio	0.13	0.67	0.67	0.04	0.59	0.59		0.16	0.16		0.18	0.18
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	237	2362	1056	70	2088	933		215	251		255	278
v/s Ratio Prot	c0.09	c0.56		0.01	0.42							
v/s Ratio Perm			0.02			0.01		c0.07	0.00		0.04	0.02
v/c Ratio	0.71	0.84	0.03	0.31	0.71	0.02		0.43	0.02		0.21	0.10
Uniform Delay, d1	49.7	15.2	6.8	56.0	17.3	10.2		45.5	42.5		42.3	41.5
Progression Factor	1.00	1.00	1.00	0.83	0.80	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	9.3	3.9	0.1	2.0	1.6	0.0		1.4	0.0		0.4	0.2
Delay (s)	59.0	19.1	6.8	48.2	15.4	10.3		46.9	42.6		42.7	41.7
Level of Service	E	B	A	D	B	B		D	D		D	D
Approach Delay (s)		21.9			15.7			45.9			41.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1635	75	35	1185	45	110	15	40	50	15	115
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	24.0	75.0	75.0	17.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	62.5%	62.5%	14.2%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1635	75	35	1185	45	110	15	40	50	15	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1784	1583		1794	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.70	1.00		0.61	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1307	1583		1138	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)	185	1777	82	38	1288	49	120	16	43	54	16	125
RTOR Reduction (vph)	0	0	30	0	0	22	0	0	36	0	0	104
Lane Group Flow (vph)	185	1777	52	38	1288	27	0	136	7	0	70	21
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.2	76.7	76.7	5.6	66.1	66.1		19.7	19.7		19.7	19.7
Effective Green, g (s)	16.2	76.7	76.7	5.6	66.1	66.1		19.7	19.7		19.7	19.7
Actuated g/C Ratio	0.13	0.64	0.64	0.05	0.55	0.55		0.16	0.16		0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	238	2262	1011	82	1949	871		214	259		186	259
v/s Ratio Prot	c0.10	c0.50		0.02	0.36							
v/s Ratio Perm			0.03			0.02		c0.10	0.00		0.06	0.01
v/c Ratio	0.78	0.79	0.05	0.46	0.66	0.03		0.64	0.03		0.38	0.08
Uniform Delay, d1	50.2	15.7	8.1	55.7	19.0	12.3		46.8	42.1		44.7	42.5
Progression Factor	1.07	0.77	1.89	1.11	0.49	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.7	1.6	0.1	3.7	1.6	0.1		6.1	0.0		1.3	0.1
Delay (s)	62.2	13.6	15.3	65.5	11.0	12.4		52.9	42.1		46.0	42.6
Level of Service	E	B	B	E	B	B		D	D		D	D
Approach Delay (s)		18.1			12.5			50.3			43.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1675	60	1145	130	85
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	28.0	28.0
Total Split (s)	66.0	22.0	88.0	32.0	32.0
Total Split (%)	55.0%	18.3%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1675	40	60	1145	130	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3527		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3527		1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1821	43	65	1245	141	92
RTOR Reduction (vph)	1	0	0	0	0	77
Lane Group Flow (vph)	1863	0	65	1245	141	15
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	73.9		8.6	88.5	19.5	19.5
Effective Green, g (s)	73.9		8.6	88.5	19.5	19.5
Actuated g/C Ratio	0.62		0.07	0.74	0.16	0.16
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2172		126	2610	287	257
v/s Ratio Prot	c0.53		0.04	c0.35	c0.08	
v/s Ratio Perm						0.01
v/c Ratio	0.86		0.52	0.48	0.49	0.06
Uniform Delay, d1	18.8		53.7	6.4	45.7	42.5
Progression Factor	0.52		1.28	0.47	1.00	1.00
Incremental Delay, d2	3.1		3.2	0.6	1.3	0.1
Delay (s)	12.9		71.8	3.6	47.1	42.6
Level of Service	B		E	A	D	D
Approach Delay (s)	12.9			6.9	45.3	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1690	30	50	1070	10	50	5	100	20	10	90
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	15.0	73.0	73.0	19.0	77.0	77.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	12.5%	60.8%	60.8%	15.8%	64.2%	64.2%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1690	30	50	1070	10	50	5	100	20	10	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1781	1583		1803	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.80	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1341	1583		1499	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)	43	1837	33	54	1163	11	54	5	109	22	11	98
RTOR Reduction (vph)	0	0	12	0	0	4	0	0	92	0	0	83
Lane Group Flow (vph)	43	1837	21	54	1163	7	0	59	17	0	33	15
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.0	76.3	76.3	7.9	77.2	77.2		18.8	18.8		18.8	18.8
Effective Green, g (s)	7.0	76.3	76.3	7.9	77.2	77.2		18.8	18.8		18.8	18.8
Actuated g/C Ratio	0.06	0.64	0.64	0.07	0.64	0.64		0.16	0.16		0.16	0.16
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	103	2250	1006	116	2276	1018		210	248		234	248
v/s Ratio Prot	0.02	c0.52		c0.03	0.33							
v/s Ratio Perm			0.01			0.00		c0.04	0.01		0.02	0.01
v/c Ratio	0.42	0.82	0.02	0.47	0.51	0.01		0.28	0.07		0.14	0.06
Uniform Delay, d1	54.5	16.5	8.1	54.0	11.4	7.7		44.6	43.1		43.6	43.1
Progression Factor	1.07	0.47	1.00	1.17	1.43	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	1.9	0.0	2.7	0.8	0.0		0.7	0.1		0.3	0.1
Delay (s)	59.7	9.8	8.1	65.9	17.1	7.7		45.4	43.3		43.9	43.2
Level of Service	E	A	A	E	B	A		D	D		D	D
Approach Delay (s)		10.9			19.1			44.0			43.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1750	55	70	1010	125	115
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	28.0
Total Split (s)	69.0	69.0	22.0	91.0	29.0	29.0
Total Split (%)	57.5%	57.5%	18.3%	75.8%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1750	55	70	1010	125	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1902	60	76	1098	136	125
RTOR Reduction (vph)	0	7	0	0	0	105
Lane Group Flow (vph)	1902	53	76	1098	136	20
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	75.4	75.4	9.2	89.6	19.4	19.4
Effective Green, g (s)	75.4	75.4	9.2	89.6	19.4	19.4
Actuated g/C Ratio	0.63	0.63	0.08	0.75	0.16	0.16
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2223	994	135	2642	286	255
v/s Ratio Prot	c0.54		c0.04	0.31	c0.08	
v/s Ratio Perm		0.03				0.01
v/c Ratio	0.86	0.05	0.56	0.42	0.48	0.08
Uniform Delay, d1	17.9	8.6	53.5	5.6	45.7	42.7
Progression Factor	0.57	0.96	0.88	1.61	1.00	1.00
Incremental Delay, d2	2.8	0.1	4.9	0.4	1.2	0.1
Delay (s)	13.1	8.3	51.9	9.4	46.9	42.8
Level of Service	B	A	D	A	D	D
Approach Delay (s)	12.9			12.2	45.0	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations												
Volume (vph)	1785	50	100	945	25	125	20	125	10	5	15	
Turn Type	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	2		1	6			8			4		5
Permitted Phases		2			6	8		8	4		4	
Detector Phase	2	2	1	6	6	8	8	8	4	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	10.0
Total Split (s)	58.0	58.0	32.0	62.0	62.0	30.0	30.0	30.0	30.0	30.0	30.0	28.0
Total Split (%)	48.3%	48.3%	26.7%	51.7%	51.7%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	23%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lag	Lag							Lead
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1785	50	100	945	25	125	20	125	10	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)		3539	1583	1770	3539	1583		1786	1583		1801	1583
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.80	1.00
Satd. Flow (perm)		3539	1583	1770	3539	1583		1387	1583		1491	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1940	54	109	1027	27	136	22	136	11	5	16
RTOR Reduction (vph)	0	0	23	0	0	7	0	0	113	0	0	13
Lane Group Flow (vph)	0	1940	31	109	1027	20	0	158	23	0	16	3
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)		69.0	69.0	12.7	87.7	87.7		20.3	20.3		20.3	20.3
Effective Green, g (s)		69.0	69.0	12.7	87.7	87.7		20.3	20.3		20.3	20.3
Actuated g/C Ratio		0.58	0.58	0.11	0.73	0.73		0.17	0.17		0.17	0.17
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2034	910	187	2586	1156		234	267		252	267
v/s Ratio Prot		c0.55		c0.06	0.29							
v/s Ratio Perm			0.02			0.01		c0.11	0.01		0.01	0.00
v/c Ratio		0.95	0.03	0.58	0.40	0.02		0.68	0.09		0.06	0.01
Uniform Delay, d1		24.0	11.1	51.1	6.1	4.4		46.8	42.0		41.9	41.5
Progression Factor		0.61	1.07	1.08	0.40	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		7.5	0.0	4.2	0.4	0.0		7.5	0.1		0.1	0.0
Delay (s)		22.0	11.8	59.5	2.9	4.4		54.2	42.2		42.0	41.5
Level of Service		C	B	E	A	A		D	D		D	D
Approach Delay (s)		21.8			8.2			48.7			41.7	
Approach LOS		C			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1730	30	255	990	50	70	45	285	70	35	25
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	26.0	55.0	55.0	36.0	65.0	65.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	21.7%	45.8%	45.8%	30.0%	54.2%	54.2%	24.2%	24.2%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1730	30	255	990	50	70	45	285	70	35	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1364	1863	1583	1351	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1880	33	277	1076	54	76	49	310	76	38	27
RTOR Reduction (vph)	0	0	14	0	0	19	0	0	261	0	0	23
Lane Group Flow (vph)	27	1880	19	277	1076	35	76	49	49	76	38	4
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.0	68.0	68.0	15.0	78.0	78.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	5.0	68.0	68.0	15.0	78.0	78.0	19.0	19.0	19.0	19.0	19.0	19.0
Actuated g/C Ratio	0.04	0.57	0.57	0.12	0.65	0.65	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	73	2005	897	429	2300	1028	215	294	250	213	294	250
v/s Ratio Prot	0.02	c0.53		c0.08	0.30			0.03			0.02	
v/s Ratio Perm			0.01			0.02	0.06		0.03	c0.06		0.00
v/c Ratio	0.37	0.94	0.02	0.65	0.47	0.03	0.35	0.17	0.20	0.36	0.13	0.02
Uniform Delay, d1	56.0	24.0	11.4	50.0	10.6	7.5	45.0	43.7	43.9	45.0	43.4	42.6
Progression Factor	0.65	1.04	1.00	1.29	0.49	0.71	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	4.7	0.0	2.9	0.6	0.1	1.0	0.3	0.4	1.0	0.2	0.0
Delay (s)	37.6	29.7	11.4	67.5	5.8	5.4	46.0	43.9	44.3	46.1	43.6	42.6
Level of Service	D	C	B	E	A	A	D	D	D	D	D	D
Approach Delay (s)		29.5			17.9			44.5			44.8	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL
Lane Configurations			
Volume (vph)	1900	1250	50
Turn Type	NA	NA	NA
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0
Total Split (s)	89.0	89.0	31.0
Total Split (%)	74.2%	74.2%	25.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1900	50	0	1250	50	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	1.00			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3526			3539	1761	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3526			3539	1761	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2065	54	0	1359	54	5
RTOR Reduction (vph)	1	0	0	0	3	0
Lane Group Flow (vph)	2118	0	0	1359	56	0
Turn Type	NA		Perm	NA	NA	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	85.2			85.2	22.8	
Effective Green, g (s)	85.2			85.2	22.8	
Actuated g/C Ratio	0.71			0.71	0.19	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2503			2512	334	
v/s Ratio Prot	c0.60			0.38	c0.03	
v/s Ratio Perm						
v/c Ratio	0.85			0.54	0.17	
Uniform Delay, d1	12.6			8.2	40.7	
Progression Factor	2.40			2.96	1.00	
Incremental Delay, d2	1.4			0.2	1.1	
Delay (s)	31.7			24.5	41.7	
Level of Service	C			C	D	
Approach Delay (s)	31.7			24.5	41.7	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	40	1760	80	1230	110	50	40	440	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	28.0
Total Split (s)	20.0	54.0	26.0	60.0		12.0	12.0	28.0	40.0
Total Split (%)	16.7%	45.0%	21.7%	50.0%		10.0%	10.0%	23.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1760	0	80	1230	110	0	50	40	440	5	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1863	1583	3433	1612	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1863	1583	3433	1612	
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)	43	1913	0	87	1337	120	0	54	43	478	5	43
RTOR Reduction (vph)	0	0	0	0	0	18	0	0	41	0	32	0
Lane Group Flow (vph)	43	1913	0	87	1337	102	0	54	2	478	16	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	7.2	60.2		11.2	64.2	101.8		5.2	5.2	20.4	31.6	
Effective Green, g (s)	7.2	60.2		11.2	64.2	101.8		5.2	5.2	20.4	31.6	
Actuated g/C Ratio	0.06	0.50		0.09	0.54	0.85		0.04	0.04	0.17	0.26	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	106	1775		165	1893	1342		80	68	583	424	
v/s Ratio Prot	0.02	c0.54		c0.05	c0.38			c0.03		c0.14	0.01	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.41	1.08		0.53	0.71	0.08		0.68	0.03	0.82	0.04	
Uniform Delay, d1	54.3	29.9		51.9	20.9	1.5		56.6	55.0	48.0	32.9	
Progression Factor	1.22	0.67		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	41.1		3.0	2.2	0.0		20.2	0.2	8.8	0.0	
Delay (s)	67.8	61.2		54.9	23.1	1.5		76.8	55.1	56.9	32.9	
Level of Service	E	E		D	C	A		E	E	E	C	
Approach Delay (s)		61.4			23.2			67.2			54.7	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	45	10	40	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	49	11	43	87

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	60	130
Volume Left (vph)	0	49	43
Volume Right (vph)	27	0	87
Hadj (s)	-0.34	0.20	-0.30
Departure Headway (s)	3.9	4.4	3.8
Degree Utilization, x	0.05	0.07	0.14
Capacity (veh/h)	888	789	909
Control Delay (s)	7.1	7.8	7.4
Approach Delay (s)	7.1	7.8	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay		7.5	
Level of Service		A	
Intersection Capacity Utilization		23.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	2130	390	1090
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 122.5
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2130	0	390	1090	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2315	0	424	1185	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2315	0	424	1185	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	76.4		34.1	122.5		
Effective Green, g (s)	76.4		34.1	122.5		
Actuated g/C Ratio	0.62		0.28	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	2207		492	3539		
v/s Ratio Prot	c0.65		c0.24	0.33		
v/s Ratio Perm						
v/c Ratio	1.05		0.86	0.33		
Uniform Delay, d1	23.0		42.0	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	33.5		14.4	0.1		
Delay (s)	56.6		56.3	0.1		
Level of Service	E		E	A		
Approach Delay (s)	56.6			14.9	0.0	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	122.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	920	1930	1405	210
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 95.8
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	920	1930	1405	210	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1000	2098	1527	228	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1000	2098	1527	228	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	33.4	95.8	51.4	95.8		
Effective Green, g (s)	33.4	95.8	51.4	95.8		
Actuated g/C Ratio	0.35	1.00	0.54	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	617	3539	1898	1583		
v/s Ratio Prot	c0.57	0.59	c0.43			
v/s Ratio Perm				0.14		
v/c Ratio	1.62	0.59	0.80	0.14		
Uniform Delay, d1	31.2	0.0	18.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	286.8	0.3	2.6	0.2		
Delay (s)	317.9	0.3	20.7	0.2		
Level of Service	F	A	C	A		
Approach Delay (s)		102.8	18.0		0.0	
Approach LOS		F	B		A	

Intersection Summary			
HCM 2000 Control Delay	72.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	95.8	Sum of lost time (s)	11.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	660	1225	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	717	1332	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1353				1853	677
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1353				1853	677
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				51	93
cM capacity (veh/h)	504				56	396

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	359	359	888	466	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	504	1700	1700	1700	1700	56	396
Volume to Capacity	0.15	0.21	0.21	0.52	0.27	0.49	0.07
Queue Length 95th (ft)	13	0	0	0	0	47	6
Control Delay (s)	13.4	0.0	0.0	0.0	0.0	120.4	14.8
Lane LOS	B					F	B
Approach Delay (s)	1.3			0.0		67.6	
Approach LOS						F	

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	500	15	0	820	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	543	16	0	891	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	891			560			1410	1606	280	1337	1614	446
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	891			560			1410	1606	280	1337	1614	446
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			35	88	99	100	100	55
cM capacity (veh/h)	756			1007			50	93	717	93	92	560

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	362	197	0	594	297	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	756	1700	1700	1700	1700	1700	63	1700	560
Volume to Capacity	0.11	0.21	0.12	0.00	0.35	0.17	0.78	0.00	0.45
Queue Length 95th (ft)	9	0	0	0	0	0	87	0	57
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	162.3	0.0	16.5
Lane LOS	B						F	A	C
Approach Delay (s)	1.3			0.0			162.3	16.5	
Approach LOS							F	C	

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	380	10	0	655	0	25	15	0	20	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	413	11	0	712	0	27	16	0	22	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	712			424			1171	1380	212	1177	1386	356
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	712			424			1171	1380	212	1177	1386	356
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			73	87	100	82	100	77
cM capacity (veh/h)	884			1132			102	123	793	118	122	640

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	275	149	0	475	237	43	22	147
Volume Left	125	0	0	0	0	0	27	22	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	884	1700	1700	1700	1700	1700	109	118	640
Volume to Capacity	0.14	0.16	0.09	0.00	0.28	0.14	0.40	0.18	0.23
Queue Length 95th (ft)	12	0	0	0	0	0	42	16	22
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	58.7	42.4	12.3
Lane LOS	A						F	E	B
Approach Delay (s)	2.2			0.0			58.7	16.2	
Approach LOS							F	C	

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization		43.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	300	5	0	530	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	326	5	0	576	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	582			332			932	1106	166	943	1106	291
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	582			332			932	1106	166	943	1106	291
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			87	94	100	100	100	83
cM capacity (veh/h)	989			1225			170	188	849	192	188	706

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	217	114	0	384	197	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	989	1700	1700	1700	1700	1700	176	1700	706
Volume to Capacity	0.10	0.13	0.07	0.00	0.23	0.12	0.19	0.00	0.17
Queue Length 95th (ft)	8	0	0	0	0	0	16	0	15
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	30.1	0.0	11.1
Lane LOS	A						D	A	B
Approach Delay (s)	2.1			0.0			30.1	11.1	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		35.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	235	15	0	415	25	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	255	16	0	451	27	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	478			272			701	861	136	739	856	239
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478			272			701	861	136	739	856	239
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			84	80	100	100	96	89
cM capacity (veh/h)	1080			1289			268	275	888	249	277	762

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	60	170	101	0	301	178	98	0	11	87
Volume Left	60	0	0	0	0	0	43	0	0	0
Volume Right	0	0	16	0	0	27	0	0	0	87
cSH	1080	1700	1700	1700	1700	1700	272	1700	277	762
Volume to Capacity	0.06	0.10	0.06	0.00	0.18	0.10	0.36	0.00	0.04	0.11
Queue Length 95th (ft)	4	0	0	0	0	0	39	0	3	10
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	25.5	0.0	18.5	10.3
Lane LOS	A						D	A	C	B
Approach Delay (s)	1.5			0.0			25.5		11.2	
Approach LOS							D		B	

Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		37.1%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	110	45	25	250	60	40	0	30	215	5	145
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	120	49	27	272	65	43	0	33	234	5	158
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	337			168			690	731	84	647	723	168
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	337			168			690	731	84	647	723	168
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			98			82	100	97	27	98	81
cM capacity (veh/h)	1219			1407			246	313	958	318	317	846

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	80	89	27	181	156	76	239	158
Volume Left	98	0	0	27	0	0	43	234	0
Volume Right	0	0	49	0	0	65	33	0	158
cSH	1219	1700	1700	1407	1700	1700	361	318	846
Volume to Capacity	0.08	0.05	0.05	0.02	0.11	0.09	0.21	0.75	0.19
Queue Length 95th (ft)	7	0	0	1	0	0	20	144	17
Control Delay (s)	8.2	0.0	0.0	7.6	0.0	0.0	17.6	43.8	10.2
Lane LOS	A			A			C	E	B
Approach Delay (s)	3.0			0.6			17.6	30.5	
Approach LOS							C	D	

Intersection Summary			
Average Delay		13.1	
Intersection Capacity Utilization		42.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	305	5	10	230	30	10	0	30	70	5	95
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	332	5	11	250	33	11	0	33	76	5	103
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	283			337			696	747	168	595	734	141
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	283			337			696	747	168	595	734	141
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			96	100	96	79	98	88
cM capacity (veh/h)	1277			1219			275	322	846	358	328	881

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	54	221	116	11	167	116	43	82	103
Volume Left	54	0	0	11	0	0	11	76	0
Volume Right	0	0	5	0	0	33	33	0	103
cSH	1277	1700	1700	1219	1700	1700	557	356	881
Volume to Capacity	0.04	0.13	0.07	0.01	0.10	0.07	0.08	0.23	0.12
Queue Length 95th (ft)	3	0	0	1	0	0	6	22	10
Control Delay (s)	7.9	0.0	0.0	8.0	0.0	0.0	12.0	18.1	9.6
Lane LOS	A			A			B	C	A
Approach Delay (s)	1.1			0.3			12.0	13.4	
Approach LOS							B	B	

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		32.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	355	5	5	140	50	10	0	25	100	5	120
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	386	5	5	152	54	11	0	27	109	5	130
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	207			391			696	693	196	497	668	103
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	207			391			696	693	196	497	668	103
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			96	100	97	75	99	86
cM capacity (veh/h)	1362			1164			271	352	813	428	364	932

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	257	134	5	101	105	38	114	130
Volume Left	43	0	0	5	0	0	11	109	0
Volume Right	0	0	5	0	0	54	27	0	130
cSH	1362	1700	1700	1164	1700	1700	518	425	932
Volume to Capacity	0.03	0.15	0.08	0.00	0.06	0.06	0.07	0.27	0.14
Queue Length 95th (ft)	2	0	0	0	0	0	6	27	12
Control Delay (s)	7.7	0.0	0.0	8.1	0.0	0.0	12.5	16.6	9.5
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.8			0.2			12.5	12.8	
Approach LOS							B	B	

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization		35.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	475	180	85	235	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	516	196	92	255	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	288				723	196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	288				723	196
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				35	99
cM capacity (veh/h)	1274				391	846

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	5	516	196	92	266
Volume Left	5	0	0	0	255
Volume Right	0	0	0	92	11
cSH	1274	1700	1700	1700	408
Volume to Capacity	0.00	0.30	0.12	0.05	0.65
Queue Length 95th (ft)	0	0	0	0	112
Control Delay (s)	7.8	0.0	0.0	0.0	29.0
Lane LOS	A				D
Approach Delay (s)	0.1		0.0		29.0
Approach LOS					D

Intersection Summary			
Average Delay		7.2	
Intersection Capacity Utilization		44.7%	ICU Level of Service A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	460	0	200	375	730	335	735
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 71.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	460	0	200	375	730	0	0	335	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1552	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1552	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	500	0	217	408	793	0	0	364	799
RTOR Reduction (vph)	0	0	0	0	0	124	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	250	250	93	408	793	0	0	364	799
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Effective Green, g (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Actuated g/C Ratio				0.26	0.26	0.26	0.31	0.57			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				434	434	401	549	2027			631	1583
v/s Ratio Prot							c0.23	0.22			0.10	
v/s Ratio Perm				0.15	0.15	0.06						c0.50
v/c Ratio				0.58	0.58	0.23	0.74	0.39			0.58	0.50
Uniform Delay, d1				23.0	23.0	20.8	22.0	8.4			26.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.9	1.9	0.3	5.4	0.1			1.3	1.2
Delay (s)				24.9	24.9	21.1	27.4	8.5			28.1	1.2
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			23.7			14.9			9.6	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	550	355	240	605
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	64.0	64.0	46.0	30.0	76.0
Total Split (%)	45.7%	45.7%	32.9%	21.4%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 129.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	635	90	550	0	0	0	0	355	335	240	605	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3234		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3234		1770	3539	
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)	690	98	598	0	0	0	0	386	364	261	658	0
RTOR Reduction (vph)	0	0	107	0	0	0	0	129	0	0	0	0
Lane Group Flow (vph)	0	788	491	0	0	0	0	621	0	261	658	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		58.3	58.3					31.0		22.2	59.2	
Effective Green, g (s)		58.3	58.3					31.0		22.2	59.2	
Actuated g/C Ratio		0.45	0.45					0.24		0.17	0.46	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		803	703					774		303	1617	
v/s Ratio Prot								c0.19		c0.15	0.19	
v/s Ratio Perm		0.44	0.31									
v/c Ratio		0.98	0.70					0.80		0.86	0.41	
Uniform Delay, d1		35.1	28.5					46.4		52.2	23.4	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		27.0	3.0					6.0		21.3	0.2	
Delay (s)		62.1	31.6					52.4		73.5	23.6	
Level of Service		E	C					D		E	C	
Approach Delay (s)		48.9			0.0			52.4			37.8	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	129.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1360	925	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 112.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1360	925	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	379	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1478	1005	114	54	33
RTOR Reduction (vph)	0	0	0	55	0	21
Lane Group Flow (vph)	22	1478	1005	59	54	12
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	58.1	58.1	58.1	58.1	42.5	42.5
Effective Green, g (s)	58.1	58.1	58.1	58.1	42.5	42.5
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.38	0.38
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	195	1826	1826	816	668	597
v/s Ratio Prot		c0.42	0.28		c0.03	
v/s Ratio Perm	0.06			0.04		0.01
v/c Ratio	0.11	0.81	0.55	0.07	0.08	0.02
Uniform Delay, d1	14.0	22.6	18.4	13.7	22.5	22.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	2.8	0.4	0.0	0.2	0.1
Delay (s)	14.3	25.4	18.8	13.7	22.7	22.1
Level of Service	B	C	B	B	C	C
Approach Delay (s)		25.2	18.3		22.5	
Approach LOS		C	B		C	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	112.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2035 PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	2155	5	315	600	425	300	145
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	63.0	63.0	63.0	29.0	57.0	28.0	28.0
Total Split (%)	52.5%	52.5%	52.5%	24.2%	47.5%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	2155	5	315	600	425	0	0	300	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2177	5	342	606	429	0	0	303	158
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	0	0	0	132
Lane Group Flow (vph)	0	0	0	1088	1094	194	606	429	0	0	303	26
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				59.7	59.7	59.7	23.4	48.3			19.9	19.9
Effective Green, g (s)				59.7	59.7	59.7	23.4	48.3			19.9	19.9
Actuated g/C Ratio				0.50	0.50	0.50	0.19	0.40			0.17	0.17
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				836	838	787	669	749			586	262
v/s Ratio Prot				0.65	c0.65		c0.18	c0.23			0.09	
v/s Ratio Perm						0.12						0.02
v/c Ratio				1.30	1.31	0.25	0.91	0.57			0.52	0.10
Uniform Delay, d1				30.1	30.1	17.3	47.2	27.8			45.7	42.5
Progression Factor				1.00	1.00	1.00	0.94	1.57			1.00	1.00
Incremental Delay, d2				144.4	146.1	0.7	14.6	1.0			0.8	0.2
Delay (s)				174.5	176.3	18.0	59.0	44.6			46.4	42.6
Level of Service				F	F	B	E	D			D	D
Approach Delay (s)		0.0			154.1			53.0			45.1	
Approach LOS		A			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	115.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	635	925	1575	95	2355
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	32.0		51.0		37.0	88.0
Total Split (%)	26.7%		42.5%		30.8%	73.3%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	635	0	0	0	0	925	1575	95	2355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1780	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1780	1583					3539	2787	1770	3539	
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)	158	11	690	0	0	0	0	1005	1712	103	2560	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	169	690	0	0	0	0	1005	1712	103	2560	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		16.7	120.0					74.0	120.0	12.3	91.3	
Effective Green, g (s)		16.7	120.0					74.0	120.0	12.3	91.3	
Actuated g/C Ratio		0.14	1.00					0.62	1.00	0.10	0.76	
Clearance Time (s)		6.0						6.0		5.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		247	1583					2182	2787	181	2692	
v/s Ratio Prot		0.09						0.28		0.06	c0.72	
v/s Ratio Perm			0.44						c0.61			
v/c Ratio		0.68	0.44					0.46	0.61	0.57	0.95	
Uniform Delay, d1		49.1	0.0					12.3	0.0	51.3	12.4	
Progression Factor		1.00	1.00					1.00	1.00	1.07	1.39	
Incremental Delay, d2		7.6	0.9					0.7	1.0	0.4	1.1	
Delay (s)		56.8	0.9					13.0	1.0	55.3	18.4	
Level of Service		E	A					B	A	E	B	
Approach Delay (s)		11.9			0.0			5.5			19.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	180	0	2645	2825	165
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	196	0	2672	2854	179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.72	0.58	0.58			
vC, conflicting volume	3744	951	3033			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	758	0	1953			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	69	100			
cM capacity (veh/h)	247	625	170			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	196	891	891	891	951	951	951	179
Volume Left	0	0	0	0	0	0	0	0
Volume Right	196	0	0	0	0	0	0	179
cSH	625	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.52	0.52	0.52	0.56	0.56	0.56	0.11
Queue Length 95th (ft)	33	0	0	0	0	0	0	0
Control Delay (s)	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	13.4	0.0			0.0			
Approach LOS	B							

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	640	235	480	935	560	490	1405	505	710	1995	410
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	46.0	46.0	46.0	51.0	51.0		34.0	84.0		59.0	109.0	
Total Split (%)	19.2%	19.2%	19.2%	21.3%	21.3%		14.2%	35.0%		24.6%	45.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Natural Cycle: 180
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	640	235	480	935	560	490	1405	505	710	1995	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	598	696	255	522	1016	609	533	1527	549	772	2168	446
RTOR Reduction (vph)	0	0	160	0	0	23	0	0	28	0	0	14
Lane Group Flow (vph)	598	696	95	522	1016	586	533	1527	521	772	2168	432
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	40.0	43.5	43.5	41.5	45.0	105.0	29.0	78.0	125.5	54.0	103.0	149.0
Effective Green, g (s)	40.0	43.5	43.5	41.5	45.0	105.0	29.0	78.0	125.5	54.0	103.0	149.0
Actuated g/C Ratio	0.17	0.18	0.18	0.17	0.19	0.44	0.12	0.32	0.52	0.22	0.43	0.62
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	572	921	286	593	953	692	414	1652	827	772	2182	982
v/s Ratio Prot	c0.17	0.14		0.15	c0.20		c0.16	0.30		c0.22	c0.43	
v/s Ratio Perm			0.06			0.37			0.33			0.27
v/c Ratio	1.05	0.76	0.33	0.88	1.07	0.85	1.29	0.92	0.63	1.00	0.99	0.44
Uniform Delay, d1	100.0	93.2	85.6	96.8	97.5	60.3	105.5	78.2	40.7	93.0	68.2	23.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	50.0	3.6	0.7	14.3	48.5	9.4	146.5	9.1	1.5	32.4	17.7	0.3
Delay (s)	150.0	96.8	86.3	111.1	146.0	69.7	252.0	87.3	42.2	125.4	85.8	24.1
Level of Service	F	F	F	F	F	E	F	F	D	F	F	C
Approach Delay (s)		115.6			115.9			111.5			86.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	104.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	250	360	125	145	335	130	1700	110	555	1950	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	39.0	44.0		44.0	49.0		34.0	99.0		53.0	118.0	
Total Split (%)	16.3%	18.3%		18.3%	20.4%		14.2%	41.3%		22.1%	49.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 228.8
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	250	360	125	145	335	130	1700	110	555	1950	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	1770	5085	1583	3433	5085	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)	353	272	391	136	158	364	141	1848	120	603	2120	370
RTOR Reduction (vph)	0	0	59	0	0	25	0	0	30	0	0	104
Lane Group Flow (vph)	353	272	332	136	158	339	141	1848	90	603	2120	267
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	28.5	44.7	73.7	23.0	39.2	88.9	23.0	93.4	122.4	43.7	115.1	149.6
Effective Green, g (s)	28.5	44.7	73.7	23.0	39.2	88.9	23.0	93.4	122.4	43.7	115.1	149.6
Actuated g/C Ratio	0.12	0.20	0.32	0.10	0.17	0.39	0.10	0.41	0.53	0.19	0.50	0.65
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	427	363	509	177	319	615	177	2075	846	655	2558	1035
v/s Ratio Prot	c0.10	c0.15		0.08	0.08		0.08	c0.36		c0.18	0.42	
v/s Ratio Perm			0.21			0.21			0.06			0.17
v/c Ratio	0.83	0.75	0.65	0.77	0.50	0.55	0.80	0.89	0.11	0.92	0.83	0.26
Uniform Delay, d1	97.7	86.8	66.6	100.3	85.8	54.4	100.6	62.9	26.2	90.8	48.5	16.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	8.2	3.0	18.0	1.2	1.1	21.5	6.3	0.1	18.4	3.3	0.1
Delay (s)	110.1	95.0	69.5	118.3	87.1	55.5	122.1	69.2	26.3	109.2	51.7	16.6
Level of Service	F	F	E	F	F	E	F	E	C	F	D	B
Approach Delay (s)		90.5			76.0			70.3			58.7	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	68.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	228.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	100	270	475	1490	335	635	1620	105
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		49.0		55.0	55.0	36.0	91.0	91.0
Total Split (%)		35.0%		39.3%	39.3%	25.7%	65.0%	65.0%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 129.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	270	0	475	0	1490	335	635	1620	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	293	0	516	0	1620	364	690	1761	114
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	227	0	0	40
Lane Group Flow (vph)	0	0	109	293	0	505	0	1620	137	690	1761	74
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			129.2	33.3		68.4		48.8	48.8	29.1	83.9	83.9
Effective Green, g (s)			129.2	33.3		68.4		48.8	48.8	29.1	83.9	83.9
Actuated g/C Ratio			1.00	0.26		0.53		0.38	0.38	0.23	0.65	0.65
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	456		838		1920	597	773	3302	1027
v/s Ratio Prot				0.17				c0.32		c0.20	0.35	
v/s Ratio Perm			0.07			c0.32			0.09			0.05
v/c Ratio			0.07	0.64		0.60		0.84	0.23	0.89	0.53	0.07
Uniform Delay, d1			0.0	42.7		21.0		36.7	27.4	48.5	12.1	8.3
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	3.1		1.2		3.6	0.2	12.6	0.2	0.0
Delay (s)			0.1	45.7		22.2		40.3	27.6	61.2	12.3	8.4
Level of Service			A	D		C		D	C	E	B	A
Approach Delay (s)		0.1			30.8			38.0			25.3	
Approach LOS		A			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	129.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	285	280	495	255	970	705	955	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	26.0	40.0		26.0	40.0		24.0	51.0	33.0	60.0	
Total Split (%)	17.3%	26.7%		17.3%	26.7%		16.0%	34.0%	22.0%	40.0%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 145.7
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	285	280	495	255	970	425	705	955	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4853		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4853		3433	5085	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)	304	228	310	310	304	538	277	1054	462	766	1038	359
RTOR Reduction (vph)	0	0	59	0	0	31	0	52	0	0	0	63
Lane Group Flow (vph)	304	228	251	310	304	507	277	1464	0	766	1038	296
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	17.8	32.7	55.1	17.9	32.8	66.8	16.4	45.1		28.0	56.7	80.5
Effective Green, g (s)	17.8	32.7	55.1	17.9	32.8	66.8	16.4	45.1		28.0	56.7	80.5
Actuated g/C Ratio	0.12	0.22	0.38	0.12	0.23	0.46	0.11	0.31		0.19	0.39	0.55
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	419	418	598	421	419	725	386	1502		659	1978	874
v/s Ratio Prot	0.09	0.12		c0.09	0.16		0.08	c0.30		c0.22	0.20	
v/s Ratio Perm			0.16			c0.32						0.19
v/c Ratio	0.73	0.55	0.42	0.74	0.73	0.70	0.72	0.97		1.16	0.52	0.34
Uniform Delay, d1	61.6	49.9	33.5	61.6	52.3	31.4	62.4	49.7		58.8	34.2	17.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.1	1.5	0.5	6.6	6.1	3.0	6.3	17.4		89.1	0.3	0.2
Delay (s)	67.7	51.4	34.0	68.2	58.4	34.4	68.7	67.2		148.0	34.4	18.2
Level of Service	E	D	C	E	E	C	E	E		F	C	B
Approach Delay (s)		50.9			49.8			67.4			71.9	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	63.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	145.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	905	795	65	360	495	370	70	380	230	500	385	655
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	52.0	52.0	52.0	44.0	44.0		11.0	46.0		38.0	73.0	
Total Split (%)	28.9%	28.9%	28.9%	24.4%	24.4%		6.1%	25.6%		21.1%	40.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 160.4
Natural Cycle: 175
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	905	795	65	360	495	370	70	380	230	500	385	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	984	864	71	391	538	402	76	413	250	543	418	712
RTOR Reduction (vph)	0	0	50	0	0	0	0	0	69	0	0	20
Lane Group Flow (vph)	984	864	21	391	538	402	76	413	181	543	418	692
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	46.6	48.3	48.3	25.4	27.1	63.4	6.1	33.1	64.5	30.3	57.3	109.9
Effective Green, g (s)	46.6	48.3	48.3	25.4	27.1	63.4	6.1	33.1	64.5	30.3	57.3	109.9
Actuated g/C Ratio	0.29	0.30	0.30	0.16	0.17	0.40	0.04	0.21	0.40	0.19	0.36	0.69
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	999	1067	477	544	860	1103	67	731	637	649	1266	1913
v/s Ratio Prot	c0.29	c0.24		0.11	0.11	0.14	0.04	c0.12		c0.16	0.12	0.25
v/s Ratio Perm			0.01						0.11			
v/c Ratio	0.98	0.81	0.04	0.72	0.63	0.36	1.13	0.56	0.28	0.84	0.33	0.36
Uniform Delay, d1	56.4	51.7	39.6	64.0	61.8	34.1	77.0	57.0	32.2	62.5	37.4	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.6	4.6	0.0	4.5	1.4	0.2	151.2	1.0	0.2	9.2	0.2	0.1
Delay (s)	81.0	56.3	39.6	68.5	63.2	34.3	228.2	58.0	32.5	71.7	37.6	10.6
Level of Service	F	E	D	E	E	C	F	E	C	E	D	B
Approach Delay (s)		68.4			56.0			66.9			37.2	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	56.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	160.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	655	0	55	5	1155	150	1590
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 160
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	655	0	55	5	1155	615	150	1590	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.95		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3355		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3355		1770	3539	
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	0	11	712	0	60	5	1255	668	163	1728	0
RTOR Reduction (vph)	0	11	0	0	0	46	0	36	0	0	0	0
Lane Group Flow (vph)	0	0	0	356	356	14	5	1887	0	163	1728	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		2.2		41.2	41.2	41.2	1.5	97.5		19.1	115.1	
Effective Green, g (s)		2.2		41.2	41.2	41.2	1.5	97.5		19.1	115.1	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.54		0.11	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		19		384	384	362	14	1817		187	2262	
v/s Ratio Prot		c0.00		c0.21	0.21		0.00	c0.56		c0.09	0.49	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.93	0.93	0.04	0.36	1.04		0.87	0.76	
Uniform Delay, d1		87.8		67.9	67.9	54.0	88.8	41.2		79.2	22.9	
Progression Factor		1.00		1.00	1.00	1.00	1.33	0.70		1.00	1.00	
Incremental Delay, d2		0.1		28.0	28.0	0.0	11.1	29.0		33.0	2.5	
Delay (s)		88.0		96.0	96.0	54.0	129.4	57.9		112.2	25.4	
Level of Service		F		F	F	D	F	E		F	C	
Approach Delay (s)		88.0			92.7			58.1			32.9	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	53.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	450	25	1715	950	2335
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	450	25	1715	950	0	2335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	27	1864	1033	0	2538
RTOR Reduction (vph)	0	15	0	148	0	0
Lane Group Flow (vph)	489	12	1864	885	0	2538
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	31.4	31.4	136.6	136.6		136.6
Effective Green, g (s)	31.4	31.4	136.6	136.6		136.6
Actuated g/C Ratio	0.17	0.17	0.76	0.76		0.76
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	598	276	2685	1201		2685
v/s Ratio Prot	c0.14		0.53			c0.72
v/s Ratio Perm		0.01		0.56		
v/c Ratio	0.82	0.04	0.69	0.74		0.95
Uniform Delay, d1	71.5	61.8	11.1	11.9		18.5
Progression Factor	1.00	1.00	1.00	1.00		0.96
Incremental Delay, d2	8.5	0.1	1.5	4.1		6.1
Delay (s)	80.1	61.9	12.6	15.9		23.9
Level of Service	F	E	B	B		C
Approach Delay (s)	79.1		13.8			23.9
Approach LOS	E		B			C

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2470	2055	740	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2685	2234	804	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.25				0.25	0.25
vC, conflicting volume	3038				3531	1519
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3151				5110	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	25				0	273

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	895	895	895	1489	1549
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	804
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.53	0.53	0.53	0.88	0.91
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	145	2470	2055
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	145	2470	2055	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	158	2685	2234	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	158	2685	2234	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			13.3	90.4	65.1	
Effective Green, g (s)			13.3	90.4	65.1	
Actuated g/C Ratio			0.15	1.00	0.72	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			260	5085	2548	
v/s Ratio Prot			0.09	c0.53	c0.63	
v/s Ratio Perm						
v/c Ratio			0.61	0.53	0.88	
Uniform Delay, d1			36.1	0.0	9.6	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.0	0.1	3.7	
Delay (s)			40.1	0.1	13.3	
Level of Service			D	A	B	
Approach Delay (s)	0.0			2.3	13.3	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	395	300	1435	680	4040
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 161.3
Natural Cycle: 170
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	0	300	0	0	0	0	1435	0	680	4040	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	429	0	326	0	0	0	0	1560	0	739	4391	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	429	0	326	0	0	0	0	1560	0	739	4391	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	25.2		161.3					81.1		37.0	124.1	
Effective Green, g (s)	25.2		161.3					81.1		37.0	124.1	
Actuated g/C Ratio	0.16		1.00					0.50		0.23	0.77	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	536		1583					1779		787	3912	
v/s Ratio Prot	c0.12							0.44		0.22	c0.86	
v/s Ratio Perm			0.21									
v/c Ratio	0.80		0.21					0.88		0.94	1.12	
Uniform Delay, d1	65.6		0.0					35.7		61.0	18.6	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	8.4		0.3					5.2		18.6	59.0	
Delay (s)	74.0		0.3					40.9		79.7	77.6	
Level of Service	E		A					D		E	E	
Approach Delay (s)		42.2			0.0			40.9			77.9	
Approach LOS		D			A			D			E	

Intersection Summary			
HCM 2000 Control Delay	66.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	161.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2025	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2025	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2201	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2201	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.62			
v/s Ratio Perm						
v/c Ratio			0.69			
Uniform Delay, d1			2.1			
Progression Factor			1.00			
Incremental Delay, d2			1.3			
Delay (s)			3.3			
Level of Service			A			
Approach Delay (s)	0.0		3.3			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	1435	2025	0	4340	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	1560	2201	0	4717	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.24			
vC, conflicting volume			3761		3132	780		
vC1, stage 1 conf vol					1560			
vC2, stage 2 conf vol					1572			
vCu, unblocked vol			3761		0	780		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			55		243	338		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	780	780	1101	1101	1572	1572	1572
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1101	1101	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.46	0.46	0.65	0.65	0.92	0.92	0.92
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		87.2%	ICU Level of Service	E
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	60	0	0	120	0	3385	65	0	3825	515
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	65	0	0	130	0	3679	71	0	3864	560
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.26	0.26	0.26	0.26	0.26		0.26					
vC, conflicting volume	5090	7545	1288	4969	8105	1228	4423			3681		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6806	16401	0	6334	18588	1228	4201			3681		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	76	100	100	23	100			100		
cM capacity (veh/h)	0	0	277	0	0	169	9			59		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	65	130	1226	1226	1226	71	1288	1288	1288	560
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	65	130	0	0	0	71	0	0	0	560
cSH	277	169	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.24	0.77	0.72	0.72	0.72	0.04	0.76	0.76	0.76	0.33
Queue Length 95th (ft)	22	124	0	0	0	0	0	0	0	0
Control Delay (s)	21.9	74.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	F								
Approach Delay (s)	21.9	74.7	0.0				0.0			
Approach LOS	C	F								

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		84.3%	ICU Level of Service	E
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	125	150	40	5	115	50	2390	35	115	3220	125
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	150	35	40	5	115	50	2390	35	115	3220	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797		1743	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1797		547	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	136	163	38	43	5	125	54	2516	38	125	3253	136
RTOR Reduction (vph)	0	3	0	0	0	13	0	0	12	0	0	20
Lane Group Flow (vph)	136	198	0	43	5	112	54	2516	26	125	3253	116
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	63.9	9.6	163.1	163.1	20.9	174.4	174.4
Effective Green, g (s)	37.0	37.0		37.0	37.0	63.9	9.6	163.1	163.1	20.9	174.4	174.4
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.27	0.04	0.68	0.68	0.09	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	277		84	287	421	70	3455	1048	154	3695	1088
v/s Ratio Prot		c0.11			0.00		0.03	0.49		c0.07	c0.64	
v/s Ratio Perm	0.10			0.08		0.07			0.02			0.08
v/c Ratio	0.63	0.71		0.51	0.02	0.27	0.77	0.73	0.02	0.81	0.88	0.11
Uniform Delay, d1	95.1	96.5		93.2	86.1	69.5	114.1	24.4	12.5	107.6	24.9	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.71	1.27	56.50	1.00	1.01	1.02
Incremental Delay, d2	5.6	8.4		5.2	0.0	0.3	22.0	0.7	0.0	26.7	3.4	0.2
Delay (s)	100.7	104.9		98.4	86.1	69.9	102.6	31.7	708.0	134.6	28.5	10.1
Level of Service	F	F		F	F	E	F	C	F	F	C	B
Approach Delay (s)		103.2			77.4			43.0			31.6	
Approach LOS		F			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	111.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	305	105	220	35	10	115	230	2145	50	160	2940	365
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	23.0	135.0	135.0	35.0	147.0	147.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	29.2%	29.2%	9.6%	56.3%	56.3%	14.6%	61.3%	61.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	305	105	220	35	10	115	230	2145	50	160	2940	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1796	1533		1793	1583	1770	5085	1551	1770	5085	1560
Flt Permitted		0.75	1.00		0.22	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1396	1533		406	1583	1770	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	332	114	239	38	11	125	250	2332	54	174	2970	397
RTOR Reduction (vph)	0	0	73	0	0	92	0	0	25	0	0	126
Lane Group Flow (vph)	0	446	166	0	49	33	250	2332	29	174	2970	271
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		64.0	64.0		64.0	64.0	17.0	130.2	130.2	26.8	140.0	140.0
Effective Green, g (s)		64.0	64.0		64.0	64.0	17.0	130.2	130.2	26.8	140.0	140.0
Actuated g/C Ratio		0.27	0.27		0.27	0.27	0.07	0.54	0.54	0.11	0.58	0.58
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		372	408		108	422	125	2758	841	197	2966	910
v/s Ratio Prot							c0.14	0.46		0.10	c0.58	
v/s Ratio Perm		c0.32	0.11		0.12	0.02			0.02			0.17
v/c Ratio		1.20	0.41		0.45	0.08	2.00	0.85	0.03	0.88	1.00	0.30
Uniform Delay, d1		88.0	72.4		73.4	65.9	111.5	46.4	25.6	105.1	50.0	25.2
Progression Factor		1.00	1.00		1.00	1.00	0.88	1.03	4.40	1.03	0.80	1.52
Incremental Delay, d2		112.7	0.7		3.0	0.1	471.8	2.7	0.1	21.5	12.5	0.5
Delay (s)		200.7	73.1		76.4	66.0	569.5	50.4	112.8	129.6	52.3	38.8
Level of Service		F	E		E	E	F	D	F	F	D	D
Approach Delay (s)		156.2			68.9			100.9			54.6	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	82.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	114.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2395	3350	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2395	3350	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2603	3384	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2603	3384	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.51	c0.67	
v/s Ratio Perm						
v/c Ratio				0.66	0.86	
Uniform Delay, d1				6.5	9.5	
Progression Factor				1.08	2.29	
Incremental Delay, d2				0.7	1.1	
Delay (s)				7.8	22.8	
Level of Service				A	C	
Approach Delay (s)	0.0			7.8	22.8	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	30	165	15	20	185	1955	35	40	2695	395
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2			6
Detector Phase	4	4	4 5	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0		11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0		14.0	14.0	38.0	153.0	153.0	30.0	145.0	145.0
Total Split (%)	17.9%	17.9%		5.8%	5.8%	15.8%	63.8%	63.8%	12.5%	60.4%	60.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	30	165	25	15	20	185	1955	35	40	2695	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
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)	326	33	179	27	16	22	201	2125	38	43	2929	429
RTOR Reduction (vph)	0	0	32	0	0	21	0	0	12	0	0	171
Lane Group Flow (vph)	179	180	147	0	43	1	201	2125	43	43	2929	258
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2			6
Actuated Green, G (s)	33.0	33.0	69.0		7.7	7.7	30.0	165.2	165.2	9.1	144.3	144.3
Effective Green, g (s)	33.0	33.0	69.0		7.7	7.7	30.0	165.2	165.2	9.1	144.3	144.3
Actuated g/C Ratio	0.14	0.14	0.29		0.03	0.03	0.12	0.69	0.69	0.04	0.60	0.60
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	231	233	411		57	50	221	3500	957	67	3057	809
v/s Ratio Prot	c0.11	0.11			c0.02		c0.11	0.42		0.02	c0.58	
v/s Ratio Perm			0.10			0.00			0.02			0.19
v/c Ratio	0.77	0.77	0.36		0.75	0.01	0.91	0.61	0.03	0.64	0.96	0.32
Uniform Delay, d1	99.9	99.9	67.9		115.2	112.5	103.7	20.0	11.9	113.8	45.0	23.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.91	1.41	68.82	1.11	0.38	2.45
Incremental Delay, d2	14.9	14.6	0.5		38.8	0.0	31.2	0.6	0.0	8.7	5.9	0.6
Delay (s)	114.8	114.5	68.4		154.0	112.5	126.0	29.0	817.6	134.6	23.0	58.3
Level of Service	F	F	E		F	F	F	C	F	F	C	E
Approach Delay (s)		99.3			139.9			49.9			28.9	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	235	75	50	85	405	35	1555	5	420	2200	450
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3		4			2			6
Detector Phase	3	3	3	4	4	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	10.0	10.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	62.0	62.0	62.0	33.0	33.0	27.0	110.0	110.0	35.0	118.0	118.0
Total Split (%)	25.8%	25.8%	25.8%	13.8%	13.8%	11.3%	45.8%	45.8%	14.6%	49.2%	49.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	75	50	10	85	405	35	1555	5	420	2200	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	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)	255	82	54	11	92	440	38	1690	5	457	2391	489
RTOR Reduction (vph)	0	0	47	0	0	358	0	0	2	0	0	124
Lane Group Flow (vph)	166	171	7	0	103	82	38	1690	3	457	2391	365
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	29.3	29.3	29.3		19.0	19.0	9.3	137.7	137.7	29.0	157.4	157.4
Effective Green, g (s)	29.3	29.3	29.3		19.0	19.0	9.3	137.7	137.7	29.0	157.4	157.4
Actuated g/C Ratio	0.12	0.12	0.12		0.08	0.08	0.04	0.57	0.57	0.12	0.66	0.66
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	210	193		146	220	68	2917	908	414	3334	1038
v/s Ratio Prot	0.10	c0.10			c0.06		0.02	0.33		c0.13	c0.47	
v/s Ratio Perm			0.00			0.03			0.00			0.23
v/c Ratio	0.81	0.81	0.03		0.71	0.37	0.56	0.58	0.00	1.10	0.72	0.35
Uniform Delay, d1	102.6	102.7	92.9		107.8	104.8	113.3	32.7	21.8	105.5	26.8	18.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.15	0.53	1.00	1.33	0.23	0.03
Incremental Delay, d2	20.5	20.9	0.1		14.4	1.1	7.8	0.7	0.0	63.1	0.7	0.4
Delay (s)	123.1	123.6	92.9		122.2	105.9	138.4	18.1	21.8	203.0	6.9	1.0
Level of Service	F	F	F		F	F	F	B	C	F	A	A
Approach Delay (s)		119.2			109.0			20.7			32.9	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1755	255
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1755	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	266	332	223	38	375	266	228	1337	43	424	1773	277
RTOR Reduction (vph)	0	0	57	0	0	46	0	0	16	0	0	84
Lane Group Flow (vph)	194	404	166	38	375	220	228	1337	27	424	1773	193
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Effective Green, g (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Actuated g/C Ratio	0.14	0.14	0.22	0.21	0.21	0.35	0.08	0.41	0.62	0.14	0.47	0.47
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	224	467	346	367	386	1032	273	2091	979	473	2387	743
v/s Ratio Prot	c0.12	0.12		0.02	c0.20	0.04	0.07	0.26		c0.12	c0.35	
v/s Ratio Perm			0.10			0.03			0.02			0.12
v/c Ratio	0.87	0.87	0.48	0.10	0.97	0.21	0.84	0.64	0.03	0.90	0.74	0.26
Uniform Delay, d1	101.1	101.1	81.8	77.0	94.4	55.5	108.9	56.4	17.7	101.8	51.8	38.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.68	1.65	2.64
Incremental Delay, d2	26.9	14.9	0.4	0.0	38.0	0.0	18.5	1.5	0.0	14.4	1.5	0.6
Delay (s)	128.0	115.9	82.2	77.1	132.4	55.5	127.4	57.9	17.7	83.9	86.8	102.0
Level of Service	F	F	F	E	F	E	F	E	B	F	F	F
Approach Delay (s)		109.6			99.2			66.7			88.0	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	86.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1540	125	70	1920	40	125	15	50	40	15	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	28.0	28.0	28.0	26.0	26.0	26.0
Total Split (s)	24.0	76.0	76.0	16.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	63.3%	63.3%	13.3%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1540	125	70	1920	40	125	15	50	40	15	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1783	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.74	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1316	1583		1377	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)	207	1674	136	76	2087	43	136	16	54	43	16	158
RTOR Reduction (vph)	0	0	37	0	0	19	0	0	45	0	0	129
Lane Group Flow (vph)	207	1674	99	76	2087	24	0	152	9	0	59	29
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	17.8	75.4	75.4	8.7	68.3	68.3		19.9	19.9		21.9	21.9
Effective Green, g (s)	17.8	75.4	75.4	8.7	68.3	68.3		19.9	19.9		21.9	21.9
Actuated g/C Ratio	0.15	0.63	0.63	0.07	0.57	0.57		0.17	0.17		0.18	0.18
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	262	2223	994	128	2014	900		218	262		251	288
v/s Ratio Prot	c0.12	0.47		0.04	c0.59							
v/s Ratio Perm			0.06			0.02		c0.12	0.01		0.04	0.02
v/c Ratio	0.79	0.75	0.10	0.59	1.04	0.03		0.70	0.03		0.24	0.10
Uniform Delay, d1	49.3	15.7	8.8	53.9	25.9	11.3		47.2	42.0		41.9	40.8
Progression Factor	1.00	1.00	1.00	0.78	0.84	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	14.9	2.4	0.2	2.5	22.5	0.0		9.3	0.1		0.5	0.2
Delay (s)	64.2	18.1	9.0	44.6	44.2	11.3		56.5	42.0		42.4	41.0
Level of Service	E	B	A	D	D	B		E	D		D	D
Approach Delay (s)		22.3			43.6			52.7			41.4	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1295	55	65	1815	50	100	15	20	40	15	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	24.0	75.0	75.0	17.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	62.5%	62.5%	14.2%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1295	55	65	1815	50	100	15	20	40	15	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1785	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.68	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1326	1583		1275	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)	190	1408	60	71	1973	54	109	16	22	43	16	158
RTOR Reduction (vph)	0	0	23	0	0	24	0	0	18	0	0	132
Lane Group Flow (vph)	190	1408	37	71	1973	30	0	125	4	0	59	26
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.4	74.4	74.4	8.1	66.1	66.1		19.5	19.5		19.5	19.5
Effective Green, g (s)	16.4	74.4	74.4	8.1	66.1	66.1		19.5	19.5		19.5	19.5
Actuated g/C Ratio	0.14	0.62	0.62	0.07	0.55	0.55		0.16	0.16		0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	241	2194	981	119	1949	871		215	257		207	257
v/s Ratio Prot	c0.11	0.40		0.04	c0.56							
v/s Ratio Perm			0.02			0.02		c0.09	0.00		0.05	0.02
v/c Ratio	0.79	0.64	0.04	0.60	1.01	0.03		0.58	0.01		0.29	0.10
Uniform Delay, d1	50.1	14.4	8.9	54.4	27.0	12.3		46.5	42.2		44.1	42.8
Progression Factor	1.05	0.74	2.38	1.14	0.74	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	11.1	1.0	0.0	5.3	19.8	0.0		4.0	0.0		0.8	0.2
Delay (s)	64.0	11.6	21.2	67.5	39.7	12.4		50.4	42.2		44.9	42.9
Level of Service	E	B	C	E	D	B		D	D		D	D
Approach Delay (s)		18.0			39.9			49.2			43.5	
Approach LOS		B			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1250	120	1810	115	70
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	28.0	28.0
Total Split (s)	66.0	22.0	88.0	32.0	32.0
Total Split (%)	55.0%	18.3%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1250	95	120	1810	115	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3502		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3502		1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1359	103	130	1967	125	76
RTOR Reduction (vph)	4	0	0	0	0	64
Lane Group Flow (vph)	1458	0	130	1967	125	12
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	68.6		14.1	88.7	19.3	19.3
Effective Green, g (s)	68.6		14.1	88.7	19.3	19.3
Actuated g/C Ratio	0.57		0.12	0.74	0.16	0.16
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2001		207	2615	284	254
v/s Ratio Prot	0.42		0.07	c0.56	c0.07	
v/s Ratio Perm						0.01
v/c Ratio	0.73		0.63	0.75	0.44	0.05
Uniform Delay, d1	18.9		50.5	9.2	45.5	42.6
Progression Factor	0.63		1.20	0.63	1.00	1.00
Incremental Delay, d2	1.9		3.3	1.1	1.1	0.1
Delay (s)	13.8		64.0	7.0	46.6	42.7
Level of Service	B		E	A	D	D
Approach Delay (s)	13.8			10.5	45.1	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1205	65	125	1795	10	95	5	85	10	5	45
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	15.0	73.0	73.0	19.0	77.0	77.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	12.5%	60.8%	60.8%	15.8%	64.2%	64.2%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1205	65	125	1795	10	95	5	85	10	5	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1778	1583		1801	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.82	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1349	1583		1520	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)	49	1310	71	136	1951	11	103	5	92	11	5	49
RTOR Reduction (vph)	0	0	29	0	0	4	0	0	77	0	0	41
Lane Group Flow (vph)	49	1310	42	136	1951	7	0	108	15	0	16	8
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.2	71.0	71.0	12.7	76.5	76.5		19.3	19.3		19.3	19.3
Effective Green, g (s)	7.2	71.0	71.0	12.7	76.5	76.5		19.3	19.3		19.3	19.3
Actuated g/C Ratio	0.06	0.59	0.59	0.11	0.64	0.64		0.16	0.16		0.16	0.16
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	106	2093	936	187	2256	1009		216	254		244	254
v/s Ratio Prot	0.03	0.37		c0.08	c0.55							
v/s Ratio Perm			0.03			0.00		c0.08	0.01		0.01	0.00
v/c Ratio	0.46	0.63	0.04	0.73	0.86	0.01		0.50	0.06		0.07	0.03
Uniform Delay, d1	54.5	15.9	10.3	52.0	17.6	7.9		45.9	42.7		42.7	42.5
Progression Factor	1.03	0.63	0.92	1.17	0.70	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.2	1.0	0.1	9.4	3.3	0.0		1.8	0.1		0.1	0.0
Delay (s)	58.3	11.1	9.6	70.2	15.6	7.9		47.8	42.7		42.8	42.5
Level of Service	E	B	A	E	B	A		D	D		D	D
Approach Delay (s)		12.6			19.1			45.5			42.6	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	79.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1180	120	145	1765	160	105
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	28.0
Total Split (s)	69.0	69.0	22.0	91.0	29.0	29.0
Total Split (%)	57.5%	57.5%	18.3%	75.8%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1180	120	145	1765	160	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1283	130	158	1918	174	114
RTOR Reduction (vph)	0	26	0	0	0	95
Lane Group Flow (vph)	1283	104	158	1918	174	19
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	68.9	68.9	15.1	89.0	20.0	20.0
Effective Green, g (s)	68.9	68.9	15.1	89.0	20.0	20.0
Actuated g/C Ratio	0.57	0.57	0.13	0.74	0.17	0.17
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2031	908	222	2624	295	263
v/s Ratio Prot	0.36		0.09	c0.54	c0.10	
v/s Ratio Perm		0.07				0.01
v/c Ratio	0.63	0.11	0.71	0.73	0.59	0.07
Uniform Delay, d1	17.1	11.6	50.4	8.7	46.2	42.2
Progression Factor	0.63	0.81	1.06	0.96	1.00	1.00
Incremental Delay, d2	1.2	0.2	6.5	1.1	3.0	0.1
Delay (s)	12.0	9.6	60.1	9.6	49.2	42.3
Level of Service	B	A	E	A	D	D
Approach Delay (s)	11.8			13.4	46.5	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1140	100	190	1665	15	120	25	120	25	5	125
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	28.0	58.0	58.0	32.0	62.0	62.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	23.3%	48.3%	48.3%	26.7%	51.7%	51.7%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1140	100	190	1665	15	120	25	120	25	5	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1789	1583		1787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.69	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1379	1583		1291	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)	54	1239	109	207	1810	16	130	27	130	27	5	136
RTOR Reduction (vph)	0	0	39	0	0	6	0	0	108	0	0	113
Lane Group Flow (vph)	54	1239	70	207	1810	10	0	157	22	0	32	23
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.9	62.5	62.5	19.2	73.8	73.8		20.3	20.3		20.3	20.3
Effective Green, g (s)	7.9	62.5	62.5	19.2	73.8	73.8		20.3	20.3		20.3	20.3
Actuated g/C Ratio	0.07	0.52	0.52	0.16	0.61	0.61		0.17	0.17		0.17	0.17
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	116	1843	824	283	2176	973		233	267		218	267
v/s Ratio Prot	0.03	0.35		c0.12	c0.51							
v/s Ratio Perm			0.04			0.01		c0.11	0.01		0.02	0.01
v/c Ratio	0.47	0.67	0.08	0.73	0.83	0.01		0.67	0.08		0.15	0.09
Uniform Delay, d1	54.0	21.2	14.4	47.9	18.2	8.9		46.7	42.0		42.5	42.0
Progression Factor	1.02	0.76	0.92	0.81	1.32	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	1.6	0.2	3.3	1.4	0.0		7.5	0.1		0.3	0.1
Delay (s)	57.6	17.7	13.4	42.3	25.4	9.0		54.2	42.1		42.8	42.2
Level of Service	E	B	B	D	C	A		D	D		D	D
Approach Delay (s)		18.9			27.0			48.7			42.3	
Approach LOS		B			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	79.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1060	55	555	1760	75	80	65	285	65	60	35
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	26.0	55.0	55.0	36.0	65.0	65.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	21.7%	45.8%	45.8%	30.0%	54.2%	54.2%	24.2%	24.2%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1060	55	555	1760	75	80	65	285	65	60	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1331	1863	1583	1324	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	1152	60	603	1913	82	87	71	310	71	65	38
RTOR Reduction (vph)	0	0	32	0	0	37	0	0	261	0	0	32
Lane Group Flow (vph)	185	1152	28	603	1913	45	87	71	49	71	65	6
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	17.1	56.9	56.9	26.0	65.8	65.8	19.1	19.1	19.1	19.1	19.1	19.1
Effective Green, g (s)	17.1	56.9	56.9	26.0	65.8	65.8	19.1	19.1	19.1	19.1	19.1	19.1
Actuated g/C Ratio	0.14	0.47	0.47	0.22	0.55	0.55	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	252	1678	750	743	1940	868	211	296	251	210	296	251
v/s Ratio Prot	0.10	0.33		c0.18	c0.54			0.04			0.03	
v/s Ratio Perm			0.02			0.03	c0.07		0.03	0.05		0.00
v/c Ratio	0.73	0.69	0.04	0.81	0.99	0.05	0.41	0.24	0.20	0.34	0.22	0.02
Uniform Delay, d1	49.3	24.6	16.9	44.7	26.6	12.6	45.4	44.1	43.8	44.8	44.0	42.6
Progression Factor	0.76	1.18	1.00	1.17	0.53	0.36	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.3	1.8	0.1	2.5	9.3	0.0	1.3	0.4	0.4	1.0	0.4	0.0
Delay (s)	45.6	30.7	17.0	54.6	23.4	4.6	46.7	44.5	44.2	45.8	44.3	42.6
Level of Service	D	C	B	D	C	A	D	D	D	D	D	D
Approach Delay (s)		32.1			30.0			44.7			44.6	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	84.2%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL
Lane Configurations			
Volume (vph)	1395	2310	95
Turn Type	NA	NA	NA
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0
Total Split (s)	89.0	89.0	31.0
Total Split (%)	74.2%	74.2%	25.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1395	35	0	2310	95	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3526			3539	1753	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3526			3539	1753	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1516	38	0	2511	103	16
RTOR Reduction (vph)	1	0	0	0	5	0
Lane Group Flow (vph)	1553	0	0	2511	114	0
Turn Type	NA		Perm	NA	NA	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	88.8			88.8	19.2	
Effective Green, g (s)	88.8			88.8	19.2	
Actuated g/C Ratio	0.74			0.74	0.16	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2609			2618	280	
v/s Ratio Prot	0.44			c0.71	c0.07	
v/s Ratio Perm						
v/c Ratio	0.60			0.96	0.41	
Uniform Delay, d1	7.2			14.0	45.3	
Progression Factor	2.56			2.31	1.00	
Incremental Delay, d2	0.3			1.3	4.3	
Delay (s)	18.9			33.5	49.6	
Level of Service	B			C	D	
Approach Delay (s)	18.9			33.5	49.6	
Approach LOS	B			C	D	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	115	1305	210	2065	490	75	60	595	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	28.0
Total Split (s)	20.0	54.0	26.0	60.0		12.0	12.0	28.0	40.0
Total Split (%)	16.7%	45.0%	21.7%	50.0%		10.0%	10.0%	23.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 160
Control Type: Actuated-Coordinated

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1305	0	210	2065	490	0	75	60	595	5	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1863	1583	3433	1588	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1863	1583	3433	1588	
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)	125	1418	0	228	2245	533	0	82	65	647	5	266
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	62	0	183	0
Lane Group Flow (vph)	125	1418	0	228	2245	474	0	82	3	647	88	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	12.8	50.0		19.0	56.2	96.2		6.0	6.0	22.0	34.0	
Effective Green, g (s)	12.8	50.0		19.0	56.2	96.2		6.0	6.0	22.0	34.0	
Actuated g/C Ratio	0.11	0.42		0.16	0.47	0.80		0.05	0.05	0.18	0.28	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	188	1474		280	1657	1269		93	79	629	449	
v/s Ratio Prot	0.07	0.40		c0.13	c0.63			c0.04		c0.19	0.06	
v/s Ratio Perm						0.30			0.00			
v/c Ratio	0.66	0.96		0.81	1.35	0.37		0.88	0.04	1.03	0.19	
Uniform Delay, d1	51.5	34.1		48.8	31.9	3.4		56.6	54.3	49.0	32.6	
Progression Factor	1.08	0.88		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.0	13.9		16.4	163.7	0.2		56.5	0.2	43.4	0.2	
Delay (s)	62.5	44.0		65.2	195.6	3.6		113.2	54.5	92.4	32.8	
Level of Service	E	D		E	F	A		F	D	F	C	
Approach Delay (s)		45.5			151.7			87.2			74.8	
Approach LOS		D			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	108.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	170	5	75	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	185	5	82	114

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	190	196
Volume Left (vph)	0	185	82
Volume Right (vph)	43	0	114
Hadj (s)	-0.45	0.23	-0.23
Departure Headway (s)	4.1	4.6	4.2
Degree Utilization, x	0.06	0.25	0.23
Capacity (veh/h)	820	739	805
Control Delay (s)	7.4	9.1	8.5
Approach Delay (s)	7.4	9.1	8.5
Approach LOS	A	A	A

Intersection Summary			
Delay		8.6	
Level of Service		A	
Intersection Capacity Utilization		33.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	1970	680	1765
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Natural Cycle: 170
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1970	0	680	1765	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2141	0	739	1918	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2141	0	739	1918	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	76.0		52.0	140.0		
Effective Green, g (s)	76.0		52.0	140.0		
Actuated g/C Ratio	0.54		0.37	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1921		657	3539		
v/s Ratio Prot	c0.60		c0.42	0.54		
v/s Ratio Perm						
v/c Ratio	1.11		1.12	0.54		
Uniform Delay, d1	32.0		44.0	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	59.4		74.7	0.2		
Delay (s)	91.4		118.7	0.2		
Level of Service	F		F	A		
Approach Delay (s)	91.4			33.1	0.0	
Approach LOS	F			C	A	

Intersection Summary			
HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	915	1600	2490	550
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	915	1600	2490	550	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	995	1739	2707	598	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	995	1739	2707	598	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	33.0	120.0	76.0	120.0		
Effective Green, g (s)	33.0	120.0	76.0	120.0		
Actuated g/C Ratio	0.28	1.00	0.63	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	486	3539	2241	1583		
v/s Ratio Prot	c0.56	0.49	c0.76			
v/s Ratio Perm				0.38		
v/c Ratio	2.05	0.49	1.21	0.38		
Uniform Delay, d1	43.5	0.0	22.0	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	478.4	0.1	98.0	0.7		
Delay (s)	521.9	0.1	120.0	0.7		
Level of Service	F	A	F	A		
Approach Delay (s)		190.0	98.4		0.0	
Approach LOS		F	F		A	

Intersection Summary			
HCM 2000 Control Delay	139.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	127.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	1275	915	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1386	995	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1011				1750	505
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1011				1750	505
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				71	82
cM capacity (veh/h)	681				74	512

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	693	693	663	348	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	681	1700	1700	1700	1700	74	512
Volume to Capacity	0.04	0.41	0.41	0.39	0.20	0.29	0.18
Queue Length 95th (ft)	3	0	0	0	0	27	16
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	73.0	13.6
Lane LOS	B					F	B
Approach Delay (s)	0.2			0.0		24.9	
Approach LOS						C	

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		45.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	135	950	45	5	725	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	1033	49	5	788	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	799			1082			1848	2160	541	1620	2179	399
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	799			1082			1848	2160	541	1620	2179	399
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			19	100	99	100	100	85
cM capacity (veh/h)	819			641			33	38	486	58	37	600

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	147	688	393	5	525	274	33	0	92
Volume Left	147	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	819	1700	1700	641	1700	1700	40	1700	600
Volume to Capacity	0.18	0.40	0.23	0.01	0.31	0.16	0.82	0.00	0.15
Queue Length 95th (ft)	16	0	0	1	0	0	77	0	14
Control Delay (s)	10.3	0.0	0.0	10.7	0.0	0.0	244.3	0.0	12.1
Lane LOS	B			B			F	A	B
Approach Delay (s)	1.2			0.1			244.3	12.1	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.9	
Intersection Capacity Utilization		44.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	770	40	5	650	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	837	43	5	707	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	717			880			1609	1902	440	1459	1918	359
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	717			880			1609	1902	440	1459	1918	359
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			59	90	100	100	100	89
cM capacity (veh/h)	879			763			53	56	565	72	54	638

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	558	322	5	471	246	27	0	71
Volume Left	158	0	0	5	0	0	22	0	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	879	1700	1700	763	1700	1700	54	1700	638
Volume to Capacity	0.18	0.33	0.19	0.01	0.28	0.14	0.51	0.00	0.11
Queue Length 95th (ft)	16	0	0	1	0	0	48	0	9
Control Delay (s)	10.0	0.0	0.0	9.7	0.0	0.0	127.0	0.0	11.3
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.5			0.1			127.0	11.3	
Approach LOS							F	B	

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		39.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	620	25	5	550	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	674	27	5	598	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	609			701			1361	1557	351	1201	1565	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	609			701			1361	1557	351	1201	1565	304
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			99			80	100	100	100	100	83
cM capacity (veh/h)	966			892			80	97	646	126	95	692

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	449	252	5	399	210	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	966	1700	1700	892	1700	1700	80	1700	692
Volume to Capacity	0.13	0.26	0.15	0.01	0.23	0.12	0.20	0.00	0.17
Queue Length 95th (ft)	11	0	0	0	0	0	18	0	15
Control Delay (s)	9.3	0.0	0.0	9.1	0.0	0.0	61.2	0.0	11.2
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.4			0.1			61.2	11.2	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		35.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	485	45	0	430	15	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	527	49	0	467	16	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			576			1043	1242	288	954	1258	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			576			1043	1242	288	954	1258	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			26	90	100	100	82	95
cM capacity (veh/h)	1075			993			140	157	709	182	153	759

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	103	351	225	0	312	172	120	0	27	38
Volume Left	103	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	16	0	0	0	38
cSH	1075	1700	1700	1700	1700	1700	142	1700	153	759
Volume to Capacity	0.10	0.21	0.13	0.00	0.18	0.10	0.84	0.00	0.18	0.05
Queue Length 95th (ft)	8	0	0	0	0	0	136	0	16	4
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	0.0	99.3	0.0	33.5	10.0
Lane LOS	A						F	A	D	A
Approach Delay (s)	1.3			0.0			99.3		19.8	
Approach LOS							F		C	

Intersection Summary			
Average Delay		10.4	
Intersection Capacity Utilization		40.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	190	100	65	165	140	90	0	60	205	5	190
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	207	109	71	179	152	98	0	65	223	5	207
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332			315			1125	1158	158	989	1136	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			315			1125	1158	158	989	1136	166
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			94			0	100	92	0	97	76
cM capacity (veh/h)	1225			1242			98	152	860	154	157	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	212	138	178	71	120	212	163	228	207
Volume Left	212	0	0	71	0	0	98	223	0
Volume Right	0	0	109	0	0	152	65	0	207
cSH	1225	1700	1700	1242	1700	1700	152	154	849
Volume to Capacity	0.17	0.08	0.10	0.06	0.07	0.12	1.08	1.48	0.24
Queue Length 95th (ft)	16	0	0	5	0	0	214	374	24
Control Delay (s)	8.6	0.0	0.0	8.1	0.0	0.0	154.1	300.8	10.6
Lane LOS	A			A			F	F	B
Approach Delay (s)	3.4			1.4			154.1	163.0	
Approach LOS							F	F	

Intersection Summary			
Average Delay		64.4	
Intersection Capacity Utilization		47.1%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	105	340	10	15	275	75	5	0	15	75	10	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	370	11	16	299	82	5	0	16	82	11	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	380			380			883	1016	190	802	981	190
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	380			380			883	1016	190	802	981	190
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			97	100	98	67	95	89
cM capacity (veh/h)	1175			1175			188	210	819	247	221	819

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	114	246	134	16	199	181	22	92	92
Volume Left	114	0	0	16	0	0	5	82	0
Volume Right	0	0	11	0	0	82	16	0	92
cSH	1175	1700	1700	1175	1700	1700	445	244	819
Volume to Capacity	0.10	0.14	0.08	0.01	0.12	0.11	0.05	0.38	0.11
Queue Length 95th (ft)	8	0	0	1	0	0	4	42	9
Control Delay (s)	8.4	0.0	0.0	8.1	0.0	0.0	13.5	28.5	10.0
Lane LOS	A			A			B	D	A
Approach Delay (s)	1.9			0.3			13.5	19.2	
Approach LOS							B	C	

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		37.2%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	325	10	15	285	100	5	0	15	100	10	100
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	353	11	16	310	109	5	0	16	109	11	109
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	418			364			856	1005	182	785	957	209
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	418			364			856	1005	182	785	957	209
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			99			97	100	98	58	95	86
cM capacity (veh/h)	1137			1191			194	216	829	256	231	797

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	236	129	16	207	212	22	120	109
Volume Left	98	0	0	16	0	0	5	109	0
Volume Right	0	0	11	0	0	109	16	0	109
cSH	1137	1700	1700	1191	1700	1700	455	254	797
Volume to Capacity	0.09	0.14	0.08	0.01	0.12	0.12	0.05	0.47	0.14
Queue Length 95th (ft)	7	0	0	1	0	0	4	59	12
Control Delay (s)	8.5	0.0	0.0	8.1	0.0	0.0	13.3	31.2	10.2
Lane LOS	A			A			B	D	B
Approach Delay (s)	1.8			0.3			13.3	21.2	
Approach LOS							B	C	

Intersection Summary			
Average Delay		5.3	
Intersection Capacity Utilization		38.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	435	380	195	190	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	473	413	212	207	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	625				897	413
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	625				897	413
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				33	97
cM capacity (veh/h)	956				309	639

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	5	473	413	212	223
Volume Left	5	0	0	0	207
Volume Right	0	0	0	212	16
cSH	956	1700	1700	1700	333
Volume to Capacity	0.01	0.28	0.24	0.12	0.67
Queue Length 95th (ft)	0	0	0	0	114
Control Delay (s)	8.8	0.0	0.0	0.0	35.4
Lane LOS	A				E
Approach Delay (s)	0.1		0.0		35.4
Approach LOS					E

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	430	0	435	505	595	555	850
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	51.0	82.0	31.0	
Total Split (%)	31.7%	31.7%	31.7%	42.5%	68.3%	25.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 99.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	430	0	435	505	595	0	0	555	850
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1547	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1547	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	467	0	473	549	647	0	0	603	924
RTOR Reduction (vph)	0	0	0	0	0	221	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	233	234	252	549	647	0	0	603	924
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				23.2	23.2	23.2	35.7	64.1			22.4	99.3
Effective Green, g (s)				23.2	23.2	23.2	35.7	64.1			22.4	99.3
Actuated g/C Ratio				0.23	0.23	0.23	0.36	0.65			0.23	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				392	392	361	636	2284			798	1583
v/s Ratio Prot							c0.31	0.18			c0.17	
v/s Ratio Perm				0.14	0.14	0.16						c0.58
v/c Ratio				0.59	0.60	0.70	0.86	0.28			0.76	0.58
Uniform Delay, d1				33.9	33.9	34.8	29.5	7.6			35.9	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				2.4	2.4	5.8	11.7	0.1			4.1	1.6
Delay (s)				36.3	36.3	40.6	41.2	7.7			40.0	1.6
Level of Service				D	D	D	D	A			D	A
Approach Delay (s)		0.0			38.5			23.1			16.8	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	99.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	385	425	190	570
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	63.0	63.0	49.0	38.0	87.0
Total Split (%)	42.0%	42.0%	32.7%	25.3%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 110.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	10	385	0	0	0	0	425	220	190	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3327		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3327		1770	3539	
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)	527	11	418	0	0	0	0	462	239	207	620	0
RTOR Reduction (vph)	0	0	151	0	0	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	538	267	0	0	0	0	656	0	207	620	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		41.9	41.9					30.6		19.5	56.1	
Effective Green, g (s)		41.9	41.9					30.6		19.5	56.1	
Actuated g/C Ratio		0.38	0.38					0.28		0.18	0.51	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		676	595					925		313	1804	
v/s Ratio Prot								c0.20		c0.12	0.18	
v/s Ratio Perm		0.30	0.17									
v/c Ratio		0.80	0.45					0.71		0.66	0.34	
Uniform Delay, d1		30.3	25.4					35.7		42.2	16.0	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		6.5	0.5					2.5		5.2	0.1	
Delay (s)		36.7	26.0					38.2		47.3	16.1	
Level of Service		D	C					D		D	B	
Approach Delay (s)		32.0			0.0			38.2			23.9	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	1190	1300	350	300	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 115.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	1190	1300	350	300	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.09	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	166	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1293	1413	380	326	103
RTOR Reduction (vph)	0	0	0	177	0	27
Lane Group Flow (vph)	43	1293	1413	203	326	76
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	61.0	61.0	61.0	61.0	42.5	42.5
Effective Green, g (s)	61.0	61.0	61.0	61.0	42.5	42.5
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.37	0.37
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	87	1869	1869	836	651	582
v/s Ratio Prot		0.37	c0.40		c0.18	
v/s Ratio Perm	0.26			0.13		0.05
v/c Ratio	0.49	0.69	0.76	0.24	0.50	0.13
Uniform Delay, d1	17.4	20.3	21.4	14.8	28.3	24.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4	1.1	1.8	0.2	2.7	0.5
Delay (s)	21.8	21.4	23.2	14.9	31.0	24.7
Level of Service	C	C	C	B	C	C
Approach Delay (s)		21.4	21.4		29.5	
Approach LOS		C	C		C	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2035 with Mitigation AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1495	0	180	645	350	895	60
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	57.0	57.0	57.0	36.0	83.0	47.0	47.0
Total Split (%)	40.7%	40.7%	40.7%	25.7%	59.3%	33.6%	33.6%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	53.6	53.6	53.6	29.6	74.4	39.8	39.8
Actuated g/C Ratio	0.38	0.38	0.38	0.21	0.53	0.28	0.28
v/c Ratio	0.82	0.81	0.27	0.90	0.36	0.90	0.13
Control Delay	46.1	51.1	4.8	43.1	32.5	60.8	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	51.1	4.8	43.1	32.5	60.8	9.7
LOS	D	D	A	D	C	E	A
Approach Delay		42.8			39.4	57.4	
Approach LOS		D			D	E	

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 45.7 — Intersection LOS: D
Intersection Capacity Utilization 84.9% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1495	0	180	645	350	0	0	895	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.91	0.91	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3221	1610	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				3221	1610	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1510	0	196	652	354	0	0	904	65
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	0	0	0	44
Lane Group Flow (vph)	0	0	0	1012	498	75	652	354	0	0	904	21
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				53.6	53.6	53.6	29.6	74.4			39.8	39.8
Effective Green, g (s)				53.6	53.6	53.6	29.6	74.4			39.8	39.8
Actuated g/C Ratio				0.38	0.38	0.38	0.21	0.53			0.28	0.28
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				1233	616	606	725	990			1006	450
v/s Ratio Prot				c0.31	0.31		c0.19	0.19			c0.26	
v/s Ratio Perm						0.05						0.01
v/c Ratio				0.82	0.81	0.12	0.90	0.36			0.90	0.05
Uniform Delay, d1				38.9	38.6	28.0	53.7	19.0			48.2	36.3
Progression Factor				1.00	1.00	1.00	0.60	1.70			1.00	1.00
Incremental Delay, d2				6.2	7.7	0.4	8.9	0.1			10.6	0.0
Delay (s)				45.1	46.3	28.4	41.2	32.4			58.8	36.4
Level of Service				D	D	C	D	C			E	D
Approach Delay (s)		0.0			43.5			38.1			57.3	
Approach LOS		A			D			D			E	

Intersection Summary

HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	605	1020	1935	425	1965
Turn Type	NA	Prot	NA	Free	Prot	NA
Protected Phases	4	4	2		1	6
Permitted Phases				Free		
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	30.0		4.0	30.0
Minimum Split (s)	10.0	10.0	36.0		10.0	36.0
Total Split (s)	40.0	40.0	53.0		47.0	100.0
Total Split (%)	28.6%	28.6%	37.9%		33.6%	71.4%
Yellow Time (s)	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		None	C-Max
Act Effct Green (s)	33.2	33.2	50.4	140.0	39.4	94.8
Actuated g/C Ratio	0.24	0.24	0.36	1.00	0.28	0.68
v/c Ratio	0.06	0.93	0.81	0.70	0.93	0.58
Control Delay	41.4	67.8	47.2	1.5	71.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	41.4	67.8	47.2	1.5	71.6	6.0
LOS	D	E	D	A	E	A
Approach Delay	66.8		17.3			18.4
Approach LOS	E		B			B

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 23.3 — Intersection LOS: C
Intersection Capacity Utilization 84.9% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	5	605	0	0	0	0	1020	1935	425	1965	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	0.88					0.95	0.88	1.00	0.91	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790	2787					3539	2787	1770	5085	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1790	2787					3539	2787	1770	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99	0.92	0.99	0.92
Adj. Flow (vph)	22	5	658	0	0	0	0	1030	1955	462	1985	0
RTOR Reduction (vph)	0	0	47	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	611	0	0	0	0	1030	1955	462	1985	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		33.2	33.2					50.4	140.0	39.4	94.8	
Effective Green, g (s)		33.2	33.2					50.4	140.0	39.4	94.8	
Actuated g/C Ratio		0.24	0.24					0.36	1.00	0.28	0.68	
Clearance Time (s)		6.0	6.0					6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		424	660					1274	2787	498	3443	
v/s Ratio Prot			c0.22					c0.29		c0.26	0.39	
v/s Ratio Perm		0.02							0.70			
v/c Ratio		0.06	0.93					0.81	0.70	0.93	0.58	
Uniform Delay, d1		41.4	52.2					40.4	0.0	48.9	12.0	
Progression Factor		1.00	1.00					1.00	1.00	1.14	0.45	
Incremental Delay, d2		0.1	18.9					5.6	1.5	14.9	0.4	
Delay (s)		41.4	71.1					46.0	1.5	70.6	5.7	
Level of Service		D	E					D	A	E	A	
Approach Delay (s)		69.9			0.0			16.9			18.0	
Approach LOS		E			A			B			B	

Intersection Summary

HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	3050	2520	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	38	0	3081	2545	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.82	0.79	0.79			
vC, conflicting volume	3316	848	2600			
vC1, stage 1 conf vol	2545					
vC2, stage 2 conf vol	770					
vCu, unblocked vol	810	0	2099			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	96	100			
cM capacity (veh/h)	-56	858	205			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	38	770	770	770	770	848	848	848	54
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	0	54
cSH	858	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.45	0.45	0.45	0.45	0.50	0.50	0.50	0.03
Queue Length 95th (ft)	3	0	0	0	0	0	0	0	0
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A								
Approach Delay (s)	9.4	0.0				0.0			
Approach LOS	A								

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		58.7%	ICU Level of Service	B
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	820	120	225	455	730	345	1890	410	735	1555	265
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	54.0		10.0	54.0		9.0	54.0		9.0	54.0	
Total Split (s)	28.0	55.0		27.0	54.0		35.0	77.0		41.0	83.0	
Total Split (%)	14.0%	27.5%		13.5%	27.0%		17.5%	38.5%		20.5%	41.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	21.4	48.9	79.9	18.5	46.0	86.2	26.1	71.1	95.6	35.2	80.2	107.6
Actuated g/C Ratio	0.11	0.25	0.41	0.09	0.23	0.44	0.13	0.36	0.49	0.18	0.41	0.55
v/c Ratio	0.88	0.71	0.19	0.76	0.42	0.63	0.83	0.89	0.55	0.89	0.65	0.32
Control Delay	104.6	71.2	16.1	102.6	65.2	40.8	98.9	65.2	32.5	92.3	49.0	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.6	71.2	16.1	102.6	65.2	40.8	98.9	65.2	32.5	92.3	49.0	21.1
LOS	F	E	B	F	E	D	F	E	C	F	D	C
Approach Delay		77.0			58.5			64.5			58.6	
Approach LOS		E			E			E			E	

Intersection Summary		
Cycle Length: 200		
Actuated Cycle Length: 196.7		
Natural Cycle: 160		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 63.7	Intersection LOS: E	
Intersection Capacity Utilization 82.8%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	820	120	225	455	730	345	1890	410	735	1555	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.91	1.00	0.97	0.91	0.88	0.97	0.86	1.00	0.94	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	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)	478	891	130	245	495	793	375	2054	446	799	1690	288
RTOR Reduction (vph)	0	0	45	0	0	42	0	0	36	0	0	26
Lane Group Flow (vph)	478	891	85	245	495	751	375	2054	410	799	1690	262
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	21.4	48.9	81.0	18.5	46.0	87.2	26.1	71.1	95.6	35.2	80.2	107.6
Effective Green, g (s)	21.4	48.9	81.0	18.5	46.0	87.2	26.1	71.1	95.6	35.2	80.2	107.6
Actuated g/C Ratio	0.11	0.25	0.41	0.09	0.23	0.44	0.13	0.36	0.49	0.18	0.41	0.55
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	542	1264	651	322	1189	1235	455	2316	769	892	2612	865
v/s Ratio Prot	c0.10	c0.18		0.07	0.10		0.11	c0.32		c0.16	0.26	
v/s Ratio Perm			0.05			0.27			0.26			0.17
v/c Ratio	0.88	0.70	0.13	0.76	0.42	0.61	0.82	0.89	0.53	0.90	0.65	0.30
Uniform Delay, d1	86.4	67.3	36.0	86.9	64.0	41.7	83.1	59.0	35.1	79.0	46.9	24.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.5	1.8	0.1	10.1	0.2	0.9	11.5	4.5	0.7	11.5	0.6	0.2
Delay (s)	101.9	69.1	36.1	97.1	64.2	42.6	94.6	63.5	35.8	90.4	47.4	24.4
Level of Service	F	E	D	F	E	D	F	E	D	F	D	C
Approach Delay (s)		76.7			58.3			63.3			57.4	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	62.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	196.7	Sum of lost time (s)	23.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	110	175	30	65	375	80	2300	65	225	1375	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	23.0	51.0		11.0	39.0		14.0	115.0		23.0	124.0	
Total Split (%)	11.5%	25.5%		5.5%	19.5%		7.0%	57.5%		11.5%	62.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	16.3	43.0	56.6	5.0	31.7	54.2	8.7	105.5	116.5	16.4	114.3	136.6
Actuated g/C Ratio	0.08	0.22	0.29	0.03	0.16	0.28	0.04	0.54	0.60	0.08	0.59	0.70
v/c Ratio	0.82	0.29	0.37	0.38	0.23	0.81	0.57	0.72	0.07	0.84	0.40	0.31
Control Delay	109.6	65.9	32.7	108.1	74.3	66.2	107.5	34.7	0.5	112.5	21.8	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	109.6	65.9	32.7	108.1	74.3	66.2	107.5	34.7	0.5	112.5	21.8	1.4
LOS	F	E	C	F	E	E	F	C	A	F	C	A
Approach Delay		73.1			70.0			36.2			28.6	
Approach LOS		E			E			D			C	

Intersection Summary			
Cycle Length: 200			
Actuated Cycle Length: 194			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 39.8		Intersection LOS: D	
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	110	175	30	65	375	80	2300	65	225	1375	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	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)	234	120	190	33	71	408	87	2500	71	245	1495	386
RTOR Reduction (vph)	0	0	58	0	0	59	0	0	28	0	0	114
Lane Group Flow (vph)	234	120	132	33	71	349	87	2500	43	245	1495	272
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	16.3	43.0	57.7	5.0	31.7	54.1	8.7	105.6	116.6	16.4	114.3	136.6
Effective Green, g (s)	16.3	43.0	57.7	5.0	31.7	54.1	8.7	105.6	116.6	16.4	114.3	136.6
Actuated g/C Ratio	0.08	0.22	0.30	0.03	0.16	0.28	0.04	0.54	0.60	0.08	0.59	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	288	412	470	88	304	441	153	3488	951	290	3775	1114
v/s Ratio Prot	c0.07	0.06		0.01	0.04		0.03	c0.39		c0.07	0.23	
v/s Ratio Perm			0.08			c0.22			0.03			0.17
v/c Ratio	0.81	0.29	0.28	0.38	0.23	0.79	0.57	0.72	0.04	0.84	0.40	0.24
Uniform Delay, d1	87.3	62.8	52.3	93.0	70.6	64.7	90.8	33.0	15.9	87.5	21.4	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.9	0.4	0.3	2.7	0.4	9.4	4.8	0.7	0.0	19.6	0.1	0.1
Delay (s)	103.2	63.2	52.6	95.6	71.0	74.1	95.6	33.7	15.9	107.2	21.4	10.4
Level of Service	F	E	D	F	E	E	F	C	B	F	C	B
Approach Delay (s)		76.7			75.0			35.3			29.3	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	194.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBT	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations									
Volume (vph)	40	0	715	1785	135	210	1215	125	
Turn Type	Free	NA	custom	NA	Perm	Prot	NA	Perm	
Protected Phases		8		2		1	6		3
Permitted Phases	Free		3 1		2			6	
Detector Phase		8	3 1	2	2	1	6	6	
Switch Phase									
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)		28.0		37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)		38.0		60.0	60.0	22.0	82.0	82.0	38.0
Total Split (%)		31.7%		50.0%	50.0%	18.3%	68.3%	68.3%	32%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lag	Lag	Lead			
Lead-Lag Optimize?									
Recall Mode		None		Min	Min	None	Min	Min	None
Act Effct Green (s)	116.6	32.0	51.1	53.5	53.5	13.0	72.6	72.6	
Actuated g/C Ratio	1.00	0.27	0.44	0.46	0.46	0.11	0.62	0.62	
v/c Ratio	0.03	0.87	0.65	0.83	0.18	0.60	0.42	0.13	
Control Delay	0.0	47.8	29.3	31.8	3.6	56.0	11.7	1.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	0.0	47.8	29.3	31.8	3.6	56.0	11.7	1.7	
LOS	A	D	C	C	A	E	B	A	
Approach Delay		38.7		29.8			16.9		
Approach LOS		D		C			B		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.6	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 26.6	Intersection LOS: C
Intersection Capacity Utilization 75.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	100	0	715	0	1785	135	210	1215	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00		0.95	0.95		0.91	1.00	0.97	0.91	1.00
Frt			0.86		0.89	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00		0.99	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611		1550	1504		5085	1583	3433	5085	1583
Flt Permitted			1.00		0.99	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611		1550	1504		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	109	0	777	0	1940	147	228	1321	136
RTOR Reduction (vph)	0	0	0	0	93	15	0	0	79	0	0	51
Lane Group Flow (vph)	0	0	43	0	358	420	0	1940	68	228	1321	85
Turn Type			Free	Prot	NA	custom		NA	Perm	Prot	NA	Perm
Protected Phases				3	8			2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			116.6		32.0	51.0		53.6	53.6	13.0	72.6	72.6
Effective Green, g (s)			116.6		32.0	51.0		53.6	53.6	13.0	72.6	72.6
Actuated g/C Ratio			1.00		0.27	0.44		0.46	0.46	0.11	0.62	0.62
Clearance Time (s)					6.0			6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)					3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611		425	657		2337	727	382	3166	985
v/s Ratio Prot					c0.23			c0.38		0.07	0.26	
v/s Ratio Perm			0.03			c0.28			0.04			0.05
v/c Ratio			0.03		0.84	0.64		0.83	0.09	0.60	0.42	0.09
Uniform Delay, d1			0.0		39.9	25.6		27.5	17.8	49.3	11.2	8.8
Progression Factor			1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0		14.1	2.0		2.6	0.1	2.5	0.1	0.0
Delay (s)			0.0		54.0	27.7		30.2	17.8	51.8	11.3	8.8
Level of Service			A		D	C		C	B	D	B	A
Approach Delay (s)		0.0			41.1			29.3			16.6	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	116.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	210	215	830	185	835	320	875	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	26.0	40.0		26.0	40.0		24.0	51.0	33.0	60.0	
Total Split (%)	17.3%	26.7%		17.3%	26.7%		16.0%	34.0%	22.0%	40.0%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	
Act Effct Green (s)	14.3	33.3	51.5	14.3	33.3	59.4	13.2	45.2	21.1	53.1	72.4
Actuated g/C Ratio	0.11	0.24	0.38	0.11	0.24	0.44	0.10	0.33	0.16	0.39	0.53
v/c Ratio	0.63	0.67	0.28	0.63	0.51	0.71	0.60	0.64	0.65	0.48	0.19
Control Delay	67.3	55.9	15.5	67.3	50.4	31.5	67.6	40.7	60.4	32.8	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	55.9	15.5	67.3	50.4	31.5	67.6	40.7	60.4	32.8	2.7
LOS	E	E	B	E	D	C	E	D	E	C	A
Approach Delay		49.1			40.7			45.0		35.8	
Approach LOS		D			D			D		D	

Intersection Summary	
Cycle Length: 150	
Actuated Cycle Length: 136	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 41.6	Intersection LOS: D
Intersection Capacity Utilization 86.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	210	215	830	185	835	140	320	875	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	0.88	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	2787	3433	4976		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	2787	3433	4976		3433	5085	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)	228	304	185	228	234	902	201	908	152	348	951	174
RTOR Reduction (vph)	0	0	58	0	0	51	0	15	0	0	0	80
Lane Group Flow (vph)	228	304	127	228	234	851	201	1045	0	348	951	94
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	14.3	33.3	52.5	14.3	33.3	60.4	13.2	45.2		21.1	53.1	73.4
Effective Green, g (s)	14.3	33.3	52.5	14.3	33.3	60.4	13.2	45.2		21.1	53.1	73.4
Actuated g/C Ratio	0.11	0.25	0.39	0.11	0.25	0.44	0.10	0.33		0.16	0.39	0.54
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	361	456	611	361	456	1238	333	1655		533	1986	854
v/s Ratio Prot	c0.07	0.16		0.07	0.13		0.06	c0.21		0.10	0.19	
v/s Ratio Perm			0.08			c0.31						0.06
v/c Ratio	0.63	0.67	0.21	0.63	0.51	0.69	0.60	0.63		0.65	0.48	0.11
Uniform Delay, d1	58.3	46.3	27.8	58.3	44.3	30.2	58.8	38.3		54.0	31.0	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.6	3.7	0.2	3.6	1.0	1.6	3.1	0.8		2.9	0.2	0.1
Delay (s)	61.9	50.0	28.0	61.9	45.3	31.8	61.9	39.1		56.8	31.2	15.3
Level of Service	E	D	C	E	D	C	E	D		E	C	B
Approach Delay (s)		48.1			39.1			42.7			35.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	135.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	730	175	35	180	985	325	20	110	35	540	150	430
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		18.0	44.0		28.0	54.0	
Total Split (%)	27.5%	27.5%	27.5%	27.5%	27.5%		11.3%	27.5%		17.5%	33.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	
Act Effct Green (s)	33.9	52.9	52.9	17.8	36.7	63.5	7.6	30.1	54.1	21.6	49.4	89.6
Actuated g/C Ratio	0.23	0.36	0.36	0.12	0.25	0.43	0.05	0.21	0.37	0.15	0.34	0.61
v/c Ratio	0.69	0.15	0.06	0.47	0.84	0.29	0.24	0.17	0.06	0.80	0.14	0.25
Control Delay	55.9	36.5	0.2	65.3	61.3	30.3	79.0	48.5	0.2	71.6	36.0	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	36.5	0.2	65.3	61.3	30.3	79.0	48.5	0.2	71.6	36.0	3.8
LOS	E	D	A	E	E	C	E	D	A	E	D	A
Approach Delay		50.2			55.1			42.0			40.8	
Approach LOS		D			E			D			D	

Intersection Summary		
Cycle Length: 160		
Actuated Cycle Length: 146.4		
Natural Cycle: 145		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.84		
Intersection Signal Delay: 49.0	Intersection LOS: D	
Intersection Capacity Utilization 65.7%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	730	175	35	180	985	325	20	110	35	540	150	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.94	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
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)	793	190	38	196	1071	353	22	120	38	587	163	467
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	24	0	0	138
Lane Group Flow (vph)	793	190	14	196	1071	353	22	120	14	587	163	329
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	33.9	52.9	52.9	17.7	36.7	64.2	4.7	32.6	56.3	21.5	49.4	89.3
Effective Green, g (s)	33.9	52.9	52.9	17.7	36.7	64.2	4.7	32.6	56.3	21.5	49.4	89.3
Actuated g/C Ratio	0.23	0.36	0.36	0.12	0.25	0.43	0.03	0.22	0.38	0.15	0.33	0.60
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1145	1267	566	411	1263	1211	56	781	603	726	1183	1685
v/s Ratio Prot	c0.16	0.05		0.06	c0.21	0.13	0.01	0.03		c0.12	0.05	c0.12
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.69	0.15	0.02	0.48	0.85	0.29	0.39	0.15	0.02	0.81	0.14	0.20
Uniform Delay, d1	52.1	32.2	30.7	60.7	52.8	27.0	70.1	46.4	28.5	61.1	34.3	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	0.0	0.9	5.5	0.1	4.5	0.1	0.0	6.6	0.1	0.1
Delay (s)	54.0	32.2	30.7	61.6	58.3	27.2	74.6	46.5	28.6	67.7	34.3	13.1
Level of Service	D	C	C	E	E	C	E	D	C	E	C	B
Approach Delay (s)		49.0			51.9			46.2			42.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	147.7	Sum of lost time (s)	23.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	380	5	75	10	1775	40	970
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	5.5	28.9	28.9	28.9	6.8	125.6	9.8	133.0
Actuated g/C Ratio	0.03	0.16	0.16	0.16	0.04	0.70	0.05	0.74
v/c Ratio	0.02	0.78	0.77	0.24	0.17	0.89	0.45	0.28
Control Delay	0.2	91.4	89.8	5.9	116.1	12.3	96.0	9.7
Queue Delay	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	0.2	91.9	90.2	5.9	116.1	12.4	96.0	9.7
LOS	A	F	F	A	F	B	F	A
Approach Delay	0.2		77.1			12.9		13.0
Approach LOS	A		E			B		B

Intersection Summary	
Cycle Length: 180	
Actuated Cycle Length: 180	
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 21.4	Intersection LOS: C
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	380	5	75	10	1775	215	40	970	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.91	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1687	1583	1770	3482		1770	5082	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1687	1583	1770	3482		1770	5082	
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	0	5	413	5	82	11	1929	234	43	1054	5
RTOR Reduction (vph)	0	5	0	0	0	69	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	211	207	13	11	2160	0	43	1059	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		1.1		28.9	28.9	28.9	3.2	121.4		8.6	126.8	
Effective Green, g (s)		1.1		28.9	28.9	28.9	3.2	121.4		8.6	126.8	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.02	0.67		0.05	0.70	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		9		269	270	254	31	2348		84	3579	
v/s Ratio Prot		c0.00		c0.13	0.12		0.01	c0.62		c0.02	0.21	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.78	0.77	0.05	0.35	0.92		0.51	0.30	
Uniform Delay, d1		88.9		72.6	72.3	64.0	87.4	25.1		83.7	9.9	
Progression Factor		1.00		1.00	1.00	1.00	1.36	0.32		1.00	1.00	
Incremental Delay, d2		0.1		13.9	12.2	0.1	3.7	4.2		5.2	0.2	
Delay (s)		89.1		86.4	84.6	64.0	122.2	12.1		88.8	10.1	
Level of Service		F		F	F	E	F	B		F	B	
Approach Delay (s)		89.1			82.0			12.7			13.2	
Approach LOS		F			F			B			B	

Intersection Summary

HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	520	25	2005	415	1380
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	35.5	35.5	132.5	132.5	132.5
Actuated g/C Ratio	0.20	0.20	0.74	0.74	0.74
v/c Ratio	0.83	0.08	0.84	0.37	0.40
Control Delay	80.5	41.8	21.2	5.1	10.6
Queue Delay	0.4	0.0	42.3	0.9	0.1
Total Delay	80.9	41.8	63.5	6.0	10.7
LOS	F	D	E	A	B
Approach Delay	79.1		53.6		10.7
Approach LOS	E		D		B

Intersection Summary

Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 43.2 — Intersection LOS: D
Intersection Capacity Utilization 80.3% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	520	25	2005	415	0	1380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.91
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		5085
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	565	27	2179	451	0	1500
RTOR Reduction (vph)	0	7	0	60	0	0
Lane Group Flow (vph)	565	20	2179	391	0	1500
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	35.5	35.5	132.5	132.5		132.5
Effective Green, g (s)	35.5	35.5	132.5	132.5		132.5
Actuated g/C Ratio	0.20	0.20	0.74	0.74		0.74
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	677	312	2605	1165		3743
v/s Ratio Prot	c0.16		c0.62			0.29
v/s Ratio Perm		0.01		0.25		
v/c Ratio	0.83	0.06	0.84	0.34		0.40
Uniform Delay, d1	69.4	58.7	16.3	8.3		8.9
Progression Factor	1.00	1.00	1.00	1.00		1.10
Incremental Delay, d2	8.7	0.1	3.4	0.8		0.3
Delay (s)	78.2	58.8	19.7	9.1		10.1
Level of Service	E	E	B	A		B
Approach Delay (s)	77.3		17.9			10.1
Approach LOS	E		B			B

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2250	1420	545	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2446	1543	592	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	2136				2655	811
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1844				2427	355
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	290				24	571

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	815	815	815	617	617	901
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	592
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.48	0.48	0.48	0.36	0.36	0.53
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	230	2250	1420
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min
Act Effct Green (s)	13.4	61.2	35.3
Actuated g/C Ratio	0.22	1.00	0.58
v/c Ratio	0.65	0.48	0.53
Control Delay	32.1	0.3	8.6
Queue Delay	0.0	0.0	0.0
Total Delay	32.1	0.3	8.6
LOS	C	A	A
Approach Delay		3.3	8.6
Approach LOS		A	A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 61.2	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 5.2	Intersection LOS: A
Intersection Capacity Utilization 50.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	230	2250	1420	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.91	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	5085	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	250	2446	1543	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	250	2446	1543	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			13.4	61.1	35.7	
Effective Green, g (s)			13.4	61.1	35.7	
Actuated g/C Ratio			0.22	1.00	0.58	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			388	5085	2971	
v/s Ratio Prot			0.14	c0.48	0.30	
v/s Ratio Perm						
v/c Ratio			0.64	0.48	0.52	
Uniform Delay, d1			21.7	0.0	7.6	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			3.6	0.1	0.2	
Delay (s)			25.3	0.1	7.7	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.4	7.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	535	250	1330	625	2520
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None
Act Effct Green (s)	30.5	155.5	72.0	34.7	112.8
Actuated g/C Ratio	0.20	1.00	0.46	0.22	0.73
v/c Ratio	0.86	0.17	0.88	0.89	0.59
Control Delay	75.5	0.2	45.8	73.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.3
Total Delay	75.5	0.2	45.8	73.8	11.2
LOS	E	A	D	E	B
Approach Delay			45.8		23.6
Approach LOS			D		C

Intersection Summary	
Cycle Length: 170	
Actuated Cycle Length: 155.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 33.4	Intersection LOS: C
Intersection Capacity Utilization 83.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	535	0	250	0	0	0	0	1330	0	625	2520	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.86	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	6408	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	6408	
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)	582	0	272	0	0	0	0	1446	0	679	2739	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	582	0	272	0	0	0	0	1446	0	679	2739	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	30.5		155.3					72.1		34.7	112.8	
Effective Green, g (s)	30.5		155.3					72.1		34.7	112.8	
Actuated g/C Ratio	0.20		1.00					0.46		0.22	0.73	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	674		1583					1643		767	4654	
v/s Ratio Prot	c0.17							c0.41		c0.20	0.43	
v/s Ratio Perm			0.17									
v/c Ratio	0.86		0.17					0.88		0.89	0.59	
Uniform Delay, d1	60.4		0.0					37.7		58.4	10.2	
Progression Factor	1.00		1.00					1.00		0.99	0.99	
Incremental Delay, d2	11.1		0.2					5.9		11.9	0.2	
Delay (s)	71.5		0.2					43.5		69.9	10.2	
Level of Service	E		A					D		E	B	
Approach Delay (s)		48.8			0.0			43.5			22.1	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	155.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2710	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None
Act Effct Green (s)	140.5	
Actuated g/C Ratio	0.96	
v/c Ratio	0.86	
Control Delay	7.8	
Queue Delay	0.0	
Total Delay	7.8	
LOS	A	
Approach Delay	7.8	
Approach LOS	A	

Intersection Summary	
Cycle Length: 166	
Actuated Cycle Length: 146	
Natural Cycle: 170	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 7.8	Intersection LOS: A
Intersection Capacity Utilization 79.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2710	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2946	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2946	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.83			
v/s Ratio Perm						
v/c Ratio			0.93			
Uniform Delay, d1			4.6			
Progression Factor			1.00			
Incremental Delay, d2			6.0			
Delay (s)			10.7			
Level of Service			B			
Approach Delay (s)	0.0		10.7			0.0
Approach LOS	A		B			A

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	1330	2710	0	2770	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1446	2946	0	3011	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.79	
vC, conflicting volume			4391		2198	723
vC1, stage 1 conf vol					1446	
vC2, stage 2 conf vol					753	
vCu, unblocked vol			4391		1211	723
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			30		165	369

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	723	723	1473	1473	753	753	753	753
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	1473	1473	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.87	0.87	0.44	0.44	0.44	0.44
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.
Channelized right turn lanes are not counted.

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	20	35	135	5	165	65	3410	30	40	1985	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	37.0	37.0	37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.6	171.6
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.23	0.05	0.72	0.72	0.05	0.72	0.72
v/c Ratio	0.10	0.22	0.75	0.02	0.48	0.77	0.98	0.03	0.52	0.55	0.10
Control Delay	83.7	71.3	118.9	79.8	74.7	96.5	36.3	1.2	132.6	17.6	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.7	71.3	118.9	79.8	74.7	96.5	36.3	1.2	132.6	17.6	2.8
LOS	F	E	F	E	E	F	D	A	F	B	A
Approach Delay		74.6		94.4			37.1			19.2	
Approach LOS		E		F			D			B	

Intersection Summary	
Cycle Length: 240	
Actuated Cycle Length: 240	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 180	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 34.5	Intersection LOS: C
Intersection Capacity Utilization 96.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	35	20	135	5	165	65	3410	30	40	1985	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1736		1728	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1736		1271	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	22	38	22	147	5	179	71	3589	33	43	2005	109
RTOR Reduction (vph)	0	9	0	0	0	14	0	0	9	0	0	27
Lane Group Flow (vph)	22	51	0	147	5	165	71	3589	24	43	2005	82
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Effective Green, g (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.05	0.72	0.72	0.05	0.71	0.71
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	267		195	287	357	92	3661	1110	82	3633	1070
v/s Ratio Prot		0.03			0.00		c0.04	c0.71		0.02	0.39	
v/s Ratio Perm	0.02			c0.12		0.10			0.02			0.05
v/c Ratio	0.10	0.19		0.75	0.02	0.46	0.77	0.98	0.02	0.52	0.55	0.08
Uniform Delay, d1	87.2	88.4		97.1	86.1	80.3	112.3	32.0	9.6	111.8	16.1	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.79	1.03	1.00	1.00	1.02	1.09
Incremental Delay, d2	0.2	0.3		15.2	0.0	1.0	9.0	3.9	0.0	5.9	0.6	0.1
Delay (s)	87.4	88.8		112.3	86.1	81.3	97.5	36.8	9.6	117.7	17.1	11.4
Level of Service	F	F		F	F	F	F	D	A	F	B	B
Approach Delay (s)		88.4			95.1			37.7			18.8	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	34.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	340	150	225	15	150	140	3025	45	45	1930	130
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8		5	2		1	6	
Permitted Phases			4		8			2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	38.0	38.0	38.0	25.0	25.0	23.0	164.0	164.0	13.0	154.0	154.0
Total Split (%)	15.8%	15.8%	15.8%	10.4%	10.4%	9.6%	68.3%	68.3%	5.4%	64.2%	64.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	32.0	32.0	32.0	19.0	19.0	15.2	157.0	157.0	7.0	148.8	148.8
Actuated g/C Ratio	0.13	0.13	0.13	0.08	0.08	0.06	0.65	0.65	0.03	0.62	0.62
v/c Ratio	1.17	1.17	0.84	1.59	0.75	0.70	0.99	0.05	0.96	0.62	0.14
Control Delay	196.7	194.4	83.2	355.3	62.4	104.0	55.2	3.6	210.1	21.2	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	196.7	194.4	83.2	355.3	62.4	104.0	55.2	3.6	210.1	21.2	1.3
LOS	F	F	F	F	E	F	E	A	F	C	A
Approach Delay		160.1		231.6			56.6			24.2	
Approach LOS		F		F			E			C	

Intersection Summary	
Cycle Length: 240	
Actuated Cycle Length: 240	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 175	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.59	
Intersection Signal Delay: 68.2	Intersection LOS: E
Intersection Capacity Utilization 103.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	150	225	190	15	150	140	3025	45	45	1930	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1735	1533		1780	1583	3433	5085	1551	1770	5085	1560
Flt Permitted	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1735	1533		1780	1583	3433	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	370	163	245	207	16	163	152	3288	49	49	1949	141
RTOR Reduction (vph)	0	0	87	0	0	92	0	0	17	0	0	54
Lane Group Flow (vph)	263	270	158	0	223	71	152	3288	32	49	1949	87
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	32.0	32.0	32.0		19.0	19.0	15.2	157.0	157.0	7.0	148.8	148.8
Effective Green, g (s)	32.0	32.0	32.0		19.0	19.0	15.2	157.0	157.0	7.0	148.8	148.8
Actuated g/C Ratio	0.13	0.13	0.13		0.08	0.08	0.06	0.65	0.65	0.03	0.62	0.62
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	224	231	204		140	125	217	3326	1014	51	3152	967
v/s Ratio Prot	c0.16	0.16			c0.13		c0.04	c0.65		0.03	0.38	
v/s Ratio Perm			0.10			0.04			0.02			0.06
v/c Ratio	1.17	1.17	0.78		1.59	0.57	0.70	0.99	0.03	0.96	0.62	0.09
Uniform Delay, d1	104.0	104.0	100.5		110.5	106.5	110.2	40.6	14.7	116.4	28.1	18.4
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.87	1.18	3.76	0.99	0.72	0.46
Incremental Delay, d2	115.2	112.4	16.7		297.7	5.8	4.6	8.2	0.0	101.2	0.8	0.2
Delay (s)	219.2	216.4	117.3		408.2	112.3	100.3	56.3	55.1	216.8	21.0	8.7
Level of Service	F	F	F		F	F	F	E	E	F	C	A
Approach Delay (s)		186.1			283.3			58.2			24.7	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	75.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	103.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3410	2265	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	99.6	99.6	
Actuated g/C Ratio	0.83	0.83	
v/c Ratio	0.88	0.54	
Control Delay	17.4	9.1	
Queue Delay	0.0	0.0	
Total Delay	17.4	9.1	
LOS	B	A	
Approach Delay	17.4	9.1	
Approach LOS	B	A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 180	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3410	2265	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3707	2288	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3707	2288	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.73	0.45	
v/s Ratio Perm						
v/c Ratio				0.95	0.58	
Uniform Delay, d1				11.7	5.8	
Progression Factor				1.20	0.97	
Incremental Delay, d2				3.1	0.4	
Delay (s)				17.2	6.0	
Level of Service				B	A	
Approach Delay (s)	0.0			17.2	6.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	210	10	5	360	3100	15	5	1960	480
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2			6
Detector Phase	4	4	4 5	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0		11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0		14.0	14.0	35.0	153.0	153.0	30.0	148.0	148.0
Total Split (%)	17.9%	17.9%		5.8%	5.8%	14.6%	63.8%	63.8%	12.5%	61.7%	61.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	35.6	35.6	75.3	6.9	6.9	33.7	178.2	178.2	5.5	141.0	141.0
Actuated g/C Ratio	0.15	0.15	0.31	0.03	0.03	0.14	0.74	0.74	0.02	0.59	0.59
v/c Ratio	0.90	0.91	0.48	0.43	0.04	1.58	0.89	0.02	0.12	0.71	0.52
Control Delay	134.5	135.8	57.2	138.5	0.8	315.4	46.3	0.0	128.2	22.2	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	134.5	135.8	57.2	138.5	0.8	315.4	46.3	0.0	128.2	22.2	4.2
LOS	F	F	E	F	A	F	D	A	F	C	A
Approach Delay		109.0		113.0			73.9			18.9	
Approach LOS		F		F			E			B	

Intersection Summary	
Cycle Length: 240	
Actuated Cycle Length: 240	
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 175	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.58	
Intersection Signal Delay: 56.9	Intersection LOS: E
Intersection Capacity Utilization 113.9%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	210	10	10	5	360	3100	15	5	1960	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
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)	440	11	228	11	11	5	391	3370	16	5	2130	522
RTOR Reduction (vph)	0	0	31	0	0	5	0	0	5	0	0	218
Lane Group Flow (vph)	224	227	197	0	22	0	391	3370	11	5	2130	304
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2			6
Actuated Green, G (s)	35.6	35.6	75.3		5.9	5.9	33.7	172.2	172.2	1.3	139.8	139.8
Effective Green, g (s)	35.6	35.6	75.3		5.9	5.9	33.7	172.2	172.2	1.3	139.8	139.8
Actuated g/C Ratio	0.15	0.15	0.31		0.02	0.02	0.14	0.72	0.72	0.01	0.58	0.58
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	249	250	448		44	38	248	3648	998	9	2962	784
v/s Ratio Prot	0.13	c0.13			c0.01		c0.22	c0.66		0.00	0.42	
v/s Ratio Perm			0.14			0.00			0.01			0.23
v/c Ratio	0.90	0.91	0.44		0.50	0.00	1.58	0.92	0.01	0.56	0.72	0.39
Uniform Delay, d1	100.4	100.6	65.6		115.6	114.2	103.2	28.4	9.7	119.1	36.0	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.84	1.79	1.00	1.07	0.59	1.75
Incremental Delay, d2	31.5	33.1	0.7		3.2	0.0	267.8	2.4	0.0	32.8	1.4	1.3
Delay (s)	131.9	133.7	66.3		118.8	114.2	354.7	53.2	9.7	159.9	22.6	48.5
Level of Service	F	F	E		F	F	F	D	A	F	C	D
Approach Delay (s)		110.5			118.0			84.3			28.0	
Approach LOS		F			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	65.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	113.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	485	45	45	85	515	40	2235	5	350	1705	75
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3		4			2			6
Detector Phase	3	3	3	4	4	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	10.0	10.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	60.0	60.0	60.0	33.0	33.0	31.0	115.0	115.0	32.0	116.0	116.0
Total Split (%)	25.0%	25.0%	25.0%	13.8%	13.8%	12.9%	47.9%	47.9%	13.3%	48.3%	48.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	45.9	45.9	45.9	27.0	27.0	11.2	116.1	116.1	26.0	133.5	133.5
Actuated g/C Ratio	0.19	0.19	0.19	0.11	0.11	0.05	0.48	0.48	0.11	0.56	0.56
v/c Ratio	0.89	0.90	0.14	0.52	1.00	0.52	0.99	0.01	1.02	0.66	0.09
Control Delay	122.5	123.8	4.0	110.1	86.9	165.6	63.9	0.0	178.9	13.4	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.5	123.8	4.0	110.1	86.9	165.6	63.9	0.0	178.9	13.4	0.5
LOS	F	F	A	F	F	F	E	A	F	B	A
Approach Delay		113.8		90.7			65.5			40.1	
Approach LOS		F		F			E			D	

Intersection Summary

Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 63.6 — Intersection LOS: E
Intersection Capacity Utilization 91.6% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	45	45	15	85	515	40	2235	5	350	1705	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	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)	527	49	49	16	92	560	43	2429	5	380	1853	82
RTOR Reduction (vph)	0	0	40	0	0	249	0	0	3	0	0	35
Lane Group Flow (vph)	285	291	9	0	108	311	43	2429	2	380	1853	47
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	45.9	45.9	45.9		27.0	27.0	9.9	116.1	116.1	26.0	132.2	132.2
Effective Green, g (s)	45.9	45.9	45.9		27.0	27.0	9.9	116.1	116.1	26.0	132.2	132.2
Actuated g/C Ratio	0.19	0.19	0.19		0.11	0.11	0.04	0.48	0.48	0.11	0.55	0.55
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	321	324	302		208	313	73	2459	765	371	2800	871
v/s Ratio Prot	0.17	c0.17			0.06		0.02	c0.48		c0.11	0.36	
v/s Ratio Perm			0.01			c0.11			0.00			0.03
v/c Ratio	0.89	0.90	0.03		0.52	0.99	0.59	0.99	0.00	1.02	0.66	0.05
Uniform Delay, d1	94.5	94.8	79.0		100.4	106.4	113.1	61.2	32.0	107.0	38.1	25.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.34	0.86	1.00	1.35	0.32	0.07
Incremental Delay, d2	24.2	25.8	0.0		2.2	48.6	8.7	13.0	0.0	45.8	0.9	0.1
Delay (s)	118.8	120.6	79.0		102.6	155.0	160.7	65.4	32.0	190.4	13.0	1.8
Level of Service	F	F	E		F	F	F	E	C	F	B	A
Approach Delay (s)		116.5			146.5			67.0			41.7	
Approach LOS		F			F			E			D	

Intersection Summary

HCM 2000 Control Delay	71.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1625	65	220	1420	170
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	32.1	32.1	48.9	43.2	43.2	70.3	16.8	118.6	160.8	21.1	122.9	122.9
Actuated g/C Ratio	0.13	0.13	0.20	0.18	0.18	0.29	0.07	0.49	0.67	0.09	0.51	0.51
v/c Ratio	0.86	0.86	0.59	0.39	0.91	0.43	0.75	0.70	0.07	0.79	0.55	0.21
Control Delay	134.4	120.3	39.0	89.3	126.5	60.0	128.2	51.1	1.6	79.5	91.9	49.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	134.4	120.3	39.0	89.3	126.5	60.0	128.2	51.1	1.6	79.5	91.9	49.6
LOS	F	F	D	F	F	E	F	D	A	E	F	D
Approach Delay		100.6			90.2			56.2			86.1	
Approach LOS		F			F			E			F	

Intersection Summary

Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 77.7 — Intersection LOS: E
Intersection Capacity Utilization 83.1% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	280	335	165	1625	65	220	1420	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	353	212	223	125	304	364	179	1766	71	239	1434	185
RTOR Reduction (vph)	0	0	58	0	0	33	0	0	23	0	0	64
Lane Group Flow (vph)	184	381	165	125	304	331	179	1766	48	239	1434	121
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	32.1	32.1	48.9	43.2	43.2	64.3	16.8	118.6	161.8	21.1	122.9	122.9
Effective Green, g (s)	32.1	32.1	48.9	43.2	43.2	64.3	16.8	118.6	161.8	21.1	122.9	122.9
Actuated g/C Ratio	0.13	0.13	0.20	0.18	0.18	0.27	0.07	0.49	0.67	0.09	0.51	0.51
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	215	443	322	318	335	816	240	2512	1067	301	2603	810
v/s Ratio Prot	0.11	c0.11		0.07	c0.16	0.07	0.05	c0.35		c0.07	c0.28	
v/s Ratio Perm			0.10			0.05			0.03			0.08
v/c Ratio	0.86	0.86	0.51	0.39	0.91	0.41	0.75	0.70	0.04	0.79	0.55	0.15
Uniform Delay, d1	101.7	101.8	84.9	86.8	96.4	72.2	109.5	47.0	13.1	107.3	39.8	30.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.60	2.19	4.46
Incremental Delay, d2	25.9	15.1	0.6	0.3	26.4	0.1	10.5	1.7	0.0	9.9	0.7	0.3
Delay (s)	127.6	116.8	85.5	87.1	122.9	72.3	120.0	48.7	13.1	74.6	87.6	138.1
Level of Service	F	F	F	F	F	E	F	D	B	E	F	F
Approach Delay (s)		110.5			94.0			53.8			91.0	
Approach LOS		F			F			D			F	

Intersection Summary

HCM 2000 Control Delay	80.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1835	45	20	1355	35	70	15	25	35	15	150
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	40.0	40.0	40.0	38.0	38.0	38.0
Total Split (s)	24.0	76.0	76.0	16.0	68.0	68.0	40.0	40.0	40.0	38.0	38.0	38.0
Total Split (%)	18.2%	57.6%	57.6%	12.1%	51.5%	51.5%	30.3%	30.3%	30.3%	28.8%	28.8%	28.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	16.8	83.9	83.9	7.2	72.3	72.3		28.8	28.8		30.8	30.8
Actuated g/C Ratio	0.13	0.64	0.64	0.05	0.55	0.55		0.22	0.22		0.23	0.23
v/c Ratio	0.75	0.62	0.05	0.23	0.53	0.04		0.31	0.06		0.16	0.33
Control Delay	75.1	17.9	2.7	59.5	13.3	0.1		43.8	0.3		38.1	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	75.1	17.9	2.7	59.5	13.3	0.1		43.8	0.3		38.1	7.2
LOS	E	B	A	E	B	A		D	A		D	A
Approach Delay		21.9			13.6			33.9			14.9	
Approach LOS		C			B			C			B	

Intersection Summary	
Cycle Length: 132	
Actuated Cycle Length: 132	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1835	45	20	1355	35	70	15	25	35	15	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1789	1583		1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.73	1.00		0.79	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1352	1583		1474	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)	168	1995	49	22	1473	38	76	16	27	38	16	163
RTOR Reduction (vph)	0	0	18	0	0	17	0	0	21	0	0	125
Lane Group Flow (vph)	168	1995	31	22	1473	21	0	92	6	0	54	38
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.8	82.3	82.3	4.9	72.4	72.4		28.8	28.8		30.8	30.8
Effective Green, g (s)	16.8	82.3	82.3	4.9	72.4	72.4		28.8	28.8		30.8	30.8
Actuated g/C Ratio	0.13	0.62	0.62	0.04	0.55	0.55		0.22	0.22		0.23	0.23
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	225	3170	986	65	2789	868		294	345		343	369
v/s Ratio Prot	c0.09	c0.39		0.01	0.29							
v/s Ratio Perm			0.02			0.01		c0.07	0.00		0.04	0.02
v/c Ratio	0.75	0.63	0.03	0.34	0.53	0.02		0.31	0.02		0.16	0.10
Uniform Delay, d1	55.5	15.4	9.5	62.0	18.9	13.6		43.3	40.5		40.3	39.7
Progression Factor	1.00	1.00	1.00	0.92	0.60	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	12.6	1.0	0.1	2.8	0.6	0.0		0.6	0.0		0.2	0.1
Delay (s)	68.2	16.4	9.6	59.8	12.1	13.7		43.9	40.5		40.5	39.9
Level of Service	E	B	A	E	B	B		D	D		D	D
Approach Delay (s)		20.1			12.8			43.1			40.0	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1635	75	35	1185	45	110	15	40	50	15	115
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	29.0	68.0	68.0	24.0	63.0	63.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	22.0%	51.5%	51.5%	18.2%	47.7%	47.7%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	18.5	78.6	78.6	8.3	66.1	66.1		29.4	29.4		29.4	29.4
Actuated g/C Ratio	0.14	0.60	0.60	0.06	0.50	0.50		0.22	0.22		0.22	0.22
v/c Ratio	0.75	0.59	0.08	0.35	0.51	0.06		0.47	0.10		0.24	0.28
Control Delay	85.2	11.2	2.2	66.9	24.7	2.1		48.4	2.7		41.9	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	85.2	11.2	2.2	66.9	24.7	2.1		48.4	2.7		41.9	8.0
LOS	F	B	A	E	C	A		D	A		D	A
Approach Delay		17.5			25.1			37.4			20.2	
Approach LOS		B			C			D			C	

Intersection Summary	
Cycle Length: 132	
Actuated Cycle Length: 132	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1635	75	35	1185	45	110	15	40	50	15	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1784	1583		1794	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.70	1.00		0.69	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1307	1583		1294	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)	185	1777	82	38	1288	49	120	16	43	54	16	125
RTOR Reduction (vph)	0	0	31	0	0	24	0	0	33	0	0	97
Lane Group Flow (vph)	185	1777	51	38	1288	25	0	136	10	0	70	28
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	18.5	77.4	77.4	7.2	66.1	66.1		29.4	29.4		29.4	29.4
Effective Green, g (s)	18.5	77.4	77.4	7.2	66.1	66.1		29.4	29.4		29.4	29.4
Actuated g/C Ratio	0.14	0.59	0.59	0.05	0.50	0.50		0.22	0.22		0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	248	2981	928	96	2546	792		291	352		288	352
v/s Ratio Prot	c0.10	c0.35		0.02	0.25							
v/s Ratio Perm			0.03			0.02		c0.10	0.01		0.05	0.02
v/c Ratio	0.75	0.60	0.06	0.40	0.51	0.03		0.47	0.03		0.24	0.08
Uniform Delay, d1	54.5	17.4	11.7	60.3	22.0	16.7		44.5	40.1		42.2	40.6
Progression Factor	1.29	0.55	0.50	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	9.4	0.7	0.1	2.7	0.7	0.1		1.2	0.0		0.4	0.1
Delay (s)	79.8	10.2	5.9	63.0	22.8	16.8		45.7	40.1		42.6	40.7
Level of Service	E	B	A	E	C	B		D	D		D	D
Approach Delay (s)		16.4			23.7			44.4			41.4	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1675	60	1145	130	85
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	40.0	40.0
Total Split (s)	63.0	25.0	88.0	40.0	40.0
Total Split (%)	49.2%	19.5%	68.8%	31.3%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None
Act Effct Green (s)	73.2	10.1	86.9	29.1	29.1
Actuated g/C Ratio	0.57	0.08	0.68	0.23	0.23
v/c Ratio	0.64	0.47	0.36	0.35	0.21
Control Delay	22.7	66.5	10.0	42.2	8.3
Queue Delay	0.3	0.0	0.0	0.0	0.0
Total Delay	23.0	66.5	10.0	42.2	8.3
LOS	C	E	B	D	A
Approach Delay	23.0		12.8	28.8	
Approach LOS	C		B	C	

Intersection Summary			
Cycle Length: 128			
Actuated Cycle Length: 128			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 58.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1675	40	60	1145	130	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5068		1770	5085	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5068		1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1821	43	65	1245	141	92
RTOR Reduction (vph)	1	0	0	0	0	71
Lane Group Flow (vph)	1863	0	65	1245	141	21
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	72.1		8.8	86.9	29.1	29.1
Effective Green, g (s)	72.1		8.8	86.9	29.1	29.1
Actuated g/C Ratio	0.56		0.07	0.68	0.23	0.23
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2854		121	3452	402	359
v/s Ratio Prot	c0.37		c0.04	0.24	c0.08	
v/s Ratio Perm						0.01
v/c Ratio	0.65		0.54	0.36	0.35	0.06
Uniform Delay, d1	19.3		57.6	8.7	41.5	38.7
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2		4.5	0.3	0.5	0.1
Delay (s)	20.5		62.2	9.0	42.0	38.8
Level of Service	C		E	A	D	D
Approach Delay (s)	20.5			11.7	40.8	
Approach LOS	C			B	D	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1690	30	50	1070	10	50	5	100	20	10	90
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	22.0	69.0	69.0	23.0	70.0	70.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	16.7%	52.3%	52.3%	17.4%	53.0%	53.0%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	8.6	79.3	79.3	9.4	80.0	80.0		28.4	28.4		28.4	28.4
Actuated g/C Ratio	0.07	0.60	0.60	0.07	0.61	0.61		0.22	0.22		0.22	0.22
v/c Ratio	0.37	0.60	0.03	0.43	0.38	0.01		0.20	0.26		0.10	0.24
Control Delay	67.4	20.4	0.5	68.3	16.0	0.0		40.8	8.3		38.2	8.5
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	67.4	20.7	0.5	68.3	16.0	0.0		40.8	8.3		38.2	8.5
LOS	E	C	A	E	B	A		D	A		D	A
Approach Delay		21.4			18.2			19.7			16.0	
Approach LOS		C			B			B			B	

Intersection Summary	
Cycle Length: 132	
Actuated Cycle Length: 132	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 59.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1690	30	50	1070	10	50	5	100	20	10	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1781	1583		1803	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.83	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1370	1583		1537	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)	43	1837	33	54	1163	11	54	5	109	22	11	98
RTOR Reduction (vph)	0	0	13	0	0	4	0	0	86	0	0	77
Lane Group Flow (vph)	43	1837	20	54	1163	7	0	59	23	0	33	21
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.5	78.4	78.4	8.2	79.1	79.1		28.4	28.4		28.4	28.4
Effective Green, g (s)	7.5	78.4	78.4	8.2	79.1	79.1		28.4	28.4		28.4	28.4
Actuated g/C Ratio	0.06	0.59	0.59	0.06	0.60	0.60		0.22	0.22		0.22	0.22
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	100	3020	940	109	3047	948		294	340		330	340
v/s Ratio Prot	0.02	c0.36		c0.03	0.23							
v/s Ratio Perm			0.01			0.00		c0.04	0.01		0.02	0.01
v/c Ratio	0.43	0.61	0.02	0.50	0.38	0.01		0.20	0.07		0.10	0.06
Uniform Delay, d1	60.2	17.0	11.0	59.9	13.7	10.6		42.5	41.3		41.5	41.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.0	0.9	0.0	3.5	0.4	0.0		0.3	0.1		0.1	0.1
Delay (s)	63.1	18.0	11.1	63.4	14.1	10.7		42.8	41.4		41.7	41.3
Level of Service	E	B	B	E	B	B		D	D		D	D
Approach Delay (s)		18.9			16.2			41.9			41.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1750	55	70	1010	125	115
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	39.0	39.0
Total Split (s)	69.0	69.0	22.0	91.0	39.0	39.0
Total Split (%)	53.1%	53.1%	16.9%	70.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	76.3	76.3	10.9	89.9	29.1	29.1
Actuated g/C Ratio	0.59	0.59	0.08	0.69	0.22	0.22
v/c Ratio	0.64	0.06	0.51	0.31	0.34	0.28
Control Delay	21.9	10.8	89.6	5.9	43.0	7.8
Queue Delay	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	10.8	89.6	5.9	43.0	7.8
LOS	C	B	F	A	D	A
Approach Delay	21.7			11.3	26.2	
Approach LOS	C			B	C	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 57.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1750	55	70	1010	125	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1902	60	76	1098	136	125
RTOR Reduction (vph)	0	10	0	0	0	97
Lane Group Flow (vph)	1902	50	76	1098	136	28
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	75.3	75.3	9.6	89.9	29.1	29.1
Effective Green, g (s)	75.3	75.3	9.6	89.9	29.1	29.1
Actuated g/C Ratio	0.58	0.58	0.07	0.69	0.22	0.22
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2945	916	130	3516	396	354
v/s Ratio Prot	c0.37		c0.04	0.22	c0.08	
v/s Ratio Perm		0.03				0.02
v/c Ratio	0.65	0.05	0.58	0.31	0.34	0.08
Uniform Delay, d1	18.4	11.9	58.3	7.9	42.4	39.9
Progression Factor	1.00	1.00	1.39	0.65	1.00	1.00
Incremental Delay, d2	1.1	0.1	6.3	0.2	0.5	0.1
Delay (s)	19.5	12.0	87.0	5.3	42.9	40.0
Level of Service	B	B	F	A	D	D
Approach Delay (s)	19.3			10.6	41.5	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations												
Volume (vph)	1785	50	100	945	25	125	20	125	10	5	15	
Turn Type	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	2		1	6			8			4		5
Permitted Phases		2			6	8		8	4		4	
Detector Phase	2	2	1	6	6	8	8	8	4	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0	10.0
Total Split (s)	58.0	58.0	32.0	62.0	62.0	40.0	40.0	40.0	40.0	40.0	40.0	28.0
Total Split (%)	44.6%	44.6%	24.6%	47.7%	47.7%	30.8%	30.8%	30.8%	30.8%	30.8%	30.8%	22%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lag	Lag							Lead
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	69.0	69.0	13.3	88.4	88.4		29.6	29.6		29.6	29.6	
Actuated g/C Ratio	0.53	0.53	0.10	0.68	0.68		0.23	0.23		0.23	0.23	
v/c Ratio	0.72	0.06	0.60	0.30	0.02		0.50	0.29		0.05	0.04	
Control Delay	10.1	0.4	69.0	9.4	0.0		48.1	7.6		36.4	0.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.1	0.4	69.0	9.4	0.0		48.1	7.6		36.4	0.2	
LOS	B	A	E	A	A		D	A		D	A	
Approach Delay	9.9			14.7			29.4			18.3		
Approach LOS	A			B			C			B		

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 13.2		Intersection LOS: B	
Intersection Capacity Utilization 69.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1785	50	100	945	25	125	20	125	10	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)		5085	1583	1770	5085	1583		1786	1583		1801	1583
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.82	1.00
Satd. Flow (perm)		5085	1583	1770	5085	1583		1387	1583		1535	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1940	54	109	1027	27	136	22	136	11	5	16
RTOR Reduction (vph)	0	0	25	0	0	9	0	0	105	0	0	12
Lane Group Flow (vph)	0	1940	29	109	1027	18	0	158	31	0	16	4
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)		69.1	69.1	13.3	88.4	88.4		29.6	29.6		29.6	29.6
Effective Green, g (s)		69.1	69.1	13.3	88.4	88.4		29.6	29.6		29.6	29.6
Actuated g/C Ratio		0.53	0.53	0.10	0.68	0.68		0.23	0.23		0.23	0.23
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2702	841	181	3457	1076		315	360		349	360
v/s Ratio Prot		c0.38		c0.06	0.20							
v/s Ratio Perm			0.02			0.01		c0.11	0.02		0.01	0.00
v/c Ratio		0.72	0.03	0.60	0.30	0.02		0.50	0.09		0.05	0.01
Uniform Delay, d1		23.1	14.5	55.8	8.3	6.7		43.8	39.5		39.2	38.9
Progression Factor		0.35	0.14	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.3	0.1	5.5	0.2	0.0		1.3	0.1		0.1	0.0
Delay (s)		9.4	2.1	61.4	8.6	6.8		45.0	39.6		39.2	38.9
Level of Service		A	A	E	A	A		D	D		D	D
Approach Delay (s)		9.2			13.5			42.5			39.1	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1730	30	255	990	50	70	45	285	70	35	25
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	26.0	55.0	55.0	36.0	65.0	65.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	19.8%	42.0%	42.0%	27.5%	49.6%	49.6%	30.5%	30.5%	30.5%	30.5%	30.5%	30.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	7.5	68.5	68.5	15.9	81.6	81.6	28.6	28.6	28.6	28.6	28.6	28.6
Actuated g/C Ratio	0.06	0.52	0.52	0.12	0.62	0.62	0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.27	0.71	0.04	0.67	0.34	0.05	0.26	0.12	0.53	0.26	0.09	0.06
Control Delay	65.0	27.7	0.1	62.8	14.4	1.6	41.8	38.1	7.5	41.8	37.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	27.7	0.1	62.8	14.4	1.6	41.8	38.1	7.5	41.8	37.5	0.3
LOS	E	C	A	E	B	A	D	D	A	D	D	A
Approach Delay		27.8			23.5			17.0			32.7	
Approach LOS		C			C			B			C	

Intersection Summary	
Cycle Length: 131	
Actuated Cycle Length: 131	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 25.2	Intersection LOS: C
Intersection Capacity Utilization 70.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1730	30	255	990	50	70	45	285	70	35	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	1364	1863	1583	1351	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1880	33	277	1076	54	76	49	310	76	38	27
RTOR Reduction (vph)	0	0	16	0	0	21	0	0	242	0	0	21
Lane Group Flow (vph)	27	1880	17	277	1076	33	76	49	68	76	38	6
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.1	68.5	68.5	15.9	79.3	79.3	28.6	28.6	28.6	28.6	28.6	28.6
Effective Green, g (s)	5.1	68.5	68.5	15.9	79.3	79.3	28.6	28.6	28.6	28.6	28.6	28.6
Actuated g/C Ratio	0.04	0.52	0.52	0.12	0.61	0.61	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	68	2658	827	416	3078	958	297	406	345	294	406	345
v/s Ratio Prot	0.02	c0.37		c0.08	0.21			0.03			0.02	
v/s Ratio Perm			0.01			0.02	0.06		0.04	c0.06		0.00
v/c Ratio	0.40	0.71	0.02	0.67	0.35	0.03	0.26	0.12	0.20	0.26	0.09	0.02
Uniform Delay, d1	61.4	23.7	15.1	55.0	12.9	10.4	42.4	41.1	41.8	42.4	40.9	40.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	1.6	0.0	4.0	0.3	0.1	0.5	0.1	0.3	0.5	0.1	0.0
Delay (s)	65.2	25.3	15.1	59.0	13.3	10.5	42.8	41.2	42.1	42.9	41.0	40.2
Level of Service	E	C	B	E	B	B	D	D	D	D	D	D
Approach Delay (s)		25.7			22.2			42.1			41.8	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Volume (vph)	1900	1250	50	5
Turn Type	NA	NA	NA	Perm
Protected Phases	4	8	2	
Permitted Phases				2
Detector Phase	4	8	2	2
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	40.0	40.0
Total Split (s)	89.0	89.0	40.0	40.0
Total Split (%)	69.0%	69.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	76.8	76.8	40.2	40.2
Actuated g/C Ratio	0.60	0.60	0.31	0.31
v/c Ratio	0.70	0.45	0.10	0.01
Control Delay	19.3	14.7	34.8	20.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.3	14.7	34.8	20.4
LOS	B	B	C	C
Approach Delay	19.3	14.7	33.6	
Approach LOS	B	B	C	

Intersection Summary	
Cycle Length: 129	
Actuated Cycle Length: 129	
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 17.7	Intersection LOS: B
Intersection Capacity Utilization 51.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1900	50	0	1250	50	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.91			0.91	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	5066			5085	1770	1583
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	5066			5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2065	54	0	1359	54	5
RTOR Reduction (vph)	2	0	0	0	0	3
Lane Group Flow (vph)	2117	0	0	1359	54	2
Turn Type	NA			NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	76.8			76.8	40.2	40.2
Effective Green, g (s)	76.8			76.8	40.2	40.2
Actuated g/C Ratio	0.60			0.60	0.31	0.31
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	3016			3027	551	493
v/s Ratio Prot	c0.42			0.27	c0.03	
v/s Ratio Perm						0.00
v/c Ratio	0.70			0.45	0.10	0.00
Uniform Delay, d1	18.1			14.4	31.5	30.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			0.1	0.4	0.0
Delay (s)	18.9			14.5	31.9	30.6
Level of Service	B			B	C	C
Approach Delay (s)	18.9			14.5	31.8	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	129.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	40	1760	80	1230	110	50	40	440	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	40.0
Total Split (s)	20.0	54.0	26.0	60.0		12.0	12.0	28.0	40.0
Total Split (%)	16.7%	45.0%	21.7%	50.0%		10.0%	10.0%	23.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None
Act Effct Green (s)	8.3	61.3	11.2	66.2	104.0	6.5	6.5	20.4	30.5
Actuated g/C Ratio	0.07	0.51	0.09	0.55	0.87	0.05	0.05	0.17	0.25
v/c Ratio	0.35	0.74	0.53	0.48	0.09	0.54	0.17	0.82	0.11
Control Delay	60.3	26.8	62.7	18.9	0.5	75.5	1.5	60.1	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	26.8	62.7	18.9	0.5	75.5	1.5	60.1	11.5
LOS	E	C	E	B	A	E	A	E	B
Approach Delay		27.5		19.9		42.7			55.7
Approach LOS		C		B		D			E

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 28.6 — Intersection LOS: C
Intersection Capacity Utilization 71.8% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1760	0	80	1230	110	0	50	40	440	5	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085		1770	5085	1583		1863	1583	3433	1612	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5085		1770	5085	1583		1863	1583	3433	1612	
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)	43	1913	0	87	1337	120	0	54	43	478	5	43
RTOR Reduction (vph)	0	0	0	0	0	18	0	0	41	0	32	0
Lane Group Flow (vph)	43	1913	0	87	1337	102	0	54	2	478	16	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	7.2	60.1		11.2	64.1	101.8		5.3	5.3	20.4	31.7	
Effective Green, g (s)	7.2	60.1		11.2	64.1	101.8		5.3	5.3	20.4	31.7	
Actuated g/C Ratio	0.06	0.50		0.09	0.53	0.85		0.04	0.04	0.17	0.26	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	106	2546		165	2716	1342		82	69	583	425	
v/s Ratio Prot	0.02	c0.38		c0.05	c0.26			c0.03		c0.14	0.01	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.41	0.75		0.53	0.49	0.08		0.66	0.03	0.82	0.04	
Uniform Delay, d1	54.3	24.0		51.9	17.7	1.5		56.5	54.9	48.0	32.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	2.1		3.0	0.6	0.0		17.5	0.2	8.8	0.0	
Delay (s)	56.9	26.1		54.9	18.3	1.5		73.9	55.0	56.9	32.9	
Level of Service	E	C		D	B	A		E	E	E	C	
Approach Delay (s)		26.7			19.1			65.6			54.7	
Approach LOS		C			B			E			D	

Intersection Summary

HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	45	10	40	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	49	11	43	87

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	60	130
Volume Left (vph)	0	49	43
Volume Right (vph)	27	0	87
Hadj (s)	-0.34	0.20	-0.30
Departure Headway (s)	3.9	4.4	3.8
Degree Utilization, x	0.05	0.07	0.14
Capacity (veh/h)	888	789	909
Control Delay (s)	7.1	7.8	7.4
Approach Delay (s)	7.1	7.8	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay		7.5	
Level of Service		A	
Intersection Capacity Utilization		23.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	2130	390	1090
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None
Act Effct Green (s)	63.7	18.1	94.2
Actuated g/C Ratio	0.68	0.19	1.00
v/c Ratio	0.67	0.64	0.23
Control Delay	10.2	41.7	0.1
Queue Delay	0.0	0.0	0.0
Total Delay	10.2	41.7	0.1
LOS	B	D	A
Approach Delay	10.2		11.1
Approach LOS	B		B

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 94.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 90.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2130	0	390	1090	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.91		0.97	0.91		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	5085		3433	5085		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	5085		3433	5085		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2315	0	424	1185	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2315	0	424	1185	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	64.1		18.1	94.2		
Effective Green, g (s)	64.1		18.1	94.2		
Actuated g/C Ratio	0.68		0.19	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	3460		659	5085		
v/s Ratio Prot	c0.46		c0.12	0.23		
v/s Ratio Perm						
v/c Ratio	0.67		0.64	0.23		
Uniform Delay, d1	8.8		35.1	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.5		2.2	0.0		
Delay (s)	9.3		37.2	0.0		
Level of Service	A		D	A		
Approach Delay (s)	9.3			9.8	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	920	1930	1405	210
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	
Act Effct Green (s)	33.2	80.0	35.7	80.0
Actuated g/C Ratio	0.42	1.00	0.45	1.00
v/c Ratio	0.70	0.59	0.67	0.14
Control Delay	23.7	0.7	18.9	0.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.7	0.7	18.9	0.2
LOS	C	A	B	A
Approach Delay		8.1	16.5	
Approach LOS		A	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 80	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 62.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	920	1930	1405	210	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	0.97	0.95	0.91	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	3433	3539	5085	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	3433	3539	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1000	2098	1527	228	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1000	2098	1527	228	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	33.2	80.0	35.8	80.0		
Effective Green, g (s)	33.2	80.0	35.8	80.0		
Actuated g/C Ratio	0.42	1.00	0.45	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	1424	3539	2275	1583		
v/s Ratio Prot	c0.29	c0.59	0.30			
v/s Ratio Perm				0.14		
v/c Ratio	0.70	0.59	0.67	0.14		
Uniform Delay, d1	19.3	0.0	17.5	0.0		
Progression Factor	0.99	1.00	1.00	1.00		
Incremental Delay, d2	1.6	0.3	0.8	0.2		
Delay (s)	20.8	0.3	18.2	0.2		
Level of Service	C	A	B	A		
Approach Delay (s)		6.9	15.9		0.0	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	660	1225	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	717	1332	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		Raised	Raised			
Median storage veh)		1	1			
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1353				1853	677
vC1, stage 1 conf vol					1342	
vC2, stage 2 conf vol					511	
vCu, unblocked vol	1353				1853	677
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	85				82	93
cM capacity (veh/h)	504				153	396

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	359	359	888	466	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	504	1700	1700	1700	1700	153	396
Volume to Capacity	0.15	0.21	0.21	0.52	0.27	0.18	0.07
Queue Length 95th (ft)	13	0	0	0	0	16	6
Control Delay (s)	13.4	0.0	0.0	0.0	0.0	33.5	14.8
Lane LOS	B					D	B
Approach Delay (s)	1.3			0.0		24.1	
Approach LOS						C	

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		51.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	500	15	0	820	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	543	16	0	891	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	891			560			1410	1606	280	1337	1614	446
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	891			560			1410	1606	280	1337	1614	446
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			35	88	99	100	100	55
cM capacity (veh/h)	756			1007			50	93	717	93	92	560

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	362	197	0	594	297	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	756	1700	1700	1700	1700	1700	63	1700	560
Volume to Capacity	0.11	0.21	0.12	0.00	0.35	0.17	0.78	0.00	0.45
Queue Length 95th (ft)	9	0	0	0	0	0	87	0	57
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	162.3	0.0	16.5
Lane LOS	B						F	A	C
Approach Delay (s)	1.3			0.0			162.3	16.5	
Approach LOS							F	C	

Intersection Summary			
Average Delay		7.0	
Intersection Capacity Utilization		50.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	380	10	0	655	0	25	15	0	20	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	413	11	0	712	0	27	16	0	22	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	712			424			1171	1380	212	1177	1386	356
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	712			424			1171	1380	212	1177	1386	356
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			73	87	100	82	100	77
cM capacity (veh/h)	884			1132			102	123	793	118	122	640

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	275	149	0	475	237	43	22	147
Volume Left	125	0	0	0	0	0	27	22	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	884	1700	1700	1700	1700	1700	109	118	640
Volume to Capacity	0.14	0.16	0.09	0.00	0.28	0.14	0.40	0.18	0.23
Queue Length 95th (ft)	12	0	0	0	0	0	42	16	22
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	58.7	42.4	12.3
Lane LOS	A						F	E	B
Approach Delay (s)	2.2			0.0			58.7	16.2	
Approach LOS							F	C	

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization		43.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	300	5	0	530	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	326	5	0	576	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	582			332			932	1106	166	943	1106	291
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	582			332			932	1106	166	943	1106	291
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			87	94	100	100	100	83
cM capacity (veh/h)	989			1225			170	188	849	192	188	706

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	217	114	0	384	197	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	989	1700	1700	1700	1700	1700	176	1700	706
Volume to Capacity	0.10	0.13	0.07	0.00	0.23	0.12	0.19	0.00	0.17
Queue Length 95th (ft)	8	0	0	0	0	0	16	0	15
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	30.1	0.0	11.1
Lane LOS	A						D	A	B
Approach Delay (s)	2.1			0.0			30.1	11.1	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		35.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	235	15	0	415	25	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	255	16	0	451	27	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	478			272			701	861	136	739	856	239
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478			272			701	861	136	739	856	239
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			84	80	100	100	96	89
cM capacity (veh/h)	1080			1289			268	275	888	249	277	762

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	60	170	101	0	301	178	98	0	11	87
Volume Left	60	0	0	0	0	0	43	0	0	0
Volume Right	0	0	16	0	0	27	0	0	0	87
cSH	1080	1700	1700	1700	1700	1700	272	1700	277	762
Volume to Capacity	0.06	0.10	0.06	0.00	0.18	0.10	0.36	0.00	0.04	0.11
Queue Length 95th (ft)	4	0	0	0	0	0	39	0	3	10
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	25.5	0.0	18.5	10.3
Lane LOS	A						D	A	C	B
Approach Delay (s)	1.5			0.0			25.5		11.2	
Approach LOS							D		B	

Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		37.1%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	110	45	25	250	60	40	0	30	215	5	145
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	120	49	27	272	65	43	0	33	234	5	158
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	337			168			690	731	84	647	723	168
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	337			168			690	731	84	647	723	168
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			98			82	100	97	27	98	81
cM capacity (veh/h)	1219			1407			246	313	958	318	317	846

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	80	89	27	181	156	76	239	158
Volume Left	98	0	0	27	0	0	43	234	0
Volume Right	0	0	49	0	0	65	33	0	158
cSH	1219	1700	1700	1407	1700	1700	361	318	846
Volume to Capacity	0.08	0.05	0.05	0.02	0.11	0.09	0.21	0.75	0.19
Queue Length 95th (ft)	7	0	0	1	0	0	20	144	17
Control Delay (s)	8.2	0.0	0.0	7.6	0.0	0.0	17.6	43.8	10.2
Lane LOS	A			A			C	E	B
Approach Delay (s)	3.0			0.6			17.6	30.5	
Approach LOS							C	D	

Intersection Summary			
Average Delay		13.1	
Intersection Capacity Utilization		42.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	305	5	10	230	30	10	0	30	70	5	95
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	332	5	11	250	33	11	0	33	76	5	103
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	283			337			696	747	168	595	734	141
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	283			337			696	747	168	595	734	141
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			96	100	96	79	98	88
cM capacity (veh/h)	1277			1219			275	322	846	358	328	881

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	54	221	116	11	167	116	43	82	103
Volume Left	54	0	0	11	0	0	11	76	0
Volume Right	0	0	5	0	0	33	33	0	103
cSH	1277	1700	1700	1219	1700	1700	557	356	881
Volume to Capacity	0.04	0.13	0.07	0.01	0.10	0.07	0.08	0.23	0.12
Queue Length 95th (ft)	3	0	0	1	0	0	6	22	10
Control Delay (s)	7.9	0.0	0.0	8.0	0.0	0.0	12.0	18.1	9.6
Lane LOS	A			A			B	C	A
Approach Delay (s)	1.1			0.3			12.0	13.4	
Approach LOS							B	B	

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		32.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	355	5	5	140	50	10	0	25	100	5	120
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	386	5	5	152	54	11	0	27	109	5	130
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	207			391			696	693	196	497	668	103
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	207			391			696	693	196	497	668	103
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			96	100	97	75	99	86
cM capacity (veh/h)	1362			1164			271	352	813	428	364	932

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	257	134	5	101	105	38	114	130
Volume Left	43	0	0	5	0	0	11	109	0
Volume Right	0	0	5	0	0	54	27	0	130
cSH	1362	1700	1700	1164	1700	1700	518	425	932
Volume to Capacity	0.03	0.15	0.08	0.00	0.06	0.06	0.07	0.27	0.14
Queue Length 95th (ft)	2	0	0	0	0	0	6	27	12
Control Delay (s)	7.7	0.0	0.0	8.1	0.0	0.0	12.5	16.6	9.5
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.8			0.2			12.5	12.8	
Approach LOS							B	B	

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization		35.8%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	475	180	85	235	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	516	196	92	255	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	288				723	196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	288				723	196
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				35	99
cM capacity (veh/h)	1274				391	846

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	5	516	196	92	266
Volume Left	5	0	0	0	255
Volume Right	0	0	0	92	11
cSH	1274	1700	1700	1700	408
Volume to Capacity	0.00	0.30	0.12	0.05	0.65
Queue Length 95th (ft)	0	0	0	0	112
Control Delay (s)	7.8	0.0	0.0	0.0	29.0
Lane LOS	A				D
Approach Delay (s)	0.1		0.0		29.0
Approach LOS					D

Intersection Summary			
Average Delay		7.2	
Intersection Capacity Utilization		44.7%	ICU Level of Service A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	460	0	200	375	730	335	735
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	
Act Effct Green (s)	18.4	18.4	18.4	22.1	40.8	12.4	71.9
Actuated g/C Ratio	0.26	0.26	0.26	0.31	0.57	0.17	1.00
v/c Ratio	0.58	0.58	0.42	0.75	0.39	0.60	0.50
Control Delay	30.5	30.5	9.8	33.2	10.0	35.2	1.2
Queue Delay	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Total Delay	30.5	30.5	9.8	33.2	10.1	35.2	1.2
LOS	C	C	A	C	B	D	A
Approach Delay		24.2			17.9	11.8	
Approach LOS		C			B	B	

Intersection Summary	
Cycle Length: 99	
Actuated Cycle Length: 71.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 93.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	460	0	200	375	730	0	0	335	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1552	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1552	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	500	0	217	408	793	0	0	364	799
RTOR Reduction (vph)	0	0	0	0	0	124	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	250	250	93	408	793	0	0	364	799
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Effective Green, g (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Actuated g/C Ratio				0.26	0.26	0.26	0.31	0.57			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				434	434	401	549	2027			631	1583
v/s Ratio Prot							c0.23	0.22			0.10	
v/s Ratio Perm				0.15	0.15	0.06						c0.50
v/c Ratio				0.58	0.58	0.23	0.74	0.39			0.58	0.50
Uniform Delay, d1				23.0	23.0	20.8	22.0	8.4			26.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.9	1.9	0.3	5.4	0.1			1.3	1.2
Delay (s)				24.9	24.9	21.1	27.4	8.5			28.1	1.2
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			23.7			14.9			9.6	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	550	355	240	605
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	58.0	58.0	33.0	29.0	62.0
Total Split (%)	48.3%	48.3%	27.5%	24.2%	51.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None
Act Effct Green (s)	52.2	52.2	25.2	20.6	51.8
Actuated g/C Ratio	0.45	0.45	0.22	0.18	0.45
v/c Ratio	0.98	0.75	0.89	0.83	0.42
Control Delay	60.8	26.3	46.7	68.9	22.5
Queue Delay	0.0	0.0	0.0	0.0	1.0
Total Delay	60.8	26.3	46.7	68.9	23.5
LOS	E	C	D	E	C
Approach Delay	45.9		46.7		36.4
Approach LOS	D		D		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 43.2	Intersection LOS: D
Intersection Capacity Utilization 93.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	635	90	550	0	0	0	0	355	335	240	605	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3237		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3237		1770	3539	
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)	690	98	598	0	0	0	0	386	364	261	658	0
RTOR Reduction (vph)	0	0	94	0	0	0	0	143	0	0	0	0
Lane Group Flow (vph)	0	788	504	0	0	0	0	607	0	261	658	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		52.2	52.2					25.2		20.6	51.8	
Effective Green, g (s)		52.2	52.2					25.2		20.6	51.8	
Actuated g/C Ratio		0.45	0.45					0.22		0.18	0.45	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		803	703					703		314	1580	
v/s Ratio Prot								c0.19		c0.15	0.19	
v/s Ratio Perm		0.44	0.32									
v/c Ratio		0.98	0.72					0.86		0.83	0.42	
Uniform Delay, d1		31.4	25.9					43.7		46.0	21.8	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		27.0	3.5					10.7		16.8	0.2	
Delay (s)		58.5	29.4					54.4		62.8	22.0	
Level of Service		E	C					D		E	C	
Approach Delay (s)		45.9			0.0			54.4			33.6	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	44.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1360	925	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	40.0	40.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max
Act Effct Green (s)	41.2	41.2	41.2	41.2	42.3	42.3
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.44	0.44
v/c Ratio	0.12	0.67	0.46	0.15	0.07	0.05
Control Delay	17.3	23.2	19.6	3.3	18.5	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	23.2	19.6	3.3	18.5	7.0
LOS	B	C	B	A	B	A
Approach Delay		23.1	18.0		14.1	
Approach LOS		C	B		B	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 95.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 20.7	Intersection LOS: C
Intersection Capacity Utilization 39.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1360	925	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	410	5085	5085	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1478	1005	114	54	33
RTOR Reduction (vph)	0	0	0	65	0	18
Lane Group Flow (vph)	22	1478	1005	49	54	15
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	41.2	41.2	41.2	41.2	42.3	42.3
Effective Green, g (s)	41.2	41.2	41.2	41.2	42.3	42.3
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.44	0.44
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	2193	2193	682	783	701
v/s Ratio Prot		c0.29	0.20		c0.03	
v/s Ratio Perm	0.05			0.03		0.01
v/c Ratio	0.12	0.67	0.46	0.07	0.07	0.02
Uniform Delay, d1	16.3	21.8	19.2	15.9	15.3	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.8	0.2	0.0	0.2	0.1
Delay (s)	16.6	22.6	19.4	16.0	15.5	15.0
Level of Service	B	C	B	B	B	B
Approach Delay (s)		22.5	19.0		15.3	
Approach LOS		C	B		B	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	95.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2035 with Mitigation PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	2155	5	315	600	425	300	145
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	60.0	60.0	60.0	30.0	70.0	40.0	40.0
Total Split (%)	46.2%	46.2%	46.2%	23.1%	53.8%	30.8%	30.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	2155	5	315	600	425	0	0	300	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.91	0.91	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3221	1615	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				3221	1615	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2177	5	342	606	429	0	0	303	158
RTOR Reduction (vph)	0	0	0	0	0	163	0	0	0	0	0	134
Lane Group Flow (vph)	0	0	0	1459	723	179	606	429	0	0	303	24
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				68.2	68.2	68.2	24.7	49.8			20.1	20.1
Effective Green, g (s)				68.2	68.2	68.2	24.7	49.8			20.1	20.1
Actuated g/C Ratio				0.52	0.52	0.52	0.19	0.38			0.15	0.15
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				1689	847	830	652	713			547	244
v/s Ratio Prot				c0.45	0.45		c0.18	c0.23			0.09	
v/s Ratio Perm						0.11						0.02
v/c Ratio				0.86	0.85	0.22	0.93	0.60			0.55	0.10
Uniform Delay, d1				26.9	26.6	16.6	51.8	32.1			50.8	47.2
Progression Factor				1.00	1.00	1.00	0.78	1.23			1.00	1.00
Incremental Delay, d2				6.1	8.4	0.6	17.9	1.3			1.2	0.2
Delay (s)				33.0	35.0	17.2	58.4	40.7			52.0	47.4
Level of Service				C	C	B	E	D			D	D
Approach Delay (s)		0.0			31.4			51.1			50.4	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	635	925	1575	95	2355
Turn Type	NA	Prot	NA	Free	Prot	NA
Protected Phases	4	4	2		1	6
Permitted Phases				Free		
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	30.0		4.0	30.0
Minimum Split (s)	10.0	10.0	36.0		10.0	36.0
Total Split (s)	48.0	48.0	62.0		20.0	82.0
Total Split (%)	36.9%	36.9%	47.7%		15.4%	63.1%
Yellow Time (s)	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		None	C-Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	635	0	0	0	0	925	1575	95	2355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	0.88					0.95	0.88	1.00	0.91	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1780	2787					3539	2787	1770	5085	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1780	2787					3539	2787	1770	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99	0.92	0.99	0.92
Adj. Flow (vph)	158	11	690	0	0	0	0	934	1591	103	2379	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	169	642	0	0	0	0	934	1591	103	2379	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		36.3	36.3					64.4	130.0	12.3	81.7	
Effective Green, g (s)		36.3	36.3					64.4	130.0	12.3	81.7	
Actuated g/C Ratio		0.28	0.28					0.50	1.00	0.09	0.63	
Clearance Time (s)		6.0	6.0					6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		497	778					1753	2787	167	3195	
v/s Ratio Prot			c0.23					0.26		0.06	c0.47	
v/s Ratio Perm		0.09							0.57			
v/c Ratio		0.34	0.82					0.53	0.57	0.62	0.74	
Uniform Delay, d1		37.3	43.9					22.5	0.0	56.6	16.9	
Progression Factor		1.00	1.00					1.00	1.00	1.23	0.43	
Incremental Delay, d2		0.4	7.1					1.2	0.9	3.9	0.9	
Delay (s)		37.7	51.0					23.7	0.9	73.7	8.2	
Level of Service		D	D					C	A	E	A	
Approach Delay (s)		48.4			0.0			9.3			10.9	
Approach LOS		D			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	180	0	2645	2825	165
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	196	0	2672	2854	179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.76	0.67	0.67			
vC, conflicting volume	3521	951	3033			
vC1, stage 1 conf vol	2854					
vC2, stage 2 conf vol	668					
vCu, unblocked vol	1127	0	2296			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	73	100			
cM capacity (veh/h)	40	722	144			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	196	668	668	668	668	951	951	951	179
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	196	0	0	0	0	0	0	0	179
cSH	722	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.27	0.39	0.39	0.39	0.39	0.56	0.56	0.56	0.11
Queue Length 95th (ft)	27	0	0	0	0	0	0	0	0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B								
Approach Delay (s)	11.8	0.0				0.0			
Approach LOS	B								

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		72.4%	ICU Level of Service	C
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	640	235	480	935	560	490	1405	505	710	1995	410
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	54.0		10.0	54.0		9.0	54.0		9.0	54.0	
Total Split (s)	38.0	54.0		47.0	63.0		47.0	86.0		53.0	92.0	
Total Split (%)	15.8%	22.5%		19.6%	26.3%		19.6%	35.8%		22.1%	38.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 235.6
Natural Cycle: 180
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	640	235	480	935	560	490	1405	505	710	1995	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.91	1.00	0.97	0.91	0.88	0.97	0.86	1.00	0.94	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	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)	598	696	255	522	1016	609	533	1527	549	772	2168	446
RTOR Reduction (vph)	0	0	55	0	0	35	0	0	27	0	0	31
Lane Group Flow (vph)	598	696	200	522	1016	574	533	1527	522	772	2168	415
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	31.2	47.6	93.3	39.2	55.6	105.1	39.7	82.3	127.5	43.5	86.1	123.3
Effective Green, g (s)	31.2	47.6	93.3	39.2	55.6	105.1	39.7	82.3	127.5	43.5	86.1	123.3
Actuated g/C Ratio	0.13	0.20	0.40	0.17	0.24	0.45	0.17	0.35	0.54	0.18	0.37	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	660	1027	626	571	1200	1243	578	2238	856	921	2341	828
v/s Ratio Prot	0.12	0.14		c0.15	c0.20		c0.16	0.24		0.15	c0.34	
v/s Ratio Perm			0.13			0.21			0.33			0.26
v/c Ratio	0.91	0.68	0.32	0.91	0.85	0.46	0.92	0.68	0.61	0.84	0.93	0.50
Uniform Delay, d1	100.8	86.9	49.2	96.5	85.9	45.5	96.4	65.5	37.0	92.7	71.7	36.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.0	1.8	0.3	19.2	5.7	0.3	20.3	0.9	1.2	6.7	6.9	0.5
Delay (s)	116.8	88.7	49.5	115.7	91.6	45.8	116.8	66.4	38.3	99.4	78.6	36.8
Level of Service	F	F	D	F	F	D	F	E	D	F	E	D
Approach Delay (s)		93.1			84.5			70.7			77.9	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	79.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	235.6	Sum of lost time (s)	23.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	250	360	125	145	335	130	1700	110	555	1950	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	39.0	52.0		31.0	44.0		20.0	83.0		74.0	137.0	
Total Split (%)	16.3%	21.7%		12.9%	18.3%		8.3%	34.6%		30.8%	57.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 209.4
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	250	360	125	145	335	130	1700	110	555	1950	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	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)	353	272	391	136	158	364	141	1848	120	603	2120	370
RTOR Reduction (vph)	0	0	46	0	0	40	0	0	48	0	0	71
Lane Group Flow (vph)	353	272	345	136	158	324	141	1848	72	603	2120	299
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	27.0	47.4	66.6	14.0	34.4	84.6	13.2	79.3	99.3	44.2	111.3	144.3
Effective Green, g (s)	27.0	47.4	66.6	14.0	34.4	84.6	13.2	79.3	99.3	44.2	111.3	144.3
Actuated g/C Ratio	0.13	0.23	0.32	0.07	0.16	0.40	0.06	0.38	0.48	0.21	0.53	0.69
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	443	422	504	230	306	641	216	2432	752	726	3414	1093
v/s Ratio Prot	c0.10	0.15		0.04	0.08		0.04	c0.29		c0.18	0.33	
v/s Ratio Perm			c0.22			0.20			0.05			0.19
v/c Ratio	0.80	0.64	0.68	0.59	0.52	0.50	0.65	0.76	0.10	0.83	0.62	0.27
Uniform Delay, d1	88.3	73.1	62.0	94.7	79.7	46.5	95.6	56.5	30.1	78.8	34.1	12.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	3.4	3.8	4.0	1.5	0.6	6.9	1.4	0.1	8.0	0.4	0.1
Delay (s)	97.9	76.5	65.8	98.7	81.1	47.1	102.5	57.9	30.2	86.8	34.4	12.5
Level of Service	F	E	E	F	F	D	F	E	C	F	C	B
Approach Delay (s)		79.8			65.9			59.3			42.0	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	55.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	208.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBT	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations									
Volume (vph)	100	0	475	1490	335	635	1620	105	
Turn Type	Free	NA	custom	NA	Perm	Prot	NA	Perm	
Protected Phases		8		2		1	6		3
Permitted Phases	Free		3 1		2			6	
Detector Phase		8	3 1	2	2	1	6	6	
Switch Phase									
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)		28.0		37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)		28.0		36.0	36.0	26.0	62.0	62.0	28.0
Total Split (%)		31.1%		40.0%	40.0%	28.9%	68.9%	68.9%	31%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lag	Lag	Lead			
Lead-Lag Optimize?									
Recall Mode		None		Min	Min	None	Min	Min	None

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	270	0	475	0	1490	335	635	1620	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00		0.95	0.95		0.91	1.00	0.97	0.91	1.00
Frt			0.86		0.95	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00		0.97	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611		1632	1504		5085	1583	3433	5085	1583
Flt Permitted			1.00		0.97	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611		1632	1504		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	293	0	516	0	1620	364	690	1761	114
RTOR Reduction (vph)	0	0	0	0	83	17	0	0	240	0	0	43
Lane Group Flow (vph)	0	0	109	0	339	370	0	1620	124	690	1761	71
Turn Type			Free	Prot	NA	custom		NA	Perm	Prot	NA	Perm
Protected Phases				3	8			2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			90.5		22.0	47.7		30.8	30.8	19.7	56.5	56.5
Effective Green, g (s)			90.5		22.0	47.7		30.8	30.8	19.7	56.5	56.5
Actuated g/C Ratio			1.00		0.24	0.53		0.34	0.34	0.22	0.62	0.62
Clearance Time (s)					6.0			6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)					3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611		396	792		1730	538	747	3174	988
v/s Ratio Prot					c0.21			c0.32		c0.20	0.35	
v/s Ratio Perm			0.07			0.25			0.08			0.04
v/c Ratio			0.07		0.86	0.47		0.94	0.23	0.92	0.55	0.07
Uniform Delay, d1			0.0		32.7	13.4		28.9	21.4	34.7	9.8	6.7
Progression Factor			1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1		16.5	0.4		10.1	0.2	17.0	0.2	0.0
Delay (s)			0.1		49.3	13.9		39.0	21.6	51.7	10.0	6.7
Level of Service			A		D	B		D	C	D	A	A
Approach Delay (s)		0.1			32.3			35.8			21.1	
Approach LOS		A			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	285	280	495	255	970	705	955	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	24.0	40.0		31.0	47.0		26.0	62.0	47.0	83.0	
Total Split (%)	13.3%	22.2%		17.2%	26.1%		14.4%	34.4%	26.1%	46.1%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 173
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	285	280	495	255	970	425	705	955	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	0.88	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	2787	3433	4853		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	2787	3433	4853		3433	5085	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)	304	228	310	310	304	538	277	1054	462	766	1038	359
RTOR Reduction (vph)	0	0	73	0	0	25	0	43	0	0	0	55
Lane Group Flow (vph)	304	228	237	310	304	513	277	1473	0	766	1038	304
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	18.4	32.4	56.9	20.9	34.9	82.4	18.5	56.2		41.5	79.2	103.6
Effective Green, g (s)	18.4	32.4	56.9	20.9	34.9	82.4	18.5	56.2		41.5	79.2	103.6
Actuated g/C Ratio	0.11	0.19	0.33	0.12	0.20	0.48	0.11	0.32		0.24	0.46	0.60
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	365	348	520	414	375	1327	367	1576		823	2327	947
v/s Ratio Prot	0.09	0.12		c0.09	c0.16		0.08	c0.30		c0.22	0.20	
v/s Ratio Perm			0.15			0.18						0.19
v/c Ratio	0.83	0.66	0.46	0.75	0.81	0.39	0.75	0.93		0.93	0.45	0.32
Uniform Delay, d1	75.8	65.1	45.8	73.5	65.9	29.1	75.0	56.6		64.3	32.0	17.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.9	4.4	0.6	7.3	12.5	0.2	8.5	10.6		16.9	0.1	0.2
Delay (s)	90.7	69.5	46.5	80.8	78.4	29.3	83.6	67.3		81.3	32.1	17.4
Level of Service	F	E	D	F	E	C	F	E		F	C	B
Approach Delay (s)		68.7			56.1			69.8			47.1	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	58.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	173.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	905	795	65	360	495	370	70	380	230	500	385	655
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		18.0	44.0		28.0	54.0	
Total Split (%)	27.5%	27.5%	27.5%	27.5%	27.5%		11.3%	27.5%		17.5%	33.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 140
Natural Cycle: 145
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	905	795	65	360	495	370	70	380	230	500	385	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.94	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
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)	984	864	71	391	538	402	76	413	250	543	418	712
RTOR Reduction (vph)	0	0	50	0	0	0	0	0	49	0	0	83
Lane Group Flow (vph)	984	864	21	391	538	402	76	413	201	543	418	629
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	35.1	40.7	40.7	23.2	28.8	55.0	8.8	33.7	62.9	20.2	45.1	86.2
Effective Green, g (s)	35.1	40.7	40.7	23.2	28.8	55.0	8.8	33.7	62.9	20.2	45.1	86.2
Actuated g/C Ratio	0.25	0.29	0.29	0.16	0.20	0.39	0.06	0.24	0.45	0.14	0.32	0.61
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1243	1022	457	565	1040	1088	110	847	707	715	1133	1706
v/s Ratio Prot	c0.20	c0.24		0.11	0.11	0.14	0.04	c0.12		c0.11	0.12	0.23
v/s Ratio Perm			0.01						0.13			
v/c Ratio	0.79	0.85	0.04	0.69	0.52	0.37	0.69	0.49	0.28	0.76	0.37	0.37
Uniform Delay, d1	49.4	47.1	36.1	55.4	49.8	30.6	64.7	46.1	24.7	58.0	36.9	13.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	6.5	0.0	3.7	0.4	0.2	17.1	0.4	0.2	4.6	0.2	0.1
Delay (s)	53.0	53.6	36.1	59.1	50.3	30.8	81.7	46.6	24.9	62.6	37.1	13.8
Level of Service	D	D	D	E	D	C	F	D	C	E	D	B
Approach Delay (s)		52.6			47.0			42.9			35.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	140.8	Sum of lost time (s)	23.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	655	0	55	5	1155	150	1590
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	655	0	55	5	1155	615	150	1590	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.91	
Frt		0.86		1.00	1.00	0.85	1.00	0.95		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3355		1770	5085	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3355		1770	5085	
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	0	11	712	0	60	5	1255	668	163	1728	0
RTOR Reduction (vph)	0	11	0	0	0	46	0	36	0	0	0	0
Lane Group Flow (vph)	0	0	0	356	356	14	5	1887	0	163	1728	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		2.2		41.2	41.2	41.2	1.5	97.5		19.1	115.1	
Effective Green, g (s)		2.2		41.2	41.2	41.2	1.5	97.5		19.1	115.1	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.54		0.11	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		19		384	384	362	14	1817		187	3251	
v/s Ratio Prot		c0.00		c0.21	0.21		0.00	c0.56		c0.09	0.34	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.93	0.93	0.04	0.36	1.04		0.87	0.53	
Uniform Delay, d1		87.8		67.9	67.9	54.0	88.8	41.2		79.2	17.7	
Progression Factor		1.00		1.00	1.00	1.00	1.33	0.70		1.00	1.00	
Incremental Delay, d2		0.1		28.0	28.0	0.0	11.1	29.0		33.0	0.6	
Delay (s)		88.0		96.0	96.0	54.0	129.4	57.9		112.2	18.4	
Level of Service		F		F	F	D	F	E		F	B	
Approach Delay (s)		88.0			92.7			58.1			26.4	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	450	25	1715	950	2335
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	450	25	1715	950	0	2335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.91
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		5085
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	27	1864	1033	0	2538
RTOR Reduction (vph)	0	15	0	148	0	0
Lane Group Flow (vph)	489	12	1864	885	0	2538
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	31.4	31.4	136.6	136.6		136.6
Effective Green, g (s)	31.4	31.4	136.6	136.6		136.6
Actuated g/C Ratio	0.17	0.17	0.76	0.76		0.76
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	598	276	2685	1201		3858
v/s Ratio Prot	c0.14		0.53			0.50
v/s Ratio Perm		0.01		c0.56		
v/c Ratio	0.82	0.04	0.69	0.74		0.66
Uniform Delay, d1	71.5	61.8	11.1	11.9		10.4
Progression Factor	1.00	1.00	1.00	1.00		0.81
Incremental Delay, d2	8.5	0.1	1.5	4.1		0.7
Delay (s)	80.1	61.9	12.6	15.9		9.2
Level of Service	F	E	B	B		A
Approach Delay (s)	79.1		13.8			9.2
Approach LOS	E		B			A

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2470	2055	740	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2685	2234	804	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.75				0.75	0.75
vC, conflicting volume	3038				3531	1147
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2539				3200	1
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	129				6	807

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	895	895	895	893	893	1251
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	804
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.53	0.53	0.53	0.53	0.53	0.74
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	145	2470	2055
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 83.5
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	145	2470	2055	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.91	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	5085	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	158	2685	2234	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	158	2685	2234	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			12.9	83.5	58.6	
Effective Green, g (s)			12.9	83.5	58.6	
Actuated g/C Ratio			0.15	1.00	0.70	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			273	5085	3568	
v/s Ratio Prot			0.09	c0.53	c0.44	
v/s Ratio Perm						
v/c Ratio			0.58	0.53	0.63	
Uniform Delay, d1			32.8	0.0	6.6	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			3.0	0.1	0.3	
Delay (s)			35.7	0.1	7.0	
Level of Service			D	A	A	
Approach Delay (s)	0.0			2.1	7.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	395	300	1435	680	4040
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 161.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	0	300	0	0	0	0	1435	0	680	4040	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.86	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	6408	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	6408	
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)	429	0	326	0	0	0	0	1560	0	739	4391	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	429	0	326	0	0	0	0	1560	0	739	4391	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	25.2		161.3					81.1		37.0	124.1	
Effective Green, g (s)	25.2		161.3					81.1		37.0	124.1	
Actuated g/C Ratio	0.16		1.00					0.50		0.23	0.77	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	536		1583					1779		787	4930	
v/s Ratio Prot	c0.12							0.44		0.22	c0.69	
v/s Ratio Perm			0.21									
v/c Ratio	0.80		0.21					0.88		0.94	0.89	
Uniform Delay, d1	65.6		0.0					35.7		61.0	13.6	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	8.4		0.3					5.2		18.6	2.3	
Delay (s)	74.0		0.3					40.9		79.7	16.0	
Level of Service	E		A					D		E	B	
Approach Delay (s)		42.2			0.0			40.9			25.1	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	161.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2025	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2025	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2201	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2201	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.62			
v/s Ratio Perm						
v/c Ratio			0.69			
Uniform Delay, d1			2.1			
Progression Factor			1.00			
Incremental Delay, d2			1.3			
Delay (s)			3.3			
Level of Service			A			
Approach Delay (s)	0.0		3.3			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	3.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	1435	2025	0	4340	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1560	2201	0	4717	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.25	
vC, conflicting volume			3761		2739	780
vC1, stage 1 conf vol					1560	
vC2, stage 2 conf vol					1179	
vCu, unblocked vol			3761		0	780
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			55		254	338

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	780	780	1101	1101	1179	1179	1179	1179
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	1101	1101	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.46	0.46	0.65	0.65	0.69	0.69	0.69	0.69
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.
Channelized right turn lanes are not counted.

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	125	150	40	5	115	50	2390	35	115	3220	125
Turn Type	Perm	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8			2			6
Detector Phase	4	4	8	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0	51.0	10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0	51.0	15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	21.3%	6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	150	35	40	5	115	50	2390	35	115	3220	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797		1743	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.30	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1797		547	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	150%	100%	100%	100%
Adj. Flow (vph)	136	163	38	43	5	125	54	2598	57	125	3253	136
RTOR Reduction (vph)	0	3	0	0	0	101	0	0	18	0	0	20
Lane Group Flow (vph)	136	198	0	43	5	24	54	2598	39	125	3253	116
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	37.0	9.6	163.1	163.1	20.9	174.4	174.4
Effective Green, g (s)	37.0	37.0		37.0	37.0	37.0	9.6	163.1	163.1	20.9	174.4	174.4
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.04	0.68	0.68	0.09	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	277		84	287	244	70	3455	1048	154	3695	1088
v/s Ratio Prot		c0.11			0.00		0.03	0.51		c0.07	c0.64	
v/s Ratio Perm	0.10			0.08		0.02			0.03			0.08
v/c Ratio	0.63	0.71		0.51	0.02	0.10	0.77	0.75	0.04	0.81	0.88	0.11
Uniform Delay, d1	95.1	96.5		93.2	86.1	87.2	114.1	25.2	12.6	107.6	24.9	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.81	0.97	3.63	1.00	1.01	1.03
Incremental Delay, d2	5.6	8.4		5.2	0.0	0.2	26.4	0.9	0.0	26.7	3.4	0.2
Delay (s)	100.7	104.9		98.4	86.1	87.4	118.8	25.3	46.0	134.5	28.6	10.2
Level of Service	F	F		F	F	F	F	C	D	F	C	B
Approach Delay (s)		103.2			90.1			27.6			31.6	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	111.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	305	105	220	10	115	230	2145	50	160	2940	365
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8		5	2		1	6	
Permitted Phases			4		8			2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	39.0	39.0	39.0	16.0	16.0	26.0	143.0	143.0	42.0	159.0	159.0
Total Split (%)	16.3%	16.3%	16.3%	6.7%	6.7%	10.8%	59.6%	59.6%	17.5%	66.3%	66.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	305	105	220	35	10	115	230	2145	50	160	2940	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1727	1533		1793	1583	3433	5085	1551	1770	5085	1560
Flt Permitted	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1727	1533		1793	1583	3433	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	332	114	239	38	11	125	250	2332	54	174	2970	397
RTOR Reduction (vph)	0	0	124	0	0	120	0	0	22	0	0	124
Lane Group Flow (vph)	219	227	115	0	49	5	250	2332	32	174	2970	273
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	32.7	32.7	32.7		9.5	9.5	19.6	144.3	144.3	28.5	153.2	153.2
Effective Green, g (s)	32.7	32.7	32.7		9.5	9.5	19.6	144.3	144.3	28.5	153.2	153.2
Actuated g/C Ratio	0.14	0.14	0.14		0.04	0.04	0.08	0.60	0.60	0.12	0.64	0.64
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	229	235	208		70	62	280	3057	932	210	3245	995
v/s Ratio Prot	0.13	c0.13			c0.03		0.07	0.46		c0.10	c0.58	
v/s Ratio Perm			0.07			0.00			0.02			0.17
v/c Ratio	0.96	0.97	0.55		0.70	0.08	0.89	0.76	0.03	0.83	0.92	0.27
Uniform Delay, d1	102.9	103.1	96.8		113.8	111.0	109.2	35.2	19.5	103.4	37.8	19.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.85	1.01	1.00	0.93	0.78	2.19
Incremental Delay, d2	46.8	48.7	3.1		26.3	0.6	23.6	1.5	0.1	13.6	3.0	0.4
Delay (s)	149.8	151.8	99.9		140.2	111.6	116.3	37.2	19.5	109.7	32.4	42.0
Level of Service	F	F	F		F	F	F	D	B	F	C	D
Approach Delay (s)		133.0			119.6			44.4			37.2	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2395	3350	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2395	3350	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2603	3384	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2603	3384	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.51	c0.67	
v/s Ratio Perm						
v/c Ratio				0.66	0.86	
Uniform Delay, d1				6.5	9.5	
Progression Factor				1.08	1.84	
Incremental Delay, d2				0.7	1.4	
Delay (s)				7.8	18.8	
Level of Service				A	B	
Approach Delay (s)	0.0			7.8	18.8	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	30	165	15	20	185	1955	35	40	2695	395
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4		3			2			6
Detector Phase	4	4	4	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0	41.0	11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0	43.0	14.0	14.0	35.0	153.0	153.0	30.0	148.0	148.0
Total Split (%)	17.9%	17.9%	17.9%	5.8%	5.8%	14.6%	63.8%	63.8%	12.5%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	30	165	25	15	20	185	1955	35	40	2695	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
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)	326	33	179	27	16	22	201	2125	38	43	2929	429
RTOR Reduction (vph)	0	0	91	0	0	21	0	0	12	0	0	170
Lane Group Flow (vph)	179	180	88	0	43	1	201	2125	26	43	2929	259
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4			3			2			6
Actuated Green, G (s)	33.0	33.0	33.0		7.7	7.7	29.4	165.2	165.2	9.1	144.9	144.9
Effective Green, g (s)	33.0	33.0	33.0		7.7	7.7	29.4	165.2	165.2	9.1	144.9	144.9
Actuated g/C Ratio	0.14	0.14	0.14		0.03	0.03	0.12	0.69	0.69	0.04	0.60	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	231	233	196		57	50	216	3500	957	67	3070	812
v/s Ratio Prot	c0.11	0.11			c0.02		c0.11	0.42		0.02	c0.58	
v/s Ratio Perm			0.06			0.00			0.02			0.19
v/c Ratio	0.77	0.77	0.45		0.75	0.01	0.93	0.61	0.03	0.64	0.95	0.32
Uniform Delay, d1	99.9	99.9	95.1		115.2	112.5	104.3	20.0	11.9	113.8	44.4	23.3
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.90	1.46	75.19	1.14	0.42	2.47
Incremental Delay, d2	14.9	14.6	1.6		38.8	0.0	36.6	0.6	0.0	8.7	5.5	0.6
Delay (s)	114.8	114.5	96.7		154.0	112.5	130.6	29.9	893.3	138.8	24.4	58.1
Level of Service	F	F	F		F	F	F	C	F	F	C	E
Approach Delay (s)		108.7			139.9			52.3			30.1	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	235	75	50	85	405	35	1555	5	420	2200	450
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3		4			2			6
Detector Phase	3	3	3	4	4	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	10.0	10.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	61.0	61.0	61.0	33.0	33.0	27.0	108.0	108.0	38.0	119.0	119.0
Total Split (%)	25.4%	25.4%	25.4%	13.8%	13.8%	11.3%	45.0%	45.0%	15.8%	49.6%	49.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	75	50	10	85	405	35	1555	5	420	2200	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	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)	255	82	54	11	92	440	38	1690	5	457	2391	489
RTOR Reduction (vph)	0	0	47	0	0	381	0	0	2	0	0	125
Lane Group Flow (vph)	166	171	7	0	103	59	38	1690	3	457	2391	364
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	29.3	29.3	29.3		19.0	19.0	9.3	134.7	134.7	32.0	157.4	157.4
Effective Green, g (s)	29.3	29.3	29.3		19.0	19.0	9.3	134.7	134.7	32.0	157.4	157.4
Actuated g/C Ratio	0.12	0.12	0.12		0.08	0.08	0.04	0.56	0.56	0.13	0.66	0.66
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	210	193		146	220	68	2853	888	457	3334	1038
v/s Ratio Prot	0.10	c0.10			c0.06		0.02	0.33		c0.13	c0.47	
v/s Ratio Perm			0.00			0.02			0.00			0.23
v/c Ratio	0.81	0.81	0.03		0.71	0.27	0.56	0.59	0.00	1.00	0.72	0.35
Uniform Delay, d1	102.6	102.7	92.9		107.8	104.0	113.3	34.6	23.1	104.0	26.8	18.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.15	0.53	1.00	1.37	0.21	0.03
Incremental Delay, d2	20.5	20.9	0.1		14.4	0.7	7.8	0.7	0.0	28.8	0.6	0.4
Delay (s)	123.1	123.6	92.9		122.2	104.6	138.4	19.2	23.1	171.7	6.4	1.0
Level of Service	F	F	F		F	F	F	B	C	F	A	A
Approach Delay (s)		119.2			107.9			21.8			28.2	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1755	255
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1755	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	266	332	223	38	375	266	228	1337	43	424	1773	277
RTOR Reduction (vph)	0	0	57	0	0	46	0	0	16	0	0	84
Lane Group Flow (vph)	194	404	166	38	375	220	228	1337	27	424	1773	193
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Effective Green, g (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Actuated g/C Ratio	0.14	0.14	0.22	0.21	0.21	0.35	0.08	0.41	0.62	0.14	0.47	0.47
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	224	467	346	367	386	1032	273	2091	979	473	2387	743
v/s Ratio Prot	c0.12	0.12		0.02	c0.20	0.04	0.07	0.26		c0.12	c0.35	
v/s Ratio Perm			0.10			0.03			0.02			0.12
v/c Ratio	0.87	0.87	0.48	0.10	0.97	0.21	0.84	0.64	0.03	0.90	0.74	0.26
Uniform Delay, d1	101.1	101.1	81.8	77.0	94.4	55.5	108.9	56.4	17.7	101.8	51.8	38.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.69	1.66	2.67
Incremental Delay, d2	26.9	14.9	0.4	0.0	38.0	0.0	18.5	1.5	0.0	14.4	1.5	0.6
Delay (s)	128.0	115.9	82.2	77.1	132.4	55.5	127.4	57.9	17.7	84.3	87.4	103.3
Level of Service	F	F	F	E	F	E	F	E	B	F	F	F
Approach Delay (s)		109.6			99.2			66.7			88.7	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	86.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1540	125	70	1920	40	125	15	50	40	15	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	40.0	40.0	40.0	38.0	38.0	38.0
Total Split (s)	23.0	65.0	65.0	15.0	57.0	57.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	19.2%	54.2%	54.2%	12.5%	47.5%	47.5%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1540	125	70	1920	40	125	15	50	40	15	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1783	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.76	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1316	1583		1409	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)	207	1674	136	76	2087	43	136	16	54	43	16	158
RTOR Reduction (vph)	0	0	53	0	0	22	0	0	41	0	0	117
Lane Group Flow (vph)	207	1674	83	76	2087	21	0	152	13	0	59	41
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	17.4	66.2	66.2	8.3	59.1	59.1		29.5	29.5		31.5	31.5
Effective Green, g (s)	17.4	66.2	66.2	8.3	59.1	59.1		29.5	29.5		31.5	31.5
Actuated g/C Ratio	0.14	0.55	0.55	0.07	0.49	0.49		0.25	0.25		0.26	0.26
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	256	2805	873	122	2504	779		323	389		369	415
v/s Ratio Prot	c0.12	0.33		0.04	c0.41							
v/s Ratio Perm			0.05			0.01		c0.12	0.01		0.04	0.03
v/c Ratio	0.81	0.60	0.10	0.62	0.83	0.03		0.47	0.03		0.16	0.10
Uniform Delay, d1	49.7	18.0	12.7	54.3	26.2	15.7		38.6	34.4		34.1	33.5
Progression Factor	1.00	1.00	1.00	0.87	1.05	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	16.9	0.9	0.2	6.1	2.2	0.0		1.1	0.0		0.2	0.1
Delay (s)	66.6	18.9	12.9	53.5	29.8	15.7		39.7	34.5		34.3	33.6
Level of Service	E	B	B	D	C	B		D	C		C	C
Approach Delay (s)		23.4			30.3			38.3			33.8	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1295	55	65	1815	50	100	15	20	40	15	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	24.0	64.0	64.0	16.0	56.0	56.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	20.0%	53.3%	53.3%	13.3%	46.7%	46.7%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1295	55	65	1815	50	100	15	20	40	15	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1785	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.75	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1326	1583		1389	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)	190	1408	60	71	1973	54	109	16	22	43	16	158
RTOR Reduction (vph)	0	0	27	0	0	29	0	0	17	0	0	120
Lane Group Flow (vph)	190	1408	33	71	1973	25	0	125	5	0	59	38
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.4	65.2	65.2	7.7	56.5	56.5		29.1	29.1		29.1	29.1
Effective Green, g (s)	16.4	65.2	65.2	7.7	56.5	56.5		29.1	29.1		29.1	29.1
Actuated g/C Ratio	0.14	0.54	0.54	0.06	0.47	0.47		0.24	0.24		0.24	0.24
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	241	2762	860	113	2394	745		321	383		336	383
v/s Ratio Prot	c0.11	0.28		0.04	c0.39							
v/s Ratio Perm			0.02			0.02		c0.09	0.00		0.04	0.02
v/c Ratio	0.79	0.51	0.04	0.63	0.82	0.03		0.39	0.01		0.18	0.10
Uniform Delay, d1	50.1	17.3	12.8	54.8	27.5	17.1		38.0	34.5		36.0	35.3
Progression Factor	1.21	0.66	1.21	1.29	0.67	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	13.3	0.6	0.1	8.8	2.8	0.1		0.8	0.0		0.3	0.1
Delay (s)	73.8	12.1	15.5	79.4	21.3	17.1		38.8	34.6		36.2	35.4
Level of Service	E	B	B	E	C	B		D	C		D	D
Approach Delay (s)		19.3			23.2			38.2			35.6	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1250	120	1810	115	70
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	40.0	40.0
Total Split (s)	55.0	23.0	78.0	42.0	42.0
Total Split (%)	45.8%	19.2%	65.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1250	95	120	1810	115	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5032		1770	5085	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5032		1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1359	103	130	1967	125	76
RTOR Reduction (vph)	6	0	0	0	0	58
Lane Group Flow (vph)	1456	0	130	1967	125	18
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	59.1		14.0	79.1	28.9	28.9
Effective Green, g (s)	59.1		14.0	79.1	28.9	28.9
Actuated g/C Ratio	0.49		0.12	0.66	0.24	0.24
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2478		206	3351	426	381
v/s Ratio Prot	0.29		0.07	c0.39	c0.07	
v/s Ratio Perm						0.01
v/c Ratio	0.59		0.63	0.59	0.29	0.05
Uniform Delay, d1	21.7		50.5	11.4	37.2	35.0
Progression Factor	0.83		1.32	0.88	1.00	1.00
Incremental Delay, d2	0.9		4.7	0.6	0.4	0.1
Delay (s)	18.9		71.2	10.6	37.6	35.0
Level of Service	B		E	B	D	D
Approach Delay (s)	18.9			14.4	36.6	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1205	65	125	1795	10	95	5	85	10	5	45
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	14.0	59.0	59.0	21.0	66.0	66.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	11.7%	49.2%	49.2%	17.5%	55.0%	55.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1205	65	125	1795	10	95	5	85	10	5	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1778	1583		1801	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.84	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1349	1583		1572	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)	49	1310	71	136	1951	11	103	5	92	11	5	49
RTOR Reduction (vph)	0	0	35	0	0	5	0	0	70	0	0	37
Lane Group Flow (vph)	49	1310	36	136	1951	6	0	108	22	0	16	12
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	6.8	60.6	60.6	13.5	67.3	67.3		28.9	28.9		28.9	28.9
Effective Green, g (s)	6.8	60.6	60.6	13.5	67.3	67.3		28.9	28.9		28.9	28.9
Actuated g/C Ratio	0.06	0.51	0.51	0.11	0.56	0.56		0.24	0.24		0.24	0.24
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	100	2567	799	199	2851	887		324	381		378	381
v/s Ratio Prot	0.03	0.26		c0.08	c0.38							
v/s Ratio Perm			0.02			0.00		c0.08	0.01		0.01	0.01
v/c Ratio	0.49	0.51	0.04	0.68	0.68	0.01		0.33	0.06		0.04	0.03
Uniform Delay, d1	54.9	19.8	15.0	51.2	18.8	11.6		37.6	35.1		34.9	34.8
Progression Factor	1.14	0.84	3.57	1.35	0.50	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.1	0.6	0.1	7.9	1.1	0.0		0.6	0.1		0.0	0.0
Delay (s)	65.8	17.2	53.8	77.3	10.6	11.6		38.2	35.1		35.0	34.9
Level of Service	E	B	D	E	B	B		D	D		C	C
Approach Delay (s)		20.7			14.9			36.8			34.9	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1180	120	145	1765	160	105
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	39.0	39.0
Total Split (s)	52.0	52.0	27.0	79.0	41.0	41.0
Total Split (%)	43.3%	43.3%	22.5%	65.8%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1180	120	145	1765	160	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1283	130	158	1918	174	114
RTOR Reduction (vph)	0	34	0	0	0	86
Lane Group Flow (vph)	1283	96	158	1918	174	28
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	58.7	58.7	15.9	79.6	29.4	29.4
Effective Green, g (s)	58.7	58.7	15.9	79.6	29.4	29.4
Actuated g/C Ratio	0.49	0.49	0.13	0.66	0.24	0.24
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2487	774	234	3373	433	387
v/s Ratio Prot	0.25		c0.09	c0.38	c0.10	
v/s Ratio Perm		0.06				0.02
v/c Ratio	0.52	0.12	0.68	0.57	0.40	0.07
Uniform Delay, d1	20.9	16.7	49.6	10.9	37.9	34.8
Progression Factor	0.41	0.39	1.24	1.07	1.00	1.00
Incremental Delay, d2	0.7	0.3	6.1	0.6	0.6	0.1
Delay (s)	9.2	6.8	67.3	12.3	38.5	34.9
Level of Service	A	A	E	B	D	C
Approach Delay (s)	9.0			16.5	37.1	
Approach LOS	A			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1140	100	190	1665	15	120	25	120	25	5	125
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	15.0	48.0	48.0	31.0	64.0	64.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	12.5%	40.0%	40.0%	25.8%	53.3%	53.3%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1140	100	190	1665	15	120	25	120	25	5	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1789	1583		1787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.74	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1379	1583		1377	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)	54	1239	109	207	1810	16	130	27	130	27	5	136
RTOR Reduction (vph)	0	0	61	0	0	7	0	0	98	0	0	103
Lane Group Flow (vph)	54	1239	48	207	1810	9	0	157	32	0	32	33
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.3	53.3	53.3	19.2	65.2	65.2		29.5	29.5		29.5	29.5
Effective Green, g (s)	7.3	53.3	53.3	19.2	65.2	65.2		29.5	29.5		29.5	29.5
Actuated g/C Ratio	0.06	0.44	0.44	0.16	0.54	0.54		0.25	0.25		0.25	0.25
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	107	2258	703	283	2762	860		339	389		338	389
v/s Ratio Prot	0.03	0.24		c0.12	c0.36							
v/s Ratio Perm			0.03			0.01		c0.11	0.02		0.02	0.02
v/c Ratio	0.50	0.55	0.07	0.73	0.66	0.01		0.46	0.08		0.09	0.09
Uniform Delay, d1	54.6	24.5	19.1	47.9	19.4	12.6		38.5	34.8		34.9	34.9
Progression Factor	1.11	0.81	1.90	0.98	1.53	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.3	0.9	0.2	6.2	0.8	0.0		1.0	0.1		0.1	0.1
Delay (s)	63.7	20.8	36.5	53.2	30.6	12.6		39.5	34.9		35.1	35.0
Level of Service	E	C	D	D	C	B		D	C		D	C
Approach Delay (s)		23.7			32.8			37.4			35.0	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1060	55	555	1760	75	80	65	285	65	60	35
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	23.0	45.0	45.0	35.0	57.0	57.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	19.2%	37.5%	37.5%	29.2%	47.5%	47.5%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1060	55	555	1760	75	80	65	285	65	60	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	1331	1863	1583	1324	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	1152	60	603	1913	82	87	71	310	71	65	38
RTOR Reduction (vph)	0	0	36	0	0	43	0	0	236	0	0	29
Lane Group Flow (vph)	185	1152	24	603	1913	39	87	71	74	71	65	9
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	15.7	47.8	47.8	25.5	57.6	57.6	28.7	28.7	28.7	28.7	28.7	28.7
Effective Green, g (s)	15.7	47.8	47.8	25.5	57.6	57.6	28.7	28.7	28.7	28.7	28.7	28.7
Actuated g/C Ratio	0.13	0.40	0.40	0.21	0.48	0.48	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	231	2025	630	729	2440	759	318	445	378	316	445	378
v/s Ratio Prot	0.10	0.23		c0.18	c0.38			0.04			0.03	
v/s Ratio Perm			0.02			0.02	c0.07		0.05	0.05		0.01
v/c Ratio	0.80	0.57	0.04	0.83	0.78	0.05	0.27	0.16	0.20	0.22	0.15	0.02
Uniform Delay, d1	50.6	28.1	22.1	45.1	26.0	16.6	37.2	36.1	36.4	36.7	36.0	34.9
Progression Factor	0.88	1.32	1.00	0.94	0.81	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.8	1.0	0.1	4.8	1.6	0.1	0.5	0.2	0.3	0.4	0.2	0.0
Delay (s)	60.4	38.2	22.2	47.4	22.7	14.4	37.6	36.3	36.7	37.1	36.1	35.0
Level of Service	E	D	C	D	C	B	D	D	D	D	D	C
Approach Delay (s)		40.4			28.1			36.8			36.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Volume (vph)	1395	2310	95	15
Turn Type	NA	NA	NA	Perm
Protected Phases	4	8	2	
Permitted Phases				2
Detector Phase	4	8	2	2
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	40.0	40.0
Total Split (s)	79.0	79.0	41.0	41.0
Total Split (%)	65.8%	65.8%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1395	35	0	2310	95	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.91			0.91	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	5067			5085	1770	1583
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	5067			5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1516	38	0	2511	103	16
RTOR Reduction (vph)	2	0	0	0	0	11
Lane Group Flow (vph)	1552	0	0	2511	103	5
Turn Type	NA			NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	73.6			73.6	34.4	34.4
Effective Green, g (s)	73.6			73.6	34.4	34.4
Actuated g/C Ratio	0.61			0.61	0.29	0.29
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	3107			3118	507	453
v/s Ratio Prot	0.31			c0.49	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	0.50			0.81	0.20	0.01
Uniform Delay, d1	12.9			17.7	32.4	30.6
Progression Factor	1.09			1.33	1.00	1.00
Incremental Delay, d2	0.1			0.7	0.9	0.0
Delay (s)	14.2			24.2	33.3	30.7
Level of Service	B			C	C	C
Approach Delay (s)	14.2			24.2	33.0	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	115	1305	210	2065	490	75	60	595	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	40.0
Total Split (s)	20.0	53.0	26.0	59.0		12.0	12.0	29.0	41.0
Total Split (%)	16.7%	44.2%	21.7%	49.2%		10.0%	10.0%	24.2%	34.2%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1305	0	210	2065	490	0	75	60	595	5	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085		1770	5085	1583		1863	1583	3433	1588	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5085		1770	5085	1583		1863	1583	3433	1588	
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)	125	1418	0	228	2245	533	0	82	65	647	5	266
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	62	0	184	0
Lane Group Flow (vph)	125	1418	0	228	2245	474	0	82	3	647	87	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	12.8	49.0		19.0	55.2	96.2		6.0	6.0	23.0	35.0	
Effective Green, g (s)	12.8	49.0		19.0	55.2	96.2		6.0	6.0	23.0	35.0	
Actuated g/C Ratio	0.11	0.41		0.16	0.46	0.80		0.05	0.05	0.19	0.29	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	188	2076		280	2339	1269		93	79	657	463	
v/s Ratio Prot	0.07	0.28		c0.13	c0.44			c0.04		c0.19	0.05	
v/s Ratio Perm						0.30			0.00			
v/c Ratio	0.66	0.68		0.81	0.96	0.37		0.88	0.04	0.98	0.19	
Uniform Delay, d1	51.5	29.1		48.8	31.3	3.4		56.6	54.3	48.3	31.8	
Progression Factor	0.88	1.09		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.6	1.6		16.4	11.3	0.2		56.5	0.2	31.0	0.2	
Delay (s)	52.9	33.3		65.2	42.6	3.6		113.2	54.5	79.4	32.0	
Level of Service	D	C		E	D	A		F	D	E	C	
Approach Delay (s)		34.9			37.4			87.2			65.4	
Approach LOS		C			D			F			E	

Intersection Summary			
HCM 2000 Control Delay	42.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	170	5	75	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	185	5	82	114

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	190	196
Volume Left (vph)	0	185	82
Volume Right (vph)	43	0	114
Hadj (s)	-0.45	0.23	-0.23
Departure Headway (s)	4.1	4.6	4.2
Degree Utilization, x	0.06	0.25	0.23
Capacity (veh/h)	820	739	805
Control Delay (s)	7.4	9.1	8.5
Approach Delay (s)	7.4	9.1	8.5
Approach LOS	A	A	A

Intersection Summary			
Delay	8.6		
Level of Service	A		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	1970	680	1765
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 105.3
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1970	0	680	1765	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.91		0.97	0.91		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	5085		3433	5085		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	5085		3433	5085		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2141	0	739	1918	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2141	0	739	1918	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	63.2		30.0	105.2		
Effective Green, g (s)	63.2		30.0	105.2		
Actuated g/C Ratio	0.60		0.29	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	3054		978	5085		
v/s Ratio Prot	c0.42		c0.22	0.38		
v/s Ratio Perm						
v/c Ratio	0.70		0.76	0.38		
Uniform Delay, d1	14.5		34.3	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.7		3.4	0.0		
Delay (s)	15.2		37.6	0.0		
Level of Service	B		D	A		
Approach Delay (s)	15.2			10.5	0.0	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	105.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	915	1600	2490	550
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	40.0	120.0	80.0	
Total Split (%)	33.3%	100.0%	66.7%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	915	1600	2490	550	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	0.97	0.95	0.91	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	3433	3539	5085	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	3433	3539	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	995	1739	2707	598	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	995	1739	2707	598	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	35.0	120.0	74.0	120.0		
Effective Green, g (s)	35.0	120.0	74.0	120.0		
Actuated g/C Ratio	0.29	1.00	0.62	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	1001	3539	3135	1583		
v/s Ratio Prot	c0.29	0.49	c0.53			
v/s Ratio Perm				0.38		
v/c Ratio	0.99	0.49	0.86	0.38		
Uniform Delay, d1	42.4	0.0	18.9	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	26.8	0.1	2.7	0.7		
Delay (s)	69.1	0.1	21.6	0.7		
Level of Service	E	A	C	A		
Approach Delay (s)		25.2	17.8		0.0	
Approach LOS		C	B		A	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	1275	915	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1386	995	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		Raised	Raised			
Median storage veh)		1	1			
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1011				1750	505
vC1, stage 1 conf vol					1003	
vC2, stage 2 conf vol					747	
vCu, unblocked vol	1011				1750	505
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				89	82
cM capacity (veh/h)	681				196	512

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	693	693	663	348	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	681	1700	1700	1700	1700	196	512
Volume to Capacity	0.04	0.41	0.41	0.39	0.20	0.11	0.18
Queue Length 95th (ft)	3	0	0	0	0	9	16
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	25.6	13.6
Lane LOS	B					D	B
Approach Delay (s)	0.2			0.0		15.9	
Approach LOS						C	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	135	950	45	5	725	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	1033	49	5	788	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	799			1082			1848	2160	541	1620	2179	399
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	799			1082			1848	2160	541	1620	2179	399
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			19	100	99	100	100	85
cM capacity (veh/h)	819			641			33	38	486	58	37	600

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	147	688	393	5	525	274	33	0	92
Volume Left	147	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	819	1700	1700	641	1700	1700	40	1700	600
Volume to Capacity	0.18	0.40	0.23	0.01	0.31	0.16	0.82	0.00	0.15
Queue Length 95th (ft)	16	0	0	1	0	0	77	0	14
Control Delay (s)	10.3	0.0	0.0	10.7	0.0	0.0	244.3	0.0	12.1
Lane LOS	B			B			F	A	B
Approach Delay (s)	1.2			0.1			244.3	12.1	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.9	
Intersection Capacity Utilization		44.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	770	40	5	650	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	837	43	5	707	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	717			880			1609	1902	440	1459	1918	359
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	717			880			1609	1902	440	1459	1918	359
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			59	90	100	100	100	89
cM capacity (veh/h)	879			763			53	56	565	72	54	638

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	558	322	5	471	246	27	0	71
Volume Left	158	0	0	5	0	0	22	0	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	879	1700	1700	763	1700	1700	54	1700	638
Volume to Capacity	0.18	0.33	0.19	0.01	0.28	0.14	0.51	0.00	0.11
Queue Length 95th (ft)	16	0	0	1	0	0	48	0	9
Control Delay (s)	10.0	0.0	0.0	9.7	0.0	0.0	127.0	0.0	11.3
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.5			0.1			127.0	11.3	
Approach LOS							F	B	

Intersection Summary			
Average Delay		3.2	
Intersection Capacity Utilization		39.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	620	25	5	550	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	674	27	5	598	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	609			701			1361	1557	351	1201	1565	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	609			701			1361	1557	351	1201	1565	304
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			99			80	100	100	100	100	83
cM capacity (veh/h)	966			892			80	97	646	126	95	692

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	449	252	5	399	210	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	966	1700	1700	892	1700	1700	80	1700	692
Volume to Capacity	0.13	0.26	0.15	0.01	0.23	0.12	0.20	0.00	0.17
Queue Length 95th (ft)	11	0	0	0	0	0	18	0	15
Control Delay (s)	9.3	0.0	0.0	9.1	0.0	0.0	61.2	0.0	11.2
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.4			0.1			61.2	11.2	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		35.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	485	45	0	430	15	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	527	49	0	467	16	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			576			1043	1242	288	954	1258	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			576			1043	1242	288	954	1258	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			26	90	100	100	82	95
cM capacity (veh/h)	1075			993			140	157	709	182	153	759

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	103	351	225	0	312	172	120	0	27	38
Volume Left	103	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	16	0	0	0	38
cSH	1075	1700	1700	1700	1700	1700	142	1700	153	759
Volume to Capacity	0.10	0.21	0.13	0.00	0.18	0.10	0.84	0.00	0.18	0.05
Queue Length 95th (ft)	8	0	0	0	0	0	136	0	16	4
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	0.0	99.3	0.0	33.5	10.0
Lane LOS	A						F	A	D	A
Approach Delay (s)	1.3			0.0			99.3		19.8	
Approach LOS							F		C	

Intersection Summary			
Average Delay		10.4	
Intersection Capacity Utilization		40.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	195	190	100	65	165	140	90	0	60	205	5	190
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	212	207	109	71	179	152	98	0	65	223	5	207
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	332			315			1125	1158	158	989	1136	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332			315			1125	1158	158	989	1136	166
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			94			0	100	92	0	97	76
cM capacity (veh/h)	1225			1242			98	152	860	154	157	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	212	138	178	71	120	212	163	228	207
Volume Left	212	0	0	71	0	0	98	223	0
Volume Right	0	0	109	0	0	152	65	0	207
cSH	1225	1700	1700	1242	1700	1700	152	154	849
Volume to Capacity	0.17	0.08	0.10	0.06	0.07	0.12	1.08	1.48	0.24
Queue Length 95th (ft)	16	0	0	5	0	0	214	374	24
Control Delay (s)	8.6	0.0	0.0	8.1	0.0	0.0	154.1	300.8	10.6
Lane LOS	A			A			F	F	B
Approach Delay (s)	3.4			1.4			154.1	163.0	
Approach LOS							F	F	

Intersection Summary			
Average Delay		64.4	
Intersection Capacity Utilization		47.1%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	105	340	10	15	275	75	5	0	15	75	10	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	370	11	16	299	82	5	0	16	82	11	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	380			380			883	1016	190	802	981	190
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	380			380			883	1016	190	802	981	190
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			97	100	98	67	95	89
cM capacity (veh/h)	1175			1175			188	210	819	247	221	819

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	114	246	134	16	199	181	22	92	92
Volume Left	114	0	0	16	0	0	5	82	0
Volume Right	0	0	11	0	0	82	16	0	92
cSH	1175	1700	1700	1175	1700	1700	445	244	819
Volume to Capacity	0.10	0.14	0.08	0.01	0.12	0.11	0.05	0.38	0.11
Queue Length 95th (ft)	8	0	0	1	0	0	4	42	9
Control Delay (s)	8.4	0.0	0.0	8.1	0.0	0.0	13.5	28.5	10.0
Lane LOS	A			A			B	D	A
Approach Delay (s)	1.9			0.3			13.5	19.2	
Approach LOS							B	C	

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		37.2%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	325	10	15	285	100	5	0	15	100	10	100
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	353	11	16	310	109	5	0	16	109	11	109
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	418			364			856	1005	182	785	957	209
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	418			364			856	1005	182	785	957	209
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			99			97	100	98	58	95	86
cM capacity (veh/h)	1137			1191			194	216	829	256	231	797

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	236	129	16	207	212	22	120	109
Volume Left	98	0	0	16	0	0	5	109	0
Volume Right	0	0	11	0	0	109	16	0	109
cSH	1137	1700	1700	1191	1700	1700	455	254	797
Volume to Capacity	0.09	0.14	0.08	0.01	0.12	0.12	0.05	0.47	0.14
Queue Length 95th (ft)	7	0	0	1	0	0	4	59	12
Control Delay (s)	8.5	0.0	0.0	8.1	0.0	0.0	13.3	31.2	10.2
Lane LOS	A			A			B	D	B
Approach Delay (s)	1.8			0.3			13.3	21.2	
Approach LOS							B	C	

Intersection Summary				
Average Delay		5.3		
Intersection Capacity Utilization		38.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	435	380	195	190	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	473	413	212	207	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	625				897	413
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	625				897	413
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				33	97
cM capacity (veh/h)	956				309	639

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	5	473	413	212	223
Volume Left	5	0	0	0	207
Volume Right	0	0	0	212	16
cSH	956	1700	1700	1700	333
Volume to Capacity	0.01	0.28	0.24	0.12	0.67
Queue Length 95th (ft)	0	0	0	0	114
Control Delay (s)	8.8	0.0	0.0	0.0	35.4
Lane LOS	A				E
Approach Delay (s)	0.1		0.0		35.4
Approach LOS					E

Intersection Summary				
Average Delay		6.0		
Intersection Capacity Utilization		40.1%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	430	0	435	505	595	555	850
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	51.0	82.0	31.0	
Total Split (%)	31.7%	31.7%	31.7%	42.5%	68.3%	25.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 99.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	430	0	435	505	595	0	0	555	850
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1547	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1547	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	467	0	473	549	647	0	0	603	924
RTOR Reduction (vph)	0	0	0	0	0	221	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	233	234	252	549	647	0	0	603	924
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				23.2	23.2	23.2	35.7	64.1			22.4	99.3
Effective Green, g (s)				23.2	23.2	23.2	35.7	64.1			22.4	99.3
Actuated g/C Ratio				0.23	0.23	0.23	0.36	0.65			0.23	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				392	392	361	636	2284			798	1583
v/s Ratio Prot							c0.31	0.18			c0.17	
v/s Ratio Perm				0.14	0.14	0.16						c0.58
v/c Ratio				0.59	0.60	0.70	0.86	0.28			0.76	0.58
Uniform Delay, d1				33.9	33.9	34.8	29.5	7.6			35.9	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				2.4	2.4	5.8	11.7	0.1			4.1	1.6
Delay (s)				36.3	36.3	40.6	41.2	7.7			40.0	1.6
Level of Service				D	D	D	D	A			D	A
Approach Delay (s)		0.0			38.5			23.1			16.8	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	99.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	385	425	190	570
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 92.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	10	385	0	0	0	0	425	220	190	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3330		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3330		1770	3539	
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)	527	11	418	0	0	0	0	462	239	207	620	0
RTOR Reduction (vph)	0	0	227	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	0	538	191	0	0	0	0	648	0	207	620	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.4	32.4					25.1		16.5	47.6	
Effective Green, g (s)		32.4	32.4					25.1		16.5	47.6	
Actuated g/C Ratio		0.35	0.35					0.27		0.18	0.52	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		625	550					908		317	1831	
v/s Ratio Prot								c0.19		c0.12	0.18	
v/s Ratio Perm		0.30	0.12									
v/c Ratio		0.86	0.35					0.71		0.65	0.34	
Uniform Delay, d1		27.7	22.0					30.2		35.1	13.0	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		11.7	0.4					2.7		4.8	0.1	
Delay (s)		39.4	22.4					32.9		39.9	13.1	
Level of Service		D	C					C		D	B	
Approach Delay (s)		31.9			0.0			32.9			19.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	1190	1300	350	300	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	41.0	41.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min	Min	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 82.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

HCM Signalized Intersection Capacity Analysis
204: Farrington Hwy

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	1190	1300	350	300	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.14	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	265	5085	5085	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	1293	1413	380	326	103
RTOR Reduction (vph)	0	0	0	172	0	29
Lane Group Flow (vph)	43	1293	1413	208	326	74
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	44.4	44.4	44.4	44.4	24.9	24.9
Effective Green, g (s)	44.4	44.4	44.4	44.4	24.9	24.9
Actuated g/C Ratio	0.55	0.55	0.55	0.55	0.31	0.31
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	144	2777	2777	864	542	484
v/s Ratio Prot		0.25	c0.28		c0.18	
v/s Ratio Perm	0.16			0.13		0.05
v/c Ratio	0.30	0.47	0.51	0.24	0.60	0.15
Uniform Delay, d1	10.0	11.2	11.6	9.6	24.0	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1	0.1	0.1	1.9	0.1
Delay (s)	11.2	11.4	11.7	9.8	25.9	20.7
Level of Service	B	B	B	A	C	C
Approach Delay (s)		11.3	11.3		24.6	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 with Rail AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	715	0	40	430	60	265	10
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	50.0	50.0	50.0	30.0	60.0	30.0	30.0
Total Split (%)	45.5%	45.5%	45.5%	27.3%	54.5%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	715	0	40	430	60	0	0	265	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	722	0	43	434	61	0	0	268	11
RTOR Reduction (vph)	0	0	0	0	0	21	0	0	0	0	0	9
Lane Group Flow (vph)	0	0	0	361	361	22	434	61	0	0	268	2
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				55.3	55.3	55.3	19.1	42.7			19.6	19.6
Effective Green, g (s)				55.3	55.3	55.3	19.1	42.7			19.6	19.6
Actuated g/C Ratio				0.50	0.50	0.50	0.17	0.39			0.18	0.18
Clearance Time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				845	845	795	596	723			630	282
v/s Ratio Prot				c0.21	0.21		c0.13	0.03			c0.08	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.43	0.43	0.03	0.73	0.08			0.43	0.01
Uniform Delay, d1				17.3	17.3	13.8	43.0	21.3			40.2	37.2
Progression Factor				1.02	1.02	1.02	1.08	1.72			1.00	1.00
Incremental Delay, d2				1.6	0.3	0.1	4.4	0.0			0.5	0.0
Delay (s)				19.2	17.9	14.1	50.7	36.6			40.7	37.2
Level of Service				B	B	B	D	D			D	D
Approach Delay (s)		0.0			18.3			49.0			40.5	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	380	515	1305	115	980
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	30.0		46.0		34.0	80.0
Total Split (%)	27.3%		41.8%		30.9%	72.7%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	380	0	0	0	0	515	1305	115	980	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1794	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1794	1583					3539	2787	1770	3539	
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)	16	5	413	0	0	0	0	560	1418	125	1065	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	413	0	0	0	0	560	1418	125	1065	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		3.2	110.0					78.7	110.0	13.1	95.8	
Effective Green, g (s)		3.2	110.0					78.7	110.0	13.1	95.8	
Actuated g/C Ratio		0.03	1.00					0.72	1.00	0.12	0.87	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		52	1583					2531	2787	210	3082	
v/s Ratio Prot		0.01						0.16		0.07	0.30	
v/s Ratio Perm			0.26						c0.51			
v/c Ratio		0.40	0.26					0.22	0.51	0.60	0.35	
Uniform Delay, d1		52.5	0.0					5.3	0.0	45.9	1.3	
Progression Factor		1.00	1.00					1.00	1.00	1.06	0.64	
Incremental Delay, d2		5.1	0.4					0.2	0.7	4.3	0.3	
Delay (s)		57.5	0.4					5.5	0.7	53.0	1.1	
Level of Service		E	A					A	A	D	A	
Approach Delay (s)		3.2			0.0			2.0			6.6	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	1955	1400	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	38	0	2125	1522	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1090	774	
pX, platoon unblocked	0.77					
vC, conflicting volume	2053	507	1576			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	846	507	1576			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	231	511	414			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	38	531	531	531	531	507	507	507	54
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	0	54
cSH	511	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.03
Queue Length 95th (ft)	6	0	0	0	0	0	0	0	0
Control Delay (s)	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B								
Approach Delay (s)	12.6	0.0				0.0			
Approach LOS	B								

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		37.1%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 145
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	310	614	87	185	212	76	250	1886	315	261	1223	190
RTOR Reduction (vph)	0	0	68	0	0	40	0	0	49	0	0	77
Lane Group Flow (vph)	310	614	19	185	212	36	250	1886	266	261	1223	113
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	18.1	32.0	32.0	14.1	28.0	49.6	18.1	64.3	83.4	16.6	62.8	85.9
Effective Green, g (s)	18.1	32.0	32.0	14.1	28.0	49.6	18.1	64.3	83.4	16.6	62.8	85.9
Actuated g/C Ratio	0.12	0.22	0.22	0.10	0.19	0.34	0.12	0.44	0.58	0.11	0.43	0.59
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	428	781	349	172	683	541	220	2254	910	393	2202	937
v/s Ratio Prot	0.09	c0.17		c0.10	0.06		c0.14	c0.37		0.08	0.24	
v/s Ratio Perm			0.01			0.02			0.17			0.07
v/c Ratio	0.72	0.79	0.06	1.08	0.31	0.07	1.14	0.84	0.29	0.66	0.56	0.12
Uniform Delay, d1	61.0	53.3	44.6	65.5	50.2	32.1	63.4	35.7	15.7	61.5	30.7	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	5.2	0.1	90.2	0.3	0.1	102.3	2.9	0.2	4.2	0.3	0.1
Delay (s)	67.0	58.5	44.6	155.6	50.5	32.2	165.7	38.6	15.9	65.7	31.0	13.0
Level of Service	E	E	D	F	D	C	F	D	B	E	C	B
Approach Delay (s)		59.9			88.7			48.6			34.4	
Approach LOS		E			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	49.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	40	95	400	130	1755	30	160	925	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	15.0	45.0		14.0	44.0		22.0	48.0		13.0	39.0	
Total Split (%)	12.5%	37.5%		11.7%	36.7%		18.3%	40.0%		10.8%	32.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 107.3
Natural Cycle: 85
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	40	95	400	130	1755	30	160	925	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	234	109	190	43	103	435	141	1908	33	174	1005	386
RTOR Reduction (vph)	0	0	77	0	0	56	0	0	16	0	0	179
Lane Group Flow (vph)	234	109	113	43	103	379	141	1908	17	174	1005	207
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	10.6	31.4	46.2	6.6	27.4	41.2	9.8	43.3	54.9	8.8	42.3	57.9
Effective Green, g (s)	10.6	31.4	46.2	6.6	27.4	41.2	9.8	43.3	54.9	8.8	42.3	57.9
Actuated g/C Ratio	0.10	0.29	0.43	0.06	0.25	0.38	0.09	0.40	0.51	0.08	0.39	0.54
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	541	676	108	472	603	311	2036	803	279	1989	847
v/s Ratio Prot	c0.07	c0.06		0.02	0.06		0.04	c0.38		0.05	0.20	
v/s Ratio Perm			0.07			c0.24			0.01			0.13
v/c Ratio	0.70	0.20	0.17	0.40	0.22	0.63	0.45	0.94	0.02	0.62	0.51	0.24
Uniform Delay, d1	47.2	28.9	19.1	48.8	31.9	27.2	46.6	31.1	13.2	48.0	25.0	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.2	0.1	2.4	0.2	2.1	1.1	8.9	0.0	4.3	0.2	0.2
Delay (s)	53.4	29.1	19.2	51.2	32.1	29.3	47.7	40.0	13.2	52.3	25.2	13.6
Level of Service	D	C	B	D	C	C	D	D	B	D	C	B
Approach Delay (s)		36.2			31.4			40.1			25.3	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	108.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	40	100	815	1280	75	240	810	125
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		47.0		45.0	45.0	28.0	73.0	73.0
Total Split (%)		39.2%		37.5%	37.5%	23.3%	60.8%	60.8%
Yellow Time (s)		3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)		1.0		2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0		5.0	5.0	4.0	5.0	5.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 117.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	100	0	815	0	1280	75	240	810	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0		4.0		5.0	5.0	4.0	5.0	5.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	1770	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	109	0	886	0	1391	82	261	880	136
RTOR Reduction (vph)	0	0	0	0	0	7	0	0	55	0	0	60
Lane Group Flow (vph)	0	0	43	109	0	879	0	1391	27	261	880	76
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			117.3	43.1		69.7		38.6	38.6	22.6	65.2	65.2
Effective Green, g (s)			117.3	43.1		69.7		38.6	38.6	22.6	65.2	65.2
Actuated g/C Ratio			1.00	0.37		0.59		0.33	0.33	0.19	0.56	0.56
Clearance Time (s)				4.0				5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	650		940		1673	520	341	2826	879
v/s Ratio Prot				0.06				c0.27		0.15	0.17	
v/s Ratio Perm			0.03			c0.55			0.02			0.05
v/c Ratio			0.03	0.17		0.93		0.83	0.05	0.77	0.31	0.09
Uniform Delay, d1			0.0	25.0		21.7		36.3	26.9	44.8	14.0	12.2
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.1		15.8		3.7	0.0	9.8	0.1	0.0
Delay (s)			0.0	25.1		37.6		40.0	26.9	54.7	14.1	12.2
Level of Service			A	C		D		D	C	D	B	B
Approach Delay (s)		0.0			36.2			39.3			22.2	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	117.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	175	220	605	185	660	195	655	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	21.0	54.0		16.0	49.0		19.0	51.0	19.0	51.0	
Total Split (%)	15.0%	38.6%		11.4%	35.0%		13.6%	36.4%	13.6%	36.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 118.1
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	175	220	605	185	660	55	195	655	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	5026		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	5026		3433	5085	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)	228	304	185	190	239	658	201	717	60	212	712	174
RTOR Reduction (vph)	0	0	29	0	0	39	0	7	0	0	0	97
Lane Group Flow (vph)	228	304	156	190	239	619	201	770	0	212	712	77
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.1	42.5	59.6	10.9	40.3	58.4	12.1	33.4		13.1	34.4	52.5
Effective Green, g (s)	13.1	42.5	59.6	10.9	40.3	58.4	12.1	33.4		13.1	34.4	52.5
Actuated g/C Ratio	0.11	0.36	0.51	0.09	0.34	0.50	0.10	0.28		0.11	0.29	0.45
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	381	671	800	317	636	784	352	1423		381	1483	704
v/s Ratio Prot	c0.07	0.16		0.06	0.13		0.06	c0.15		0.06	0.14	
v/s Ratio Perm			0.10			c0.39						0.05
v/c Ratio	0.60	0.45	0.19	0.60	0.38	0.79	0.57	0.54		0.56	0.48	0.11
Uniform Delay, d1	49.9	28.8	16.0	51.4	29.3	24.6	50.4	35.8		49.6	34.4	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.5	0.5	0.1	3.0	0.4	5.3	2.2	0.4		1.8	0.2	0.1
Delay (s)	52.4	29.3	16.1	54.4	29.7	30.0	52.7	36.2		51.4	34.6	19.1
Level of Service	D	C	B	D	C	C	D	D		D	C	B
Approach Delay (s)		33.3			34.2			39.6			35.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	117.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	37.0	37.0	9.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	31.0	55.0	55.0	20.0	44.0		15.0	49.0		26.0	60.0	
Total Split (%)	20.7%	36.7%	36.7%	13.3%	29.3%		10.0%	32.7%		17.3%	40.0%	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 100.3
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	554	190	38	196	582	272	22	92	38	462	130	402
RTOR Reduction (vph)	0	0	26	0	0	0	0	0	26	0	0	129
Lane Group Flow (vph)	554	190	12	196	582	272	22	92	12	462	130	273
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	23.2	32.9	32.9	11.3	21.0	47.5	2.8	16.0	33.3	20.5	33.7	62.9
Effective Green, g (s)	23.2	32.9	32.9	11.3	21.0	47.5	2.8	16.0	33.3	20.5	33.7	62.9
Actuated g/C Ratio	0.23	0.32	0.32	0.11	0.20	0.46	0.03	0.16	0.32	0.20	0.33	0.61
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	775	1133	507	377	1039	1289	48	551	513	685	1161	1706
v/s Ratio Prot	c0.16	0.05		0.06	c0.11	0.10	0.01	0.03		c0.13	0.04	c0.10
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.71	0.17	0.02	0.52	0.56	0.21	0.46	0.17	0.02	0.67	0.11	0.16
Uniform Delay, d1	36.7	25.1	23.9	43.1	36.7	16.4	49.2	37.6	23.6	38.0	24.1	8.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.1	0.0	1.2	0.7	0.1	6.8	0.1	0.0	2.6	0.0	0.0
Delay (s)	39.8	25.1	23.9	44.4	37.4	16.5	56.0	37.7	23.7	40.6	24.1	8.6
Level of Service	D	C	C	D	D	B	E	D	C	D	C	A
Approach Delay (s)		35.5			33.3			36.8			25.5	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	315	5	65	10	1260	40	740
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	14.0	52.0	16.0	54.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	12.7%	47.3%	14.5%	49.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	315	5	65	10	1260	195	40	740	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1688	1583	1770	3468		1770	3536	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1688	1583	1770	3468		1770	3536	
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	0	5	342	5	71	11	1370	212	43	804	5
RTOR Reduction (vph)	0	5	0	0	0	60	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	174	173	11	11	1574	0	43	809	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Effective Green, g (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.01	0.60		0.05	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		262	263	247	24	2090		91	2266	
v/s Ratio Prot		c0.00		c0.10	0.10		0.01	c0.45		c0.02	c0.23	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.66	0.66	0.04	0.46	0.75		0.47	0.36	
Uniform Delay, d1		54.2		43.7	43.6	39.4	53.8	15.9		50.7	9.2	
Progression Factor		1.00		1.00	1.00	1.00	1.41	0.44		1.00	1.00	
Incremental Delay, d2		0.1		6.2	5.8	0.1	10.1	2.0		3.8	0.4	
Delay (s)		54.3		49.9	49.5	39.5	85.9	8.9		54.5	9.6	
Level of Service		D		D	D	D	F	A		D	A	
Approach Delay (s)		54.3			47.9			9.4			11.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	505	25	1470	380	1070
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	33.0	33.0	77.0	77.0	77.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	505	25	1470	380	0	1070
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	27	1598	413	0	1163
RTOR Reduction (vph)	0	21	0	130	0	0
Lane Group Flow (vph)	549	6	1598	283	0	1163
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.5	22.5	75.5	75.5		75.5
Effective Green, g (s)	22.5	22.5	75.5	75.5		75.5
Actuated g/C Ratio	0.20	0.20	0.69	0.69		0.69
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	702	323	2429	1086		2429
v/s Ratio Prot	c0.16		c0.45			0.33
v/s Ratio Perm		0.00		0.18		
v/c Ratio	0.78	0.02	0.66	0.26		0.48
Uniform Delay, d1	41.4	34.9	9.9	6.6		8.1
Progression Factor	1.00	1.00	1.00	1.00		1.10
Incremental Delay, d2	5.7	0.0	1.4	0.6		0.6
Delay (s)	47.1	34.9	11.3	7.2		9.5
Level of Service	D	C	B	A		A
Approach Delay (s)	46.5		10.4			9.5
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1730	1205	435	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1880	1310	473	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	1783				2173	891
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1552				2016	491
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	356				43	440

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	627	627	627	873	909
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	473
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.51	0.53
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	165	1730	1205
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 59.4
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	165	1730	1205	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	179	1880	1310	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	179	1880	1310	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			11.5	59.4	35.9	
Effective Green, g (s)			11.5	59.4	35.9	
Actuated g/C Ratio			0.19	1.00	0.60	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			342	5085	2138	
v/s Ratio Prot			0.10	c0.37	c0.37	
v/s Ratio Perm						
v/c Ratio			0.52	0.37	0.61	
Uniform Delay, d1			21.5	0.0	7.4	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			1.4	0.0	0.5	
Delay (s)			22.9	0.0	7.9	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.0	7.9	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	475	170	870	710	1875
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 119.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	475	0	170	0	0	0	0	870	0	710	1875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	516	0	185	0	0	0	0	946	0	772	2038	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	516	0	185	0	0	0	0	946	0	772	2038	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.2		119.4					40.8		37.4	84.2	
Effective Green, g (s)	23.2		119.4					40.8		37.4	84.2	
Actuated g/C Ratio	0.19		1.00					0.34		0.31	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	667		1583					1209		1075	3585	
v/s Ratio Prot	c0.15							c0.27		c0.22	0.40	
v/s Ratio Perm			0.12									
v/c Ratio	0.77		0.12					0.78		0.72	0.57	
Uniform Delay, d1	45.6		0.0					35.3		36.3	8.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	5.6		0.2					3.4		2.3	0.2	
Delay (s)	51.2		0.2					38.7		38.6	8.9	
Level of Service	D		A					D		D	A	
Approach Delay (s)		37.7			0.0			38.7			17.0	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2495	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2495	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2712	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2712	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.77			
v/s Ratio Perm						
v/c Ratio			0.85			
Uniform Delay, d1			3.3			
Progression Factor			1.00			
Incremental Delay, d2			3.1			
Delay (s)			6.5			
Level of Service			A			
Approach Delay (s)	0.0		6.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	870	2495	0	2045	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	946	2712	0	2223	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.80			
vC, conflicting volume			3658		1687	473		
vC1, stage 1 conf vol					946			
vC2, stage 2 conf vol					741			
vCu, unblocked vol			3658		964	473		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			61		286	538		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	473	473	1356	1356	741	741	741
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1356	1356	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.80	0.80	0.44	0.44	0.44
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		90.6%	ICU Level of Service	E
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	135	0	3255	115	0	2050	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	147	0	3538	125	0	2071	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81		0.81					
vC, conflicting volume	3250	5611	690	4230	5611	1181	2071			3540		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2956	5872	0	4167	5872	1181	1499			3540		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	19	100			100		
cM capacity (veh/h)	1	0	878	1	0	182	359			68		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	147	1179	1179	1179	125	690	690	690	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	147	0	0	0	125	0	0	0	0
cSH	1700	182	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.81	0.69	0.69	0.69	0.07	0.41	0.41	0.41	0.00
Queue Length 95th (ft)	0	138	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	76.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	F								
Approach Delay (s)	0.0	76.2	0.0				0.0			
Approach LOS	A	F								

Intersection Summary				
Average Delay		1.9		
Intersection Capacity Utilization		77.9%	ICU Level of Service	D
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	25	30	105	5	175	40	3220	35	45	1565	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	30	15	105	5	175	40	3220	35	45	1565	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1750		1727	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1750		1318	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	27	33	16	114	5	190	43	3389	38	49	1581	109
RTOR Reduction (vph)	0	8	0	0	0	14	0	0	11	0	0	29
Lane Group Flow (vph)	27	41	0	114	5	176	43	3389	27	49	1581	80
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Effective Green, g (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.04	0.72	0.72	0.05	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	264		199	281	358	64	3659	1110	88	3726	1100
v/s Ratio Prot		0.02			0.00		0.02	c0.67		0.03	c0.31	
v/s Ratio Perm	0.02			c0.09		c0.11			0.02			0.05
v/c Ratio	0.13	0.16		0.57	0.02	0.49	0.67	0.93	0.02	0.56	0.42	0.07
Uniform Delay, d1	88.1	88.5		94.6	86.7	80.8	114.2	28.3	9.6	111.4	12.4	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.77	0.92	28.88	1.01	1.00	1.01
Incremental Delay, d2	0.3	0.3		3.9	0.0	1.1	10.5	2.3	0.0	7.4	0.4	0.1
Delay (s)	88.4	88.8		98.6	86.7	81.9	98.1	28.2	277.5	119.9	12.8	9.3
Level of Service	F	F		F	F	F	F	C	F	F	B	A
Approach Delay (s)		88.7			88.1			31.8			15.6	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0	47.0	10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	20.0	173.0	173.0	20.0	173.0	173.0
Total Split (%)	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	8.3%	72.1%	72.1%	8.3%	72.1%	72.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1853	1540		1758	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.97	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1801	1540		1305	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	43	65	163	16	168	49	3418	49	49	1636	5
RTOR Reduction (vph)	0	0	55	0	0	73	0	0	13	0	0	1
Lane Group Flow (vph)	0	48	10	0	179	95	49	3418	36	49	1636	4
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		36.5	36.5		36.5	36.5	11.5	173.0	173.0	11.5	173.0	173.0
Effective Green, g (s)		36.5	36.5		36.5	36.5	11.5	173.0	173.0	11.5	173.0	173.0
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.05	0.72	0.72	0.05	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		273	234		198	240	84	3665	1112	84	3665	1111
v/s Ratio Prot							c0.03	c0.67		0.03	0.32	
v/s Ratio Perm		0.03	0.01		c0.14	0.06			0.02			0.00
v/c Ratio		0.18	0.04		0.90	0.40	0.58	0.93	0.03	0.58	0.45	0.00
Uniform Delay, d1		88.6	86.8		100.0	91.8	111.9	28.5	9.6	111.9	13.8	9.4
Progression Factor		1.00	1.00		1.00	1.00	0.93	1.20	2.68	0.94	0.84	1.00
Incremental Delay, d2		0.3	0.1		38.2	1.1	4.7	2.9	0.0	9.2	0.4	0.0
Delay (s)		89.0	86.9		138.2	92.9	108.4	37.1	25.7	114.7	12.0	9.4
Level of Service		F	F		F	F	F	D	C	F	B	A
Approach Delay (s)		87.8			116.3			37.9			15.0	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3380	1795	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 9 (8%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3380	1795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3674	1813	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3674	1813	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.72	0.36	
v/s Ratio Perm						
v/c Ratio				0.94	0.46	
Uniform Delay, d1				11.4	4.9	
Progression Factor				1.86	1.12	
Incremental Delay, d2				2.8	0.4	
Delay (s)				24.1	5.9	
Level of Service				C	A	
Approach Delay (s)	0.0			24.1	5.9	
Approach LOS	A			C	A	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	160	10	5	250	3065	15	5	1525	330
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0	14.0	46.0	166.0		11.0	131.0	
Total Split (%)	20.4%	20.4%		5.8%	5.8%	19.2%	69.2%		4.6%	54.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	160	10	10	5	250	3065	15	5	1525	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
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)	440	11	174	11	11	5	272	3332	16	5	1658	359
RTOR Reduction (vph)	0	0	35	0	0	5	0	0	4	0	0	69
Lane Group Flow (vph)	224	227	139	0	22	0	272	3332	12	5	1658	290
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	40.1	40.1	84.8		5.9	5.9	38.7	168.0	180.9	1.0	130.3	170.4
Effective Green, g (s)	40.1	40.1	84.8		5.9	5.9	38.7	168.0	180.9	1.0	130.3	170.4
Actuated g/C Ratio	0.17	0.17	0.35		0.02	0.02	0.16	0.70	0.75	0.00	0.54	0.71
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	280	282	514		44	38	285	3559	1083	7	2760	969
v/s Ratio Prot	0.13	c0.13			c0.01		c0.15	c0.66		0.00	0.33	
v/s Ratio Perm			0.10			0.00			0.01			0.21
v/c Ratio	0.80	0.80	0.27		0.50	0.00	0.95	0.94	0.01	0.71	0.60	0.30
Uniform Delay, d1	96.1	96.2	55.5		115.6	114.2	99.8	31.3	7.3	119.4	37.2	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.90	1.33	1.00	0.87	1.32	1.37
Incremental Delay, d2	15.0	15.3	0.3		3.2	0.0	26.6	3.4	0.0	135.4	0.9	0.2
Delay (s)	111.1	111.4	55.8		118.8	114.2	116.3	45.0	7.3	238.9	50.2	17.8
Level of Service	F	F	E		F	F	F	D	A	F	D	B
Approach Delay (s)		95.8			118.0			50.2			44.9	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	118.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	520	50	50	85	505	40	2095	5	285	1295	60
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	57.0	57.0		35.0		20.0	117.0	117.0	31.0	128.0	128.0
Total Split (%)	23.8%	23.8%		14.6%		8.3%	48.8%	48.8%	12.9%	53.3%	53.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 25 (10%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	50	50	15	85	505	40	2095	5	285	1295	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	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)	565	54	54	16	92	549	43	2277	5	310	1408	65
RTOR Reduction (vph)	0	0	41	0	0	34	0	0	3	0	0	30
Lane Group Flow (vph)	311	308	13	0	108	515	43	2277	2	310	1408	35
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	47.7	47.7	58.6		29.0	59.5	10.9	113.8	113.8	24.5	127.4	127.4
Effective Green, g (s)	47.7	47.7	58.6		29.0	59.5	10.9	113.8	113.8	24.5	127.4	127.4
Actuated g/C Ratio	0.20	0.20	0.24		0.12	0.25	0.05	0.47	0.47	0.10	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	337	386		223	690	80	2411	750	350	2699	840
v/s Ratio Prot	c0.18	0.18			0.06		0.02	c0.45		c0.09	0.28	
v/s Ratio Perm			0.01			c0.18			0.00			0.02
v/c Ratio	0.93	0.91	0.03		0.48	0.75	0.54	0.94	0.00	0.89	0.52	0.04
Uniform Delay, d1	94.5	94.1	69.1		98.5	83.3	112.1	60.1	33.2	106.4	36.5	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.08	0.75	1.00	1.43	0.52	0.34
Incremental Delay, d2	31.9	28.1	0.0		1.7	4.4	5.8	8.1	0.0	19.4	0.6	0.1
Delay (s)	126.4	122.3	69.2		100.2	87.7	127.4	53.0	33.2	171.9	19.5	9.3
Level of Service	F	F	E		F	F	F	D	C	F	B	A
Approach Delay (s)		119.9			89.8			54.3			45.7	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6 3
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	
Total Split (s)	47.0	47.0		52.0	52.0	52.0	25.0	113.0		28.0	116.0	
Total Split (%)	19.6%	19.6%		21.7%	21.7%	21.7%	10.4%	47.1%		11.7%	48.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	293	174	185	114	272	326	168	1630	54	196	1056	152
RTOR Reduction (vph)	0	0	52	0	0	49	0	0	16	0	0	42
Lane Group Flow (vph)	152	315	133	114	272	277	168	1630	38	196	1056	110
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Actuated Green, G (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Effective Green, g (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Actuated g/C Ratio	0.12	0.12	0.18	0.16	0.16	0.24	0.07	0.54	0.70	0.07	0.55	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	190	392	291	286	301	728	226	2752	1112	256	2796	1104
v/s Ratio Prot	0.09	c0.09		0.06	c0.15	0.06	0.05	c0.32		c0.06	0.21	
v/s Ratio Perm			0.08			0.04			0.02			0.07
v/c Ratio	0.80	0.80	0.46	0.40	0.90	0.38	0.74	0.59	0.03	0.77	0.38	0.10
Uniform Delay, d1	103.0	103.1	87.2	90.1	98.8	76.9	110.1	37.2	10.9	109.0	30.7	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.84	1.57	1.29
Incremental Delay, d2	19.9	10.7	0.4	0.3	28.0	0.1	11.0	0.9	0.0	10.3	0.3	0.0
Delay (s)	122.9	113.8	87.6	90.5	126.7	77.0	121.1	38.1	10.9	102.2	48.4	15.3
Level of Service	F	F	F	F	F	E	F	D	B	F	D	B
Approach Delay (s)		108.5			98.2			44.8			52.3	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	64.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1015	95	110	450	10	195
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1103	103	120	489	11	212
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked						
vC, conflicting volume			1207		1587	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1207		1587	552
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		86	56
cM capacity (veh/h)			574		78	478

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	552	552	103	120	245	245	223
Volume Left	0	0	0	120	0	0	11
Volume Right	0	0	103	0	0	0	212
cSH	1700	1700	1700	574	1700	1700	502
Volume to Capacity	0.32	0.32	0.06	0.21	0.14	0.14	0.44
Queue Length 95th (ft)	0	0	0	19	0	0	56
Control Delay (s)	0.0	0.0	0.0	12.9	0.0	0.0	20.4
Lane LOS				B			C
Approach Delay (s)	0.0			2.5			20.4
Approach LOS							C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	955	40	10	565	30	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1038	43	11	614	33	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1082		1389	541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1082		1389	541
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		75	99
cM capacity (veh/h)			641		131	486

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	692	389	216	409	38
Volume Left	0	0	11	0	33
Volume Right	0	43	0	0	5
cSH	1700	1700	641	1700	147
Volume to Capacity	0.41	0.23	0.02	0.24	0.26
Queue Length 95th (ft)	0	0	1	0	25
Control Delay (s)	0.0	0.0	0.7	0.0	37.9
Lane LOS			A		E
Approach Delay (s)	0.0		0.3		37.9
Approach LOS					E

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	920	0	55	585	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1000	0	60	636	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			1000		1438	500
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1000		1438	500
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	92
cM capacity (veh/h)			688		113	516

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	500	500	272	424	43
Volume Left	0	0	60	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	688	1700	516
Volume to Capacity	0.29	0.29	0.09	0.25	0.08
Queue Length 95th (ft)	0	0	7	0	7
Control Delay (s)	0.0	0.0	3.2	0.0	12.6
Lane LOS			A		B
Approach Delay (s)	0.0		1.2		12.6
Approach LOS					B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.2		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	895	20	0	560	0	0	0	0	0	0	65
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	973	22	0	609	0	0	0	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	609			995			1359	1592	497	1095	1603	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	609			995			1359	1592	497	1095	1603	304
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	90
cM capacity (veh/h)	966			691			96	106	518	168	105	692

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	649	346	304	304	71
Volume Left	0	0	0	0	0
Volume Right	0	22	0	0	71
cSH	1700	1700	1700	1700	692
Volume to Capacity	0.38	0.20	0.18	0.18	0.10
Queue Length 95th (ft)	0	0	0	0	8
Control Delay (s)	0.0	0.0	0.0	0.0	10.8
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.8
Approach LOS					B

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization	28.7%	ICU Level of Service		A
Analysis Period (min)		15		

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	895	325	560
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 56.3
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	895	0	325	560	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	973	0	353	609	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	973	0	353	609	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	26.2		18.0	56.2		
Effective Green, g (s)	26.2		18.0	56.2		
Actuated g/C Ratio	0.47		0.32	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1649		566	3539		
v/s Ratio Prot	c0.27		c0.20	0.17		
v/s Ratio Perm						
v/c Ratio	0.59		0.62	0.17		
Uniform Delay, d1	11.0		16.2	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.6		2.1	0.0		
Delay (s)	11.6		18.4	0.0		
Level of Service	B		B	A		
Approach Delay (s)	11.6			6.8	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	56.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	295	1235	885	175
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 49.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	295	1235	885	175	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	321	1342	962	190	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	321	1342	962	190	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	14.6	49.6	24.0	49.6		
Effective Green, g (s)	14.6	49.6	24.0	49.6		
Actuated g/C Ratio	0.29	1.00	0.48	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	521	3539	1712	1583		
v/s Ratio Prot	c0.18	0.38	c0.27			
v/s Ratio Perm				0.12		
v/c Ratio	0.62	0.38	0.56	0.12		
Uniform Delay, d1	15.1	0.0	9.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.2	0.1	0.4	0.2		
Delay (s)	17.2	0.1	9.5	0.2		
Level of Service	B	A	A	A		
Approach Delay (s)		3.4	8.0		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	11.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	525	960	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	571	1043	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1065				1492	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1065				1492	533
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				73	94
cM capacity (veh/h)	650				101	492

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	285	285	696	370	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	650	1700	1700	1700	1700	101	492
Volume to Capacity	0.12	0.17	0.17	0.41	0.22	0.27	0.06
Queue Length 95th (ft)	10	0	0	0	0	25	4
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	53.4	12.8
Lane LOS	B					F	B
Approach Delay (s)	1.3			0.0		33.1	
Approach LOS						D	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	365	15	0	555	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	397	16	0	603	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	603			413			1120	1171	207	976	1179	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	603			413			1120	1171	207	976	1179	302
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			66	94	99	100	100	64
cM capacity (veh/h)	970			1142			97	175	800	182	173	694

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	264	149	0	402	201	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	970	1700	1700	1700	1700	1700	120	1700	694
Volume to Capacity	0.08	0.16	0.09	0.00	0.24	0.12	0.41	0.00	0.36
Queue Length 95th (ft)	7	0	0	0	0	0	43	0	41
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	54.0	0.0	13.1
Lane LOS	A						F	A	B
Approach Delay (s)	1.5			0.0			54.0	13.1	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.8	
Intersection Capacity Utilization		42.9%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	245	10	0	390	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	266	11	0	424	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	424			277			880	946	139	815	951	212
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			277			880	946	139	815	951	212
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			85	93	100	100	100	82
cM capacity (veh/h)	1132			1283			180	231	884	233	230	793

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	178	100	0	283	141	43	0	147
Volume Left	125	0	0	0	0	0	27	0	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	1132	1700	1700	1700	1700	1700	196	1700	793
Volume to Capacity	0.11	0.10	0.06	0.00	0.17	0.08	0.22	0.00	0.18
Queue Length 95th (ft)	9	0	0	0	0	0	20	0	17
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	0.0	28.5	0.0	10.6
Lane LOS	A						D	A	B
Approach Delay (s)	2.7			0.0			28.5	10.6	
Approach LOS							D	B	

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		32.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	145	5	0	265	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	158	5	0	288	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	293			163			620	649	82	571	649	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			163			620	649	82	571	649	147
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			93	97	100	100	100	86
cM capacity (veh/h)	1265			1413			303	357	962	371	357	874

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	105	58	0	192	101	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1265	1700	1700	1700	1700	1700	319	1700	874
Volume to Capacity	0.08	0.06	0.03	0.00	0.11	0.06	0.10	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	8	0	12
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	17.6	0.0	9.8
Lane LOS	A						C	A	A
Approach Delay (s)	3.0			0.0			17.6	9.8	
Approach LOS							C	A	

Intersection Summary			
Average Delay		3.6	
Intersection Capacity Utilization		27.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	80	10	0	150	0	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	87	11	0	163	0	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	163			98			397	386	49	364	391	82
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	163			98			397	386	49	364	391	82
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			91	90	100	100	98	91
cM capacity (veh/h)	1413			1493			464	522	1009	504	518	962

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	65	58	40	0	109	54	98	0	11	87
Volume Left	65	0	0	0	0	0	43	0	0	0
Volume Right	0	0	11	0	0	0	0	0	0	87
cSH	1413	1700	1700	1700	1700	1700	494	1700	518	962
Volume to Capacity	0.05	0.03	0.02	0.00	0.06	0.03	0.20	0.00	0.02	0.09
Queue Length 95th (ft)	4	0	0	0	0	0	18	0	2	7
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	14.1	0.0	12.1	9.1
Lane LOS	A						B	A	B	A
Approach Delay (s)	3.1			0.0			14.1		9.4	
Approach LOS							B		A	

Intersection Summary			
Average Delay		5.4	
Intersection Capacity Utilization		29.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	0	40	0	0	0	60	15	0	0	0	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	0	43	0	0	0	65	16	0	0	0	98
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			43			207	109	22	95	130	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			43			207	109	22	95	130	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			90	98	100	100	100	91
cM capacity (veh/h)	1622			1563			653	760	1050	846	739	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	0	43	0	0	0	82	0	98
Volume Left	43	0	0	0	0	0	65	0	0
Volume Right	0	0	43	0	0	0	0	0	98
cSH	1622	1700	1700	1700	1700	1700	672	1700	1084
Volume to Capacity	0.03	0.00	0.03	0.00	0.00	0.00	0.12	0.00	0.09
Queue Length 95th (ft)	2	0	0	0	0	0	10	0	7
Control Delay (s)	7.3	0.0	0.0	0.0	0.0	0.0	11.1	0.0	8.6
Lane LOS	A						B	A	A
Approach Delay (s)	3.6			0.0			11.1	8.6	
Approach LOS							B	A	

Intersection Summary			
Average Delay		7.8	
Intersection Capacity Utilization		16.4%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	375	0	190	350	660	335	730
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 67.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	375	0	190	350	660	0	0	335	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1553	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1553	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	408	0	207	380	717	0	0	364	793
RTOR Reduction (vph)	0	0	0	0	0	153	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	204	204	54	380	717	0	0	364	793
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Effective Green, g (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Actuated g/C Ratio				0.24	0.24	0.24	0.30	0.58			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				404	404	373	537	2052			661	1583
v/s Ratio Prot							c0.21	0.20			0.10	
v/s Ratio Perm				0.12	0.12	0.04						c0.50
v/c Ratio				0.50	0.50	0.15	0.71	0.35			0.55	0.50
Uniform Delay, d1				22.0	22.0	20.0	20.7	7.4			24.7	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.0	1.0	0.2	4.2	0.1			1.0	1.1
Delay (s)				23.0	23.0	20.2	24.9	7.5			25.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			22.0			13.5			8.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	525	415	245	495
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	66.0	66.0	42.0	32.0	74.0
Total Split (%)	47.1%	47.1%	30.0%	22.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 132.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	580	90	525	0	0	0	0	415	345	245	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3253		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3253		1770	3539	
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)	630	98	571	0	0	0	0	451	375	266	538	0
RTOR Reduction (vph)	0	0	146	0	0	0	0	108	0	0	0	0
Lane Group Flow (vph)	0	728	425	0	0	0	0	718	0	266	538	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		57.5	57.5					33.5		23.4	62.9	
Effective Green, g (s)		57.5	57.5					33.5		23.4	62.9	
Actuated g/C Ratio		0.43	0.43					0.25		0.18	0.48	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		775	678					823		312	1681	
v/s Ratio Prot								c0.22		c0.15	0.15	
v/s Ratio Perm		0.41	0.27									
v/c Ratio		0.94	0.63					0.87		0.85	0.32	
Uniform Delay, d1		35.8	29.1					47.4		52.8	21.5	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		18.9	1.8					10.1		19.6	0.1	
Delay (s)		54.7	30.9					57.5		72.4	21.6	
Level of Service		D	C					E		E	C	
Approach Delay (s)		44.2			0.0			57.5			38.4	
Approach LOS		D			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 85.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.39	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	723	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	967	543	114	54	33
RTOR Reduction (vph)	0	0	0	73	0	17
Lane Group Flow (vph)	22	967	543	41	54	16
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	30.9	30.9	30.9	30.9	42.2	42.2
Effective Green, g (s)	30.9	30.9	30.9	30.9	42.2	42.2
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.50	0.50
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	262	1285	1285	574	877	784
v/s Ratio Prot		c0.27	0.15		c0.03	
v/s Ratio Perm	0.03			0.03		0.01
v/c Ratio	0.08	0.75	0.42	0.07	0.06	0.02
Uniform Delay, d1	17.8	23.7	20.4	17.7	11.2	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.5	0.2	0.1	0.1	0.0
Delay (s)	17.9	26.3	20.6	17.8	11.3	11.0
Level of Service	B	C	C	B	B	B
Approach Delay (s)		26.1	20.1		11.2	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 with Rail PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1435	5	20	485	70	140	30
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	55.0	55.0	55.0	25.0	55.0	30.0	30.0
Total Split (%)	50.0%	50.0%	50.0%	22.7%	50.0%	27.3%	27.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1435	5	20	485	70	0	0	140	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1449	5	22	490	71	0	0	141	33
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	724	730	11	490	71	0	0	141	6
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				55.6	55.6	55.6	19.4	42.4			19.0	19.0
Effective Green, g (s)				55.6	55.6	55.6	19.4	42.4			19.0	19.0
Actuated g/C Ratio				0.51	0.51	0.51	0.18	0.39			0.17	0.17
Clearance Time (s)				6.0	6.0	6.0	4.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				849	852	800	605	718			611	273
v/s Ratio Prot				0.43	c0.43		c0.14	0.04			c0.04	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.85	0.86	0.01	0.81	0.10			0.23	0.02
Uniform Delay, d1				23.6	23.7	13.5	43.5	21.6			39.2	37.8
Progression Factor				1.01	1.01	1.00	1.02	1.56			1.00	1.00
Incremental Delay, d2				10.6	8.5	0.0	7.8	0.1			0.2	0.0
Delay (s)				34.4	32.4	13.6	52.2	33.6			39.4	37.8
Level of Service				C	C	B	D	C			D	D
Approach Delay (s)		0.0			33.1			49.8			39.1	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	350	590	1265	40	1595
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	26.0		66.0		18.0	84.0
Total Split (%)	23.6%		60.0%		16.4%	76.4%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	1.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	350	0	0	0	0	590	1265	40	1595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1779	1583					3539	2787	1770	3539	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1779	1583					3539	2787	1770	3539	
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)	87	5	380	0	0	0	0	641	1375	43	1734	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	380	0	0	0	0	641	1375	43	1734	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		9.7	110.0					79.6	110.0	5.7	89.3	
Effective Green, g (s)		9.7	110.0					79.6	110.0	5.7	89.3	
Actuated g/C Ratio		0.09	1.00					0.72	1.00	0.05	0.81	
Clearance Time (s)		5.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		156	1583					2560	2787	91	2873	
v/s Ratio Prot		0.05						0.18		0.02	c0.49	
v/s Ratio Perm			0.24						c0.49			
v/c Ratio		0.59	0.24					0.25	0.49	0.47	0.60	
Uniform Delay, d1		48.2	0.0					5.1	0.0	50.7	3.8	
Progression Factor		1.00	1.00					1.00	1.00	0.90	1.19	
Incremental Delay, d2		5.6	0.4					0.2	0.6	2.7	0.7	
Delay (s)		53.8	0.4					5.4	0.6	48.1	5.2	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		10.8			0.0			2.1			6.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	175	0	1845	1835	230
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	190	0	2005	1995	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1090	774	
pX, platoon unblocked	0.84	1.00	1.00			
vC, conflicting volume	2496	665	2245			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1803	653	2237			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	53	100			
cM capacity (veh/h)	59	409	227			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	190	501	501	501	501	665	665	665	250
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	190	0	0	0	0	0	0	0	250
cSH	409	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.47	0.29	0.29	0.29	0.29	0.39	0.39	0.39	0.15
Queue Length 95th (ft)	60	0	0	0	0	0	0	0	0
Control Delay (s)	21.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C								
Approach Delay (s)	21.2	0.0				0.0			
Approach LOS	C								

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		53.0%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	280	470	120	390	1460	225	250	1595	375
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	26.0	52.0	52.0	18.0	44.0		22.0	69.0		41.0	88.0	
Total Split (%)	14.4%	28.9%	28.9%	10.0%	24.4%		12.2%	38.3%		22.8%	48.9%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 165.4
Natural Cycle: 170
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	280	470	120	390	1460	225	250	1595	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	5085	1583	3433	5085	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)	424	582	272	304	511	130	424	1587	245	272	1734	408
RTOR Reduction (vph)	0	0	140	0	0	41	0	0	49	0	0	13
Lane Group Flow (vph)	424	582	132	304	511	89	424	1587	196	272	1734	395
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	22.2	38.5	38.5	14.1	30.4	54.0	18.2	76.1	95.2	18.6	76.5	103.7
Effective Green, g (s)	22.2	38.5	38.5	14.1	30.4	54.0	18.2	76.1	95.2	18.6	76.5	103.7
Actuated g/C Ratio	0.13	0.23	0.23	0.09	0.18	0.33	0.11	0.46	0.58	0.11	0.46	0.63
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	461	824	368	150	650	517	194	2341	911	386	2353	993
v/s Ratio Prot	c0.12	0.16		c0.17	c0.14		c0.24	0.31		0.08	c0.34	
v/s Ratio Perm			0.08			0.06			0.12			0.25
v/c Ratio	0.92	0.71	0.36	2.03	0.79	0.17	2.19	0.68	0.22	0.70	0.74	0.40
Uniform Delay, d1	70.7	58.2	53.1	75.6	64.3	39.7	73.6	35.0	17.0	70.7	36.2	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.3	2.8	0.6	484.6	6.2	0.2	550.1	0.8	0.1	5.8	1.2	0.3
Delay (s)	94.0	61.0	53.7	560.2	70.6	39.9	623.6	35.8	17.1	76.5	37.4	15.6
Level of Service	F	E	D	F	E	D	F	D	B	E	D	B
Approach Delay (s)		70.4			223.9			144.2			38.1	
Approach LOS		E			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	104.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	165.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	135	160	390	135	1455	60	380	1535	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	28.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	24.0	43.0		24.0	43.0		17.0	41.0		22.0	46.0	
Total Split (%)	18.5%	33.1%		18.5%	33.1%		13.1%	31.5%		16.9%	35.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 114.8
Natural Cycle: 85
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	135	160	390	135	1455	60	380	1535	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	353	250	391	147	174	424	147	1582	65	413	1668	370
RTOR Reduction (vph)	0	0	69	0	0	49	0	0	33	0	0	159
Lane Group Flow (vph)	353	250	322	147	174	375	147	1582	32	413	1668	211
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	16.7	28.3	43.5	14.5	26.1	48.3	10.2	36.5	56.0	17.2	43.5	65.2
Effective Green, g (s)	16.7	28.3	43.5	14.5	26.1	48.3	10.2	36.5	56.0	17.2	43.5	65.2
Actuated g/C Ratio	0.15	0.25	0.38	0.13	0.23	0.42	0.09	0.32	0.49	0.15	0.38	0.57
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	500	460	601	224	424	667	305	1620	774	515	1931	901
v/s Ratio Prot	c0.10	0.13		0.08	0.09		0.04	c0.31		c0.12	0.33	
v/s Ratio Perm			c0.20			0.24			0.02			0.13
v/c Ratio	0.71	0.54	0.54	0.66	0.41	0.56	0.48	0.98	0.04	0.80	0.86	0.23
Uniform Delay, d1	46.6	37.5	27.6	47.6	37.6	25.1	49.6	38.6	15.3	47.0	32.8	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	1.3	0.9	6.8	0.6	1.1	1.2	16.9	0.0	8.8	4.3	0.1
Delay (s)	51.1	38.8	28.6	54.4	38.3	26.2	50.8	55.5	15.3	55.8	37.1	12.4
Level of Service	D	D	C	D	D	C	D	E	B	E	D	B
Approach Delay (s)		39.1			34.6			53.7			36.5	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	114.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	100	110	620	1090	310	645	1385	105
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		28.0		37.0	37.0	55.0	92.0	92.0
Total Split (%)		23.3%		30.8%	30.8%	45.8%	76.7%	76.7%
Yellow Time (s)		3.0		3.0	3.0	3.0	3.0	3.0
All-Red Time (s)		1.0		2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0		5.0	5.0	4.0	5.0	5.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 117.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	110	0	620	0	1090	310	645	1385	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0		4.0		5.0	5.0	4.0	5.0	5.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	1.00	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	1770	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	120	0	674	0	1185	337	701	1505	114
RTOR Reduction (vph)	0	0	0	0	0	6	0	0	246	0	0	32
Lane Group Flow (vph)	0	0	109	120	0	668	0	1185	91	701	1505	82
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			117.1	23.7		76.4		31.7	31.7	48.7	84.4	84.4
Effective Green, g (s)			117.1	23.7		76.4		31.7	31.7	48.7	84.4	84.4
Actuated g/C Ratio			1.00	0.20		0.65		0.27	0.27	0.42	0.72	0.72
Clearance Time (s)				4.0				5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	358		1032		1376	428	736	3665	1140
v/s Ratio Prot				0.07				c0.23		c0.40	0.30	
v/s Ratio Perm			0.07			c0.42			0.06			0.05
v/c Ratio			0.07	0.34		0.65		0.86	0.21	0.95	0.41	0.07
Uniform Delay, d1			0.0	40.0		12.2		40.6	33.0	33.1	6.5	4.8
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	0.6		1.4		5.8	0.3	22.1	0.1	0.0
Delay (s)			0.1	40.5		13.6		46.4	33.3	55.2	6.6	4.8
Level of Service			A	D		B		D	C	E	A	A
Approach Delay (s)		0.1			17.7			43.5			21.2	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	117.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	215	290	360	255	820	390	930	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0	4.0	30.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	40.0	9.0	40.0	
Total Split (s)	19.0	40.0		19.0	40.0		20.0	40.0	21.0	41.0	
Total Split (%)	15.8%	33.3%		15.8%	33.3%		16.7%	33.3%	17.5%	34.2%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 108.2
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	215	290	360	255	820	340	390	930	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4861		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4861		3433	5085	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)	304	228	310	234	315	391	277	891	370	424	1011	359
RTOR Reduction (vph)	0	0	37	0	0	36	0	60	0	0	0	95
Lane Group Flow (vph)	304	228	273	234	315	355	277	1201	0	424	1011	264
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.6	25.9	45.4	12.4	24.7	47.1	13.5	33.3		16.4	36.2	55.8
Effective Green, g (s)	13.6	25.9	45.4	12.4	24.7	47.1	13.5	33.3		16.4	36.2	55.8
Actuated g/C Ratio	0.13	0.24	0.42	0.11	0.23	0.44	0.12	0.31		0.15	0.34	0.52
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	446	665	394	426	690	429	1498		521	1704	817
v/s Ratio Prot	c0.09	0.12		0.07	c0.17		0.08	c0.25		c0.12	c0.20	
v/s Ratio Perm			0.17			0.22						0.17
v/c Ratio	0.70	0.51	0.41	0.59	0.74	0.51	0.65	0.80		0.81	0.59	0.32
Uniform Delay, d1	45.3	35.6	21.9	45.4	38.7	22.1	45.0	34.3		44.3	29.8	15.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	1.0	0.4	2.4	6.6	0.7	3.3	3.2		9.4	0.6	0.2
Delay (s)	50.4	36.6	22.3	47.8	45.3	22.8	48.3	37.5		53.8	30.4	15.4
Level of Service	D	D	C	D	D	C	D	D		D	C	B
Approach Delay (s)		36.3			36.5			39.4			32.9	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	108.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	435	65	360	355	300	70	345	230	495	350	530
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	37.0	37.0	9.0	44.0		9.0	47.0		9.0	44.0	
Total Split (s)	26.0	44.0	44.0	26.0	44.0		17.0	47.0		23.0	53.0	
Total Split (%)	18.6%	31.4%	31.4%	18.6%	31.4%		12.1%	33.6%		16.4%	37.9%	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 100.5
Natural Cycle: 160
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	435	65	360	355	300	70	345	230	495	350	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	772	473	71	391	386	326	76	375	250	538	380	576
RTOR Reduction (vph)	0	0	55	0	0	0	0	0	58	0	0	153
Lane Group Flow (vph)	772	473	16	391	386	326	76	375	192	538	380	423
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	21.8	23.0	23.0	16.6	17.8	42.4	7.9	20.7	43.3	18.6	31.4	59.2
Effective Green, g (s)	21.8	23.0	23.0	16.6	17.8	42.4	7.9	20.7	43.3	18.6	31.4	59.2
Actuated g/C Ratio	0.22	0.23	0.23	0.16	0.18	0.42	0.08	0.21	0.43	0.18	0.31	0.59
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	741	806	360	564	897	1171	138	726	679	632	1101	1635
v/s Ratio Prot	c0.22	c0.13		0.11	0.08	0.12	0.04	c0.11		c0.16	0.11	0.15
v/s Ratio Perm			0.01						0.12			
v/c Ratio	1.04	0.59	0.04	0.69	0.43	0.28	0.55	0.52	0.28	0.85	0.35	0.26
Uniform Delay, d1	39.6	34.7	30.4	39.7	37.0	19.2	44.8	35.7	18.7	39.8	26.8	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	44.4	1.1	0.1	3.7	0.3	0.1	4.7	0.6	0.2	10.7	0.2	0.1
Delay (s)	84.0	35.8	30.4	43.4	37.4	19.3	49.5	36.3	18.9	50.5	27.0	10.2
Level of Service	F	D	C	D	D	B	D	D	B	D	C	B
Approach Delay (s)		63.8			34.2			31.5			29.0	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	570	0	50	5	765	130	1240
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	16.0	47.0	21.0	52.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	14.5%	42.7%	19.1%	47.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	570	0	50	5	765	505	130	1240	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3328		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3328		1770	3539	
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	0	11	620	0	54	5	832	549	141	1348	0
RTOR Reduction (vph)	0	11	0	0	0	42	0	87	0	0	0	0
Lane Group Flow (vph)	0	0	0	310	310	12	5	1294	0	141	1348	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Effective Green, g (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.46		0.12	0.57	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		382	382	359	20	1539		214	2023	
v/s Ratio Prot		c0.00		c0.18	0.18		0.00	c0.39		c0.08	c0.38	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.81	0.81	0.03	0.25	0.84		0.66	0.67	
Uniform Delay, d1		54.2		40.3	40.3	33.1	53.9	26.0		46.2	16.3	
Progression Factor		1.00		1.00	1.00	1.00	1.40	0.68		1.00	1.00	
Incremental Delay, d2		0.3		12.3	12.3	0.0	5.6	5.0		7.1	1.8	
Delay (s)		54.5		52.6	52.6	33.1	81.0	22.7		53.3	18.0	
Level of Service		D		D	D	C	F	C		D	B	
Approach Delay (s)		54.5			51.0			22.9			21.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	405	25	1260	915	1870
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	26.0	26.0	84.0	84.0	84.0
Total Split (%)	23.6%	23.6%	76.4%	76.4%	76.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	405	25	1260	915	0	1870
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	440	27	1370	995	0	2033
RTOR Reduction (vph)	0	23	0	273	0	0
Lane Group Flow (vph)	440	4	1370	722	0	2033
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	18.2	18.2	79.8	79.8		79.8
Effective Green, g (s)	18.2	18.2	79.8	79.8		79.8
Actuated g/C Ratio	0.17	0.17	0.73	0.73		0.73
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	568	261	2567	1148		2567
v/s Ratio Prot	c0.13		0.39			c0.57
v/s Ratio Perm		0.00		0.46		
v/c Ratio	0.77	0.02	0.53	0.63		0.79
Uniform Delay, d1	43.9	38.4	6.8	7.6		9.7
Progression Factor	1.00	1.00	1.00	1.00		0.98
Incremental Delay, d2	6.5	0.0	0.8	2.6		2.1
Delay (s)	50.5	38.4	7.6	10.2		11.7
Level of Service	D	D	A	B		B
Approach Delay (s)	49.8		8.7			11.7
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2025	1510	675	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2201	1641	734	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.56				0.56	0.56
vC, conflicting volume	2375				2742	1188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1877				2536	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	176				12	603

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	734	734	734	1094	1281
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	734
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.64	0.75
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	120	2025	1510
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 70.6
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	120	2025	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	130	2201	1641	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	130	2201	1641	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			9.0	71.8	50.8	
Effective Green, g (s)			9.0	71.8	50.8	
Actuated g/C Ratio			0.13	1.00	0.71	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			221	5085	2503	
v/s Ratio Prot			0.07	c0.43	c0.46	
v/s Ratio Perm						
v/c Ratio			0.59	0.43	0.66	
Uniform Delay, d1			29.7	0.0	5.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.0	0.1	0.6	
Delay (s)			33.6	0.1	6.4	
Level of Service			C	A	A	
Approach Delay (s)	0.0			1.9	6.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	370	190	915	615	3165
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 159.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	0	190	0	0	0	0	915	0	615	3165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	402	0	207	0	0	0	0	995	0	668	3440	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	402	0	207	0	0	0	0	995	0	668	3440	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.8		159.9					83.2		34.9	124.1	
Effective Green, g (s)	23.8		159.9					83.2		34.9	124.1	
Actuated g/C Ratio	0.15		1.00					0.52		0.22	0.78	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	510		1583					1841		749	3946	
v/s Ratio Prot	c0.12							0.28		0.19	c0.68	
v/s Ratio Perm			0.13									
v/c Ratio	0.79		0.13					0.54		0.89	0.87	
Uniform Delay, d1	65.6		0.0					25.6		60.7	12.4	
Progression Factor	1.00		1.00					1.00		0.98	0.93	
Incremental Delay, d2	7.9		0.2					0.3		12.9	2.4	
Delay (s)	73.5		0.2					25.9		72.6	13.9	
Level of Service	E		A					C		E	B	
Approach Delay (s)		48.6			0.0			25.9			23.4	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	159.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1745	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1745	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1897	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1897	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.54			
v/s Ratio Perm						
v/c Ratio			0.60			
Uniform Delay, d1			1.7			
Progression Factor			1.00			
Incremental Delay, d2			0.8			
Delay (s)			2.5			
Level of Service			A			
Approach Delay (s)	0.0		2.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	915	1745	0	3355	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	995	1897	0	3647	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.24			
vC, conflicting volume			2891		2210	497		
vC1, stage 1 conf vol					995			
vC2, stage 2 conf vol					1216			
vCu, unblocked vol			2891		0	497		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			125		245	518		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	497	497	948	948	1216	1216	1216
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	948	948	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.29	0.56	0.56	0.72	0.72	0.72
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	110	0	2685	65	0	3360	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	120	0	2918	71	0	3394	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.26	0.26	0.26	0.26	0.26		0.26					
vC, conflicting volume	4367	6314	1131	4052	6314	975	3394			2920		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3997	11348	0	2808	11348	975	326			2920		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	52	100			100		
cM capacity (veh/h)	0	0	287	2	0	251	326			121		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	120	973	973	973	71	1131	1131	1131	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	120	0	0	0	71	0	0	0	0
cSH	1700	251	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.48	0.57	0.57	0.57	0.04	0.67	0.67	0.67	0.00
Queue Length 95th (ft)	0	60	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	31.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	D								
Approach Delay (s)	0.0	31.8	0.0				0.0			
Approach LOS	A	D								

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	120	100	40	5	110	35	1955	40	120	2920	130
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	100	35	40	5	110	35	1955	40	120	2920	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1738	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1773		794	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	130	109	38	43	5	120	38	2058	43	130	2949	141
RTOR Reduction (vph)	0	5	0	0	0	13	0	0	14	0	0	22
Lane Group Flow (vph)	130	142	0	43	5	107	38	2058	29	130	2949	119
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Effective Green, g (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.26	0.03	0.68	0.68	0.09	0.74	0.74
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	260		116	274	413	53	3481	1056	157	3781	1116
v/s Ratio Prot		0.08			0.00		0.02	0.40		c0.07	c0.58	
v/s Ratio Perm	c0.09			0.05		0.07			0.02			0.08
v/c Ratio	0.63	0.55		0.37	0.02	0.26	0.72	0.59	0.03	0.83	0.78	0.11
Uniform Delay, d1	96.2	94.9		92.3	87.5	70.2	115.4	20.1	12.2	107.5	18.8	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	0.96	6.87	1.00	1.00	1.00
Incremental Delay, d2	6.2	2.3		2.0	0.0	0.3	31.3	0.6	0.0	28.7	1.7	0.2
Delay (s)	102.4	97.2		94.3	87.6	70.6	125.5	19.8	83.6	136.2	20.4	8.8
Level of Service	F	F		F	F	E	F	B	F	F	C	A
Approach Delay (s)		99.7			77.2			22.9			24.6	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Detector Phase	4	4	4 5	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0		10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	22.0	149.0	149.0	44.0	171.0	171.0
Total Split (%)	19.6%	19.6%		19.6%	19.6%	19.6%	9.2%	62.1%	62.1%	18.3%	71.3%	71.3%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1858	1540		1775	1583	1770	5085	1543	1770	5085	1542
Flt Permitted		0.99	1.00		0.56	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1837	1540		1024	1583	1770	5085	1543	1770	5085	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	87	98	38	11	114	65	2114	54	174	2919	22
RTOR Reduction (vph)	0	0	37	0	0	102	0	0	16	0	0	5
Lane Group Flow (vph)	0	92	61	0	49	12	65	2114	38	174	2919	17
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Actuated Green, G (s)		25.1	44.5		25.1	25.1	13.4	167.1	167.1	28.8	182.5	182.5
Effective Green, g (s)		25.1	44.5		25.1	25.1	13.4	167.1	167.1	28.8	182.5	182.5
Actuated g/C Ratio		0.10	0.19		0.10	0.10	0.06	0.70	0.70	0.12	0.76	0.76
Clearance Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		192	285		107	165	98	3540	1074	212	3866	1172
v/s Ratio Prot							0.04	0.42		c0.10	c0.57	
v/s Ratio Perm		c0.05	0.04		0.05	0.01			0.02			0.01
v/c Ratio		0.48	0.22		0.46	0.07	0.66	0.60	0.04	0.82	0.76	0.01
Uniform Delay, d1		101.3	82.9		101.1	96.9	111.1	19.0	11.3	103.1	16.2	7.0
Progression Factor		1.00	1.00		1.00	1.00	0.77	1.66	7.29	0.89	0.83	4.86
Incremental Delay, d2		1.9	0.4		3.1	0.2	13.8	0.7	0.1	15.2	0.9	0.0
Delay (s)		103.2	83.3		104.1	97.1	99.9	32.1	82.8	106.7	14.4	33.9
Level of Service		F	F		F	F	F	C	F	F	B	C
Approach Delay (s)		92.9			99.2			35.3			19.7	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2015	3150	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 21 (18%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2015	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2190	3182	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2190	3182	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.43	c0.63	
v/s Ratio Perm						
v/c Ratio				0.56	0.81	
Uniform Delay, d1				5.6	8.5	
Progression Factor				1.82	1.85	
Incremental Delay, d2				0.5	1.4	
Delay (s)				10.7	17.1	
Level of Service				B	B	
Approach Delay (s)	0.0			10.7	17.1	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	25	155	15	20	170	1615	35	40	2495	365
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0	14.0	35.0	159.0		18.0	142.0	
Total Split (%)	20.4%	20.4%		5.8%	5.8%	14.6%	66.3%		7.5%	59.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	25	155	25	15	20	170	1615	35	40	2495	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
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)	326	27	168	27	16	22	185	1755	38	43	2712	397
RTOR Reduction (vph)	0	0	31	0	0	21	0	0	10	0	0	65
Lane Group Flow (vph)	176	177	137	0	43	1	185	1755	28	43	2712	332
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	39.0	39.0	72.3		7.7	7.7	27.3	159.8	174.5	8.5	141.0	180.0
Effective Green, g (s)	39.0	39.0	72.3		7.7	7.7	27.3	159.8	174.5	8.5	141.0	180.0
Actuated g/C Ratio	0.16	0.16	0.30		0.03	0.03	0.11	0.67	0.73	0.04	0.59	0.75
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	273	275	438		57	50	201	3385	1045	62	2987	1023
v/s Ratio Prot	c0.10	0.10			c0.02		c0.10	0.35		0.02	c0.53	
v/s Ratio Perm			0.09			0.00			0.02			0.24
v/c Ratio	0.64	0.64	0.31		0.75	0.01	0.92	0.52	0.03	0.69	0.91	0.32
Uniform Delay, d1	94.0	94.0	64.7		115.2	112.5	105.3	20.5	9.1	114.5	43.8	9.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.91	1.29	2.88	0.89	1.36	1.27
Incremental Delay, d2	5.1	5.1	0.4		38.8	0.0	38.3	0.5	0.0	15.8	3.5	0.1
Delay (s)	99.2	99.1	65.1		154.0	112.5	133.6	26.8	26.3	118.1	63.0	12.7
Level of Service	F	F	E		F	F	F	C	C	F	E	B
Approach Delay (s)		88.1			139.9			36.8			57.4	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	54.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	225	70	50	80	360	40	1250	5	410	1995	455
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	60.0	60.0		47.0		14.0	87.0	87.0	46.0	119.0	119.0
Total Split (%)	25.0%	25.0%		19.6%		5.8%	36.3%	36.3%	19.2%	49.6%	49.6%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 235 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	70	50	10	80	360	40	1250	5	410	1995	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	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)	245	76	54	11	87	391	43	1359	5	446	2168	495
RTOR Reduction (vph)	0	0	46	0	0	140	0	0	2	0	0	138
Lane Group Flow (vph)	159	162	8	0	98	251	43	1359	3	446	2168	357
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	28.2	28.2	36.1		20.9	63.5	7.9	129.3	129.3	36.6	158.0	158.0
Effective Green, g (s)	28.2	28.2	36.1		20.9	63.5	7.9	129.3	129.3	36.6	158.0	158.0
Actuated g/C Ratio	0.12	0.12	0.15		0.09	0.26	0.03	0.54	0.54	0.15	0.66	0.66
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	197	202	238		161	737	58	2739	852	523	3347	1042
v/s Ratio Prot	c0.09	0.09			c0.05		0.02	0.27		c0.13	c0.43	
v/s Ratio Perm			0.01			0.09			0.00			0.23
v/c Ratio	0.81	0.80	0.03		0.61	0.34	0.74	0.50	0.00	0.85	0.65	0.34
Uniform Delay, d1	103.2	103.2	87.1		105.6	71.3	115.0	34.8	25.6	99.1	24.4	18.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.87	1.04	1.00	1.04	1.03	2.29
Incremental Delay, d2	20.9	20.0	0.1		6.4	0.3	36.9	0.6	0.0	7.6	0.5	0.5
Delay (s)	124.2	123.2	87.1		112.0	71.6	137.2	36.7	25.6	110.9	25.6	41.9
Level of Service	F	F	F		F	E	F	D	C	F	C	D
Approach Delay (s)		118.4			79.7			39.7			40.4	
Approach LOS		F			E			D			D	

Intersection Summary				
HCM 2000 Control Delay	49.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	72.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	31.0
Total Split (s)	51.0	51.0		61.0	61.0	61.0	28.0	80.0		48.0	100.0	100.0
Total Split (%)	21.3%	21.3%		25.4%	25.4%	25.4%	11.7%	33.3%		20.0%	41.7%	41.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	239	293	201	33	283	201	190	1038	38	408	1480	266
RTOR Reduction (vph)	0	0	58	0	0	103	0	0	14	0	0	80
Lane Group Flow (vph)	172	360	143	33	283	98	190	1038	24	408	1480	186
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	31.3	31.3	48.9	41.0	41.0	73.9	17.6	109.8	150.8	32.9	125.1	125.1
Effective Green, g (s)	31.3	31.3	48.9	41.0	41.0	73.9	17.6	109.8	150.8	32.9	125.1	125.1
Actuated g/C Ratio	0.13	0.13	0.20	0.17	0.17	0.31	0.07	0.46	0.63	0.14	0.52	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	209	438	322	302	318	927	251	2326	994	470	2650	825
v/s Ratio Prot	0.11	c0.11		0.02	c0.15	0.02	0.06	0.20		c0.12	c0.29	
v/s Ratio Perm			0.09			0.02			0.02			0.12
v/c Ratio	0.82	0.82	0.44	0.11	0.89	0.11	0.76	0.45	0.02	0.87	0.56	0.22
Uniform Delay, d1	101.7	101.6	83.6	84.1	97.3	59.4	109.1	44.4	16.8	101.4	38.8	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	0.94	1.19
Incremental Delay, d2	21.3	11.2	0.4	0.1	24.1	0.0	11.0	0.6	0.0	12.1	0.7	0.5
Delay (s)	123.0	112.9	84.0	84.1	121.4	59.4	120.1	45.0	16.8	147.2	37.3	37.5
Level of Service	F	F	F	F	F	E	F	D	B	F	D	D
Approach Delay (s)		107.3			94.9			55.4			58.1	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	780	235	305	880	20	135
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	848	255	332	957	22	147
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked					0.96	
vC, conflicting volume			1103		1989	424
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1103		1951	424
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			47		15	75
cM capacity (veh/h)			629		26	579

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	424	424	255	332	478	478	168
Volume Left	0	0	0	332	0	0	22
Volume Right	0	0	255	0	0	0	147
cSH	1700	1700	1700	629	1700	1700	199
Volume to Capacity	0.25	0.25	0.15	0.53	0.28	0.28	0.85
Queue Length 95th (ft)	0	0	0	77	0	0	157
Control Delay (s)	0.0	0.0	0.0	16.9	0.0	0.0	56.2
Lane LOS				C			F
Approach Delay (s)	0.0			4.4			56.2
Approach LOS							F

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	855	30	15	1145	40	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	929	33	16	1245	43	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			962		1601	481
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			962		1601	481
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		54	97
cM capacity (veh/h)			711		94	531

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	620	342	431	830	60
Volume Left	0	0	16	0	43
Volume Right	0	33	0	0	16
cSH	1700	1700	711	1700	122
Volume to Capacity	0.36	0.20	0.02	0.49	0.49
Queue Length 95th (ft)	0	0	2	0	56
Control Delay (s)	0.0	0.0	0.7	0.0	60.2
Lane LOS			A		F
Approach Delay (s)	0.0		0.2		60.2
Approach LOS					F

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	875	0	170	1140	0	55
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	951	0	185	1239	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			951		1940	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			951		1940	476
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			74		100	89
cM capacity (veh/h)			718		42	536

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	476	476	598	826	60
Volume Left	0	0	185	0	0
Volume Right	0	0	0	0	60
cSH	1700	1700	718	1700	536
Volume to Capacity	0.28	0.28	0.26	0.49	0.11
Queue Length 95th (ft)	0	0	26	0	9
Control Delay (s)	0.0	0.0	6.4	0.0	12.6
Lane LOS			A		B
Approach Delay (s)	0.0		2.7		12.6
Approach LOS					B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	925	15	0	1145	0	0	0	0	0	0	205
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1005	16	0	1245	0	0	0	0	0	0	223
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					327							
pX, platoon unblocked												
vC, conflicting volume	1245			1022			1859	2258	511	1747	2266	622
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1245			1022			1859	2258	511	1747	2266	622
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	48
cM capacity (veh/h)	555			675			22	41	508	55	40	429

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	670	351	622	622	223
Volume Left	0	0	0	0	0
Volume Right	0	16	0	0	223
cSH	1700	1700	1700	1700	429
Volume to Capacity	0.39	0.21	0.37	0.37	0.52
Queue Length 95th (ft)	0	0	0	0	73
Control Delay (s)	0.0	0.0	0.0	0.0	22.1
Lane LOS					C
Approach Delay (s)	0.0		0.0		22.1
Approach LOS					C

Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		51.0%	ICU Level of Service	A
Analysis Period (min)		15		

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	925	655	1145
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 100.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	925	0	655	1145	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1005	0	712	1245	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1005	0	712	1245	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	35.9		52.2	100.1		
Effective Green, g (s)	35.9		52.2	100.1		
Actuated g/C Ratio	0.36		0.52	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1269		923	3539		
v/s Ratio Prot	c0.28		c0.40	0.35		
v/s Ratio Perm						
v/c Ratio	0.79		0.77	0.35		
Uniform Delay, d1	28.8		19.2	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	3.5		4.0	0.1		
Delay (s)	32.2		23.2	0.1		
Level of Service	C		C	A		
Approach Delay (s)	32.2			8.5	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	290	1265	1800	515
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 100.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	290	1265	1800	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	1375	1957	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	315	1375	1957	560	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	23.8	100.7	65.9	100.7		
Effective Green, g (s)	23.8	100.7	65.9	100.7		
Actuated g/C Ratio	0.24	1.00	0.65	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	418	3539	2315	1583		
v/s Ratio Prot	c0.18	0.39	c0.55			
v/s Ratio Perm				0.35		
v/c Ratio	0.75	0.39	0.85	0.35		
Uniform Delay, d1	35.7	0.0	13.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	7.5	0.1	3.0	0.6		
Delay (s)	43.2	0.1	16.5	0.6		
Level of Service	D	A	B	A		
Approach Delay (s)		8.1	13.0		0.0	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.7	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	985	700	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1071	761	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	777				1359	389
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777				1359	389
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				84	85
cM capacity (veh/h)	835				135	610

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	535	535	507	270	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	835	1700	1700	1700	1700	135	610
Volume to Capacity	0.03	0.31	0.31	0.30	0.16	0.16	0.15
Queue Length 95th (ft)	3	0	0	0	0	14	13
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	36.6	12.0
Lane LOS	A					E	B
Approach Delay (s)	0.2			0.0		16.7	
Approach LOS						C	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	695	45	5	510	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	755	49	5	554	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565			804			1367	1562	402	1160	1582	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565			804			1367	1562	402	1160	1582	283
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			68	100	99	100	100	87
cM capacity (veh/h)	1003			816			84	99	598	137	96	714

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	103	504	301	5	370	196	33	0	92
Volume Left	103	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	1003	1700	1700	816	1700	1700	99	1700	714
Volume to Capacity	0.10	0.30	0.18	0.01	0.22	0.12	0.33	0.00	0.13
Queue Length 95th (ft)	9	0	0	1	0	0	32	0	11
Control Delay (s)	9.0	0.0	0.0	9.4	0.0	0.0	58.6	0.0	10.8
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.0			0.1			58.6	10.8	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		37.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	515	40	5	435	10	20	5	0	5	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	560	43	5	473	11	22	5	0	5	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			603			1215	1391	302	1087	1408	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			603			1215	1391	302	1087	1408	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	85			99			80	95	100	96	100	91
cM capacity (veh/h)	1075			970			110	120	694	146	117	759

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	373	230	5	315	168	27	5	71
Volume Left	158	0	0	5	0	0	22	5	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	1075	1700	1700	970	1700	1700	112	146	759
Volume to Capacity	0.15	0.22	0.14	0.01	0.19	0.10	0.24	0.04	0.09
Queue Length 95th (ft)	13	0	0	0	0	0	22	3	8
Control Delay (s)	8.9	0.0	0.0	8.7	0.0	0.0	47.2	30.7	10.2
Lane LOS	A			A			E	D	B
Approach Delay (s)	1.8			0.1			47.2	11.7	
Approach LOS							E	B	

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		38.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	375	25	5	335	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	408	27	5	364	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	375			435			978	1057	217	834	1065	188
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	375			435			978	1057	217	834	1065	188
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			90	100	100	100	100	86
cM capacity (veh/h)	1180			1121			161	199	787	239	197	823

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	272	163	5	243	132	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	1180	1700	1700	1121	1700	1700	161	1700	823
Volume to Capacity	0.11	0.16	0.10	0.00	0.14	0.08	0.10	0.00	0.14
Queue Length 95th (ft)	9	0	0	0	0	0	8	0	12
Control Delay (s)	8.4	0.0	0.0	8.2	0.0	0.0	29.8	0.0	10.1
Lane LOS	A			A			D	A	B
Approach Delay (s)	1.9			0.1			29.8	10.1	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		29.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	210	45	0	215	0	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	228	49	0	234	0	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	234			277			671	736	139	606	761	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			277			671	736	139	606	761	117
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			64	95	100	100	91	96
cM capacity (veh/h)	1331			1283			284	312	884	340	302	913

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	125	152	125	0	156	78	120	0	27	38
Volume Left	125	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	0	0	0	0	38
cSH	1331	1700	1700	1700	1700	1700	287	1700	302	913
Volume to Capacity	0.09	0.09	0.07	0.00	0.09	0.05	0.42	0.00	0.09	0.04
Queue Length 95th (ft)	8	0	0	0	0	0	49	0	7	3
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	0.0	26.2	0.0	18.1	9.1
Lane LOS	A						D	A	C	A
Approach Delay (s)	2.5			0.0			26.2		12.9	
Approach LOS							D		B	

Intersection Summary			
Average Delay		6.1	
Intersection Capacity Utilization		35.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	0	100	0	0	0	75	15	0	0	0	140
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	0	109	0	0	0	82	16	0	0	0	152
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			109			457	304	54	258	359	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			109			457	304	54	258	359	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			79	97	100	100	100	86
cM capacity (veh/h)	1622			1480			394	561	1001	620	523	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	0	109	0	0	0	98	0	152
Volume Left	125	0	0	0	0	0	82	0	0
Volume Right	0	0	109	0	0	0	0	0	152
cSH	1622	1700	1700	1700	1700	1700	415	1700	1084
Volume to Capacity	0.08	0.00	0.06	0.00	0.00	0.00	0.24	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	23	0	12
Control Delay (s)	7.4	0.0	0.0	0.0	0.0	0.0	16.3	0.0	8.9
Lane LOS	A						C	A	A
Approach Delay (s)	4.0			0.0			16.3	8.9	
Approach LOS							C	A	

Intersection Summary			
Average Delay		8.0	
Intersection Capacity Utilization		20.3%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	440	0	475	395	530	455	725
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 79.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	440	0	475	395	530	0	0	455	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1551	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1551	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	0	516	429	576	0	0	495	788
RTOR Reduction (vph)	0	0	0	0	0	204	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	239	239	312	429	576	0	0	495	788
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Effective Green, g (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Actuated g/C Ratio				0.28	0.28	0.28	0.31	0.57			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				468	468	431	539	2015			667	1583
v/s Ratio Prot							c0.24	0.16			c0.14	
v/s Ratio Perm				0.14	0.14	c0.20						0.50
v/c Ratio				0.51	0.51	0.72	0.80	0.29			0.74	0.50
Uniform Delay, d1				24.0	24.0	25.8	25.2	8.7			30.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.9	0.9	5.9	8.0	0.1			4.5	1.1
Delay (s)				24.9	24.9	31.7	33.2	8.8			34.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			28.4			19.2			14.1	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	420	450	225	585
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 98.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	10	420	0	0	0	0	450	255	225	585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3316		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3316		1770	3539	
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)	478	11	457	0	0	0	0	489	277	245	636	0
RTOR Reduction (vph)	0	0	228	0	0	0	0	62	0	0	0	0
Lane Group Flow (vph)	0	489	229	0	0	0	0	704	0	245	636	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.5	32.5					28.4		19.4	53.8	
Effective Green, g (s)		32.5	32.5					28.4		19.4	53.8	
Actuated g/C Ratio		0.33	0.33					0.29		0.20	0.55	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		587	516					958		349	1936	
v/s Ratio Prot								c0.21		c0.14	0.18	
v/s Ratio Perm		0.28	0.15									
v/c Ratio		0.83	0.44					0.74		0.70	0.33	
Uniform Delay, d1		30.4	25.8					31.6		36.8	12.3	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		9.8	0.6					3.0		6.3	0.1	
Delay (s)		40.2	26.4					34.5		43.0	12.4	
Level of Service		D	C					C		D	B	
Approach Delay (s)		33.6			0.0			34.5			20.9	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	740	495	295	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 86
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	740	495	295	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	428	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	886	804	538	321	103
RTOR Reduction (vph)	0	0	0	340	0	52
Lane Group Flow (vph)	43	886	804	198	321	51
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	31.6	31.6	31.6	31.6	42.4	42.4
Effective Green, g (s)	31.6	31.6	31.6	31.6	42.4	42.4
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.49	0.49
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	1300	1300	581	872	780
v/s Ratio Prot		c0.25	0.23		c0.18	
v/s Ratio Perm	0.10			0.12		0.03
v/c Ratio	0.27	0.68	0.62	0.34	0.37	0.07
Uniform Delay, d1	19.1	23.0	22.3	19.7	13.5	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.5	0.9	0.4	1.2	0.2
Delay (s)	20.1	24.4	23.1	20.0	14.7	11.6
Level of Service	C	C	C	C	B	B
Approach Delay (s)		24.2	21.9		13.9	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 with Mitigation and Rail AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	715	0	40	430	60	265	10
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	50.0	50.0	50.0	22.0	50.0	28.0	28.0
Total Split (%)	50.0%	50.0%	50.0%	22.0%	50.0%	28.0%	28.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	715	0	40	430	60	0	0	265	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	722	0	43	434	61	0	0	268	11
RTOR Reduction (vph)	0	0	0	0	0	23	0	0	0	0	0	9
Lane Group Flow (vph)	0	0	0	361	361	20	434	61	0	0	268	2
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				47.5	47.5	47.5	16.0	40.5			19.5	19.5
Effective Green, g (s)				47.5	47.5	47.5	16.0	40.5			19.5	19.5
Actuated g/C Ratio				0.48	0.48	0.48	0.16	0.40			0.20	0.20
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				798	798	751	549	754			690	308
v/s Ratio Prot				c0.21	0.21		c0.13	0.03			c0.08	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.45	0.45	0.03	0.79	0.08			0.39	0.01
Uniform Delay, d1				17.6	17.6	14.0	40.4	18.3			35.1	32.4
Progression Factor				1.00	1.00	1.00	1.00	1.66			1.00	1.00
Incremental Delay, d2				1.8	0.4	0.1	7.5	0.0			0.4	0.0
Delay (s)				19.4	18.0	14.0	48.0	30.3			35.4	32.5
Level of Service				B	B	B	D	C			D	C
Approach Delay (s)		0.0			18.4			45.8			35.3	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	380	515	1305	115	980
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		8.0	36.0
Total Split (s)	15.0		61.0		24.0	85.0
Total Split (%)	15.0%		61.0%		24.0%	85.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	380	0	0	0	0	515	1305	115	980	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1794	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1794	1583					3539	2787	1770	3539	
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)	16	5	413	0	0	0	0	560	1418	125	1065	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	413	0	0	0	0	560	1418	125	1065	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		3.2	100.0					68.5	100.0	12.3	84.8	
Effective Green, g (s)		3.2	100.0					68.5	100.0	12.3	84.8	
Actuated g/C Ratio		0.03	1.00					0.68	1.00	0.12	0.85	
Clearance Time (s)		6.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		57	1583					2424	2787	217	3001	
v/s Ratio Prot		0.01						0.16		0.07	0.30	
v/s Ratio Perm			0.26						c0.51			
v/c Ratio		0.37	0.26					0.23	0.51	0.58	0.35	
Uniform Delay, d1		47.4	0.0					5.9	0.0	41.4	1.7	
Progression Factor		1.00	1.00					1.00	1.00	1.06	0.61	
Incremental Delay, d2		4.0	0.4					0.2	0.7	3.5	0.3	
Delay (s)		51.4	0.4					6.1	0.7	47.3	1.3	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		2.9			0.0			2.2			6.1	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	3.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	1955	1400	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	38	0	1975	1414	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.70					
vC, conflicting volume	2072	471	1468			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	471	1468			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	164	539	455			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	38	658	658	658	471	471	471	54
Volume Left	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	54
cSH	539	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.07	0.39	0.39	0.39	0.28	0.28	0.28	0.03
Queue Length 95th (ft)	6	0	0	0	0	0	0	0
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	12.2	0.0			0.0			
Approach LOS	B							

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	8.0	43.0		8.0	43.0		8.0	43.0		8.0	43.0	
Total Split (s)	21.0	45.0		19.0	43.0		21.0	56.0		20.0	55.0	
Total Split (%)	15.0%	32.1%		13.6%	30.7%		15.0%	40.0%		14.3%	39.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 118.1
Natural Cycle: 115
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	285	565	80	170	195	70	230	1735	290	240	1125	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	310	614	87	185	212	76	250	1886	315	261	1223	190
RTOR Reduction (vph)	0	0	30	0	0	32	0	0	24	0	0	75
Lane Group Flow (vph)	310	614	57	185	212	44	250	1886	291	261	1223	115
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	15.0	23.2	41.7	11.6	19.8	38.4	13.5	51.6	68.2	13.6	51.7	71.7
Effective Green, g (s)	15.0	23.2	41.7	11.6	19.8	38.4	13.5	51.6	68.2	13.6	51.7	71.7
Actuated g/C Ratio	0.13	0.20	0.35	0.10	0.17	0.33	0.11	0.44	0.58	0.12	0.44	0.61
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	436	999	559	337	853	515	392	2223	914	395	2227	961
v/s Ratio Prot	c0.09	c0.12		0.05	0.04		0.07	c0.37		c0.08	0.24	
v/s Ratio Perm			0.04			0.03			0.18			0.07
v/c Ratio	0.71	0.61	0.10	0.55	0.25	0.09	0.64	0.85	0.32	0.66	0.55	0.12
Uniform Delay, d1	49.4	43.3	25.6	50.7	42.6	27.6	49.9	29.7	12.9	50.0	24.5	9.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	1.1	0.1	1.8	0.2	0.1	3.4	3.2	0.2	4.1	0.3	0.1
Delay (s)	54.8	44.4	25.7	52.5	42.8	27.7	53.3	32.9	13.1	54.1	24.8	9.9
Level of Service	D	D	C	D	D	C	D	C	B	D	C	A
Approach Delay (s)		46.0			44.2			32.4			27.7	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	40	95	400	130	1755	30	160	925	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	8.0	44.0		8.0	44.0		8.0	36.0		8.0	36.0	
Total Split (s)	15.0	45.0		14.0	44.0		22.0	48.0		13.0	39.0	
Total Split (%)	12.5%	37.5%		11.7%	36.7%		18.3%	40.0%		10.8%	32.5%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 107.3
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	100	175	40	95	400	130	1755	30	160	925	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	234	109	190	43	103	435	141	1908	33	174	1005	386
RTOR Reduction (vph)	0	0	77	0	0	56	0	0	16	0	0	179
Lane Group Flow (vph)	234	109	113	43	103	379	141	1908	17	174	1005	207
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	10.6	31.4	46.2	6.6	27.4	41.2	9.8	43.3	54.9	8.8	42.3	57.9
Effective Green, g (s)	10.6	31.4	46.2	6.6	27.4	41.2	9.8	43.3	54.9	8.8	42.3	57.9
Actuated g/C Ratio	0.10	0.29	0.43	0.06	0.25	0.38	0.09	0.40	0.51	0.08	0.39	0.54
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	541	676	108	472	603	311	2036	803	279	1989	847
v/s Ratio Prot	c0.07	c0.06		0.02	0.06		0.04	c0.38		0.05	0.20	
v/s Ratio Perm			0.07			c0.24			0.01			0.13
v/c Ratio	0.70	0.20	0.17	0.40	0.22	0.63	0.45	0.94	0.02	0.62	0.51	0.24
Uniform Delay, d1	47.2	28.9	19.1	48.8	31.9	27.2	46.6	31.1	13.2	48.0	25.0	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.2	0.1	2.4	0.2	2.1	1.1	8.9	0.0	4.3	0.2	0.2
Delay (s)	53.4	29.1	19.2	51.2	32.1	29.3	47.7	40.0	13.2	52.3	25.2	13.6
Level of Service	D	C	B	D	C	C	D	D	B	D	C	B
Approach Delay (s)		36.2			31.4			40.1			25.3	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	108.1	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	40	100	815	1280	75	240	810	125
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		44.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		49.0		55.0	55.0	36.0	91.0	91.0
Total Split (%)		35.0%		39.3%	39.3%	25.7%	65.0%	65.0%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 137.6
Natural Cycle: 95
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	40	100	0	815	0	1280	75	240	810	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	43	109	0	886	0	1391	82	261	880	136
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	54	0	0	54
Lane Group Flow (vph)	0	0	43	109	0	876	0	1391	28	261	880	82
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			137.6	43.0		79.0		46.6	46.6	30.0	82.6	82.6
Effective Green, g (s)			137.6	43.0		79.0		46.6	46.6	30.0	82.6	82.6
Actuated g/C Ratio			1.00	0.31		0.57		0.34	0.34	0.22	0.60	0.60
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	553		908		1722	536	748	3052	950
v/s Ratio Prot				0.06				c0.27		0.08	0.17	
v/s Ratio Perm			0.03			c0.55			0.02			0.05
v/c Ratio			0.03	0.20		0.96		0.81	0.05	0.35	0.29	0.09
Uniform Delay, d1			0.0	34.7		28.0		41.4	30.6	45.5	13.3	11.6
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.2		21.6		2.9	0.0	0.3	0.1	0.0
Delay (s)			0.0	34.8		49.6		44.3	30.7	45.8	13.3	11.6
Level of Service			A	C		D		D	C	D	B	B
Approach Delay (s)		0.0			47.9			43.6			19.8	
Approach LOS		A			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	137.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	210	280	170	175	220	605	185	660	195	655	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	10.0	4.0	10.0	
Minimum Split (s)	8.0	40.0		8.0	40.0		8.0	40.0	8.0	40.0	
Total Split (s)	18.0	43.0		15.0	40.0		20.0	41.0	26.0	47.0	
Total Split (%)	14.4%	34.4%		12.0%	32.0%		16.0%	32.8%	20.8%	37.6%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 125
Actuated Cycle Length: 101.3
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	280	170	175	220	605	185	660	55	195	655	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	5026		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	5026		3433	5085	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)	228	304	185	190	239	658	201	717	60	212	712	174
RTOR Reduction (vph)	0	0	48	0	0	47	0	8	0	0	0	98
Lane Group Flow (vph)	228	304	137	190	239	611	201	769	0	212	712	76
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	11.7	32.6	50.1	10.1	31.0	51.5	11.5	23.3		14.5	26.3	44.0
Effective Green, g (s)	11.7	32.6	50.1	10.1	31.0	51.5	11.5	23.3		14.5	26.3	44.0
Actuated g/C Ratio	0.12	0.32	0.50	0.10	0.31	0.51	0.11	0.23		0.14	0.26	0.44
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	399	604	789	345	574	811	392	1165		495	1330	693
v/s Ratio Prot	c0.07	0.16		0.06	0.13		0.06	c0.15		0.06	c0.14	
v/s Ratio Perm			0.09			c0.39						0.05
v/c Ratio	0.57	0.50	0.17	0.55	0.42	0.75	0.51	0.66		0.43	0.54	0.11
Uniform Delay, d1	42.0	27.4	13.8	43.0	27.6	19.5	41.9	35.0		39.2	31.9	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	0.7	0.1	1.9	0.5	4.0	1.1	1.4		0.6	0.4	0.1
Delay (s)	44.0	28.1	13.9	44.9	28.1	23.5	43.0	36.4		39.8	32.3	16.8
Level of Service	D	C	B	D	C	C	D	D		D	C	B
Approach Delay (s)		29.5			28.2			37.7			31.3	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	43.0		9.0	43.0		9.0	43.0		9.0	44.0	
Total Split (s)	32.0	47.0		29.0	44.0		17.0	44.0		20.0	47.0	
Total Split (%)	22.9%	33.6%		20.7%	31.4%		12.1%	31.4%		14.3%	33.6%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 87.5
Natural Cycle: 125
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	175	35	180	535	250	20	85	35	425	120	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	554	190	38	196	582	272	22	92	38	462	130	402
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	27	0	0	187
Lane Group Flow (vph)	554	190	18	196	582	272	22	92	11	462	130	215
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Actuated Green, G (s)	20.9	29.8	40.2	11.3	20.2	41.5	5.4	9.8	26.1	16.3	20.7	46.6
Effective Green, g (s)	20.9	29.8	40.2	11.3	20.2	41.5	5.4	9.8	26.1	16.3	20.7	46.6
Actuated g/C Ratio	0.24	0.34	0.46	0.13	0.23	0.48	0.06	0.11	0.30	0.19	0.24	0.53
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	822	1209	729	444	1177	1326	109	397	473	641	840	1489
v/s Ratio Prot	c0.16	0.05		0.06	c0.11	0.10	0.01	c0.03		c0.13	0.04	0.08
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.67	0.16	0.02	0.44	0.49	0.21	0.20	0.23	0.02	0.72	0.15	0.14
Uniform Delay, d1	30.1	20.0	12.8	35.0	29.1	13.3	38.9	35.3	21.6	33.3	26.3	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.1	0.0	0.7	0.3	0.1	0.9	0.3	0.0	4.0	0.1	0.0
Delay (s)	32.3	20.0	12.8	35.7	29.4	13.3	39.8	35.6	21.6	37.3	26.4	10.3
Level of Service	C	C	B	D	C	B	D	D	C	D	C	B
Approach Delay (s)		28.3			26.4			32.7			25.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	315	5	65	10	1260	40	740
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	14.0	52.0	16.0	54.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	12.7%	47.3%	14.5%	49.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	315	5	65	10	1260	195	40	740	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1688	1583	1770	3468		1770	3536	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1688	1583	1770	3468		1770	3536	
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	0	5	342	5	71	11	1370	212	43	804	5
RTOR Reduction (vph)	0	5	0	0	0	60	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	174	173	11	11	1574	0	43	809	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Effective Green, g (s)		0.8		17.2	17.2	17.2	1.5	66.3		5.7	70.5	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.01	0.60		0.05	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		262	263	247	24	2090		91	2266	
v/s Ratio Prot		c0.00		c0.10	0.10		0.01	c0.45		c0.02	c0.23	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.66	0.66	0.04	0.46	0.75		0.47	0.36	
Uniform Delay, d1		54.2		43.7	43.6	39.4	53.8	15.9		50.7	9.2	
Progression Factor		1.00		1.00	1.00	1.00	1.41	0.44		1.00	1.00	
Incremental Delay, d2		0.1		6.2	5.8	0.1	10.1	2.0		3.8	0.4	
Delay (s)		54.3		49.9	49.5	39.5	85.9	8.9		54.5	9.6	
Level of Service		D		D	D	D	F	A		D	A	
Approach Delay (s)		54.3			47.9			9.4			11.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	505	25	1470	380	1070
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	33.0	33.0	77.0	77.0	77.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	505	25	1470	380	0	1070
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	27	1598	413	0	1163
RTOR Reduction (vph)	0	21	0	130	0	0
Lane Group Flow (vph)	549	6	1598	283	0	1163
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.5	22.5	75.5	75.5		75.5
Effective Green, g (s)	22.5	22.5	75.5	75.5		75.5
Actuated g/C Ratio	0.20	0.20	0.69	0.69		0.69
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	702	323	2429	1086		2429
v/s Ratio Prot	c0.16		c0.45			0.33
v/s Ratio Perm		0.00		0.18		
v/c Ratio	0.78	0.02	0.66	0.26		0.48
Uniform Delay, d1	41.4	34.9	9.9	6.6		8.1
Progression Factor	1.00	1.00	1.00	1.00		1.10
Incremental Delay, d2	5.7	0.0	1.4	0.6		0.6
Delay (s)	47.1	34.9	11.3	7.2		9.5
Level of Service	D	C	B	A		A
Approach Delay (s)	46.5		10.4			9.5
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	1730	1205	435	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1880	1310	473	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	1783				2173	891
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1552				2016	491
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	356				43	440

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	627	627	627	873	909
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	473
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.37	0.51	0.53
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	165	1730	1205
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 59.4
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	165	1730	1205	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	179	1880	1310	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	179	1880	1310	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			11.5	59.4	35.9	
Effective Green, g (s)			11.5	59.4	35.9	
Actuated g/C Ratio			0.19	1.00	0.60	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			342	5085	2138	
v/s Ratio Prot			0.10	c0.37	c0.37	
v/s Ratio Perm						
v/c Ratio			0.52	0.37	0.61	
Uniform Delay, d1			21.5	0.0	7.4	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			1.4	0.0	0.5	
Delay (s)			22.9	0.0	7.9	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.0	7.9	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	475	170	870	710	1875
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 119.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	475	0	170	0	0	0	0	870	0	710	1875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	516	0	185	0	0	0	0	946	0	772	2038	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	516	0	185	0	0	0	0	946	0	772	2038	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.2		119.4					40.8		37.4	84.2	
Effective Green, g (s)	23.2		119.4					40.8		37.4	84.2	
Actuated g/C Ratio	0.19		1.00					0.34		0.31	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	667		1583					1209		1075	3585	
v/s Ratio Prot	c0.15							c0.27		c0.22	0.40	
v/s Ratio Perm			0.12									
v/c Ratio	0.77		0.12					0.78		0.72	0.57	
Uniform Delay, d1	45.6		0.0					35.3		36.3	8.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	5.6		0.2					3.4		2.3	0.2	
Delay (s)	51.2		0.2					38.7		38.6	8.9	
Level of Service	D		A					D		D	A	
Approach Delay (s)		37.7			0.0			38.7			17.0	
Approach LOS		D			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2495	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2495	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2712	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2712	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.77			
v/s Ratio Perm						
v/c Ratio			0.85			
Uniform Delay, d1			3.3			
Progression Factor			1.00			
Incremental Delay, d2			3.1			
Delay (s)			6.5			
Level of Service			A			
Approach Delay (s)	0.0		6.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	870	2495	0	2045	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	946	2712	0	2223	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.80			
vC, conflicting volume			3658		1687	473		
vC1, stage 1 conf vol					946			
vC2, stage 2 conf vol					741			
vCu, unblocked vol			3658		964	473		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			61		286	538		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	473	473	1356	1356	741	741	741
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1356	1356	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.80	0.80	0.44	0.44	0.44
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		90.6%	ICU Level of Service	E
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	135	0	3255	115	0	2050	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	147	0	3538	125	0	2071	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81		0.81					
vC, conflicting volume	3250	5611	690	4230	5611	1181	2071			3540		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2956	5872	0	4167	5872	1181	1499			3540		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	19	100			100		
cM capacity (veh/h)	1	0	878	1	0	182	359			68		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	147	1179	1179	1179	125	690	690	690	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	147	0	0	0	125	0	0	0	0
cSH	1700	182	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.81	0.69	0.69	0.69	0.07	0.41	0.41	0.41	0.00
Queue Length 95th (ft)	0	138	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	76.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	F								
Approach Delay (s)	0.0	76.2	0.0				0.0			
Approach LOS	A	F								

Intersection Summary				
Average Delay		1.9		
Intersection Capacity Utilization		77.9%	ICU Level of Service	D
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	25	30	105	5	175	40	3220	35	45	1565	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	30	15	105	5	175	40	3220	35	45	1565	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1750		1727	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1750		1318	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	27	33	16	114	5	190	43	3389	38	49	1581	109
RTOR Reduction (vph)	0	8	0	0	0	14	0	0	11	0	0	29
Lane Group Flow (vph)	27	41	0	114	5	176	43	3389	27	49	1581	80
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Effective Green, g (s)	36.3	36.3		36.3	36.3	54.3	8.8	172.7	172.7	12.0	175.9	175.9
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.04	0.72	0.72	0.05	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	264		199	281	358	64	3659	1110	88	3726	1100
v/s Ratio Prot		0.02			0.00		0.02	c0.67		0.03	c0.31	
v/s Ratio Perm	0.02			c0.09		c0.11			0.02			0.05
v/c Ratio	0.13	0.16		0.57	0.02	0.49	0.67	0.93	0.02	0.56	0.42	0.07
Uniform Delay, d1	88.1	88.5		94.6	86.7	80.8	114.2	28.3	9.6	111.4	12.4	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.75	0.89	32.83	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3		3.9	0.0	1.1	10.5	2.3	0.0	7.4	0.4	0.1
Delay (s)	88.4	88.8		98.6	86.7	81.9	95.8	27.4	315.4	118.8	12.8	9.2
Level of Service	F	F		F	F	F	F	C	F	F	B	A
Approach Delay (s)		88.7			88.1			31.4			15.5	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0	47.0	10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0	47.0	47.0	47.0	47.0	24.0	151.0	151.0	42.0	169.0	169.0
Total Split (%)	19.6%	19.6%	19.6%	19.6%	19.6%	19.6%	10.0%	62.9%	62.9%	17.5%	70.4%	70.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	40	60	150	15	155	45	3145	45	45	1620	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1853	1540		1758	1583	1770	5085	1543	1770	5085	1558
Flt Permitted		0.97	1.00		0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1801	1540		1305	1583	1770	5085	1543	1770	5085	1558
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	43	65	163	16	168	49	3418	49	49	1636	5
RTOR Reduction (vph)	0	0	55	0	0	142	0	0	14	0	0	1
Lane Group Flow (vph)	0	48	10	0	179	26	49	3418	35	49	1636	4
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		36.5	36.5		36.5	36.5	12.0	172.5	172.5	12.0	172.5	172.5
Effective Green, g (s)		36.5	36.5		36.5	36.5	12.0	172.5	172.5	12.0	172.5	172.5
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.05	0.72	0.72	0.05	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		273	234		198	240	88	3654	1109	88	3654	1119
v/s Ratio Prot							c0.03	c0.67		0.03	0.32	
v/s Ratio Perm		0.03	0.01		c0.14	0.02			0.02			0.00
v/c Ratio		0.18	0.04		0.90	0.11	0.56	0.94	0.03	0.56	0.45	0.00
Uniform Delay, d1		88.6	86.8		100.0	87.7	111.4	29.0	9.7	111.4	14.0	9.5
Progression Factor		1.00	1.00		1.00	1.00	0.95	0.98	3.32	0.94	0.84	1.00
Incremental Delay, d2		0.3	0.1		38.2	0.2	3.5	3.0	0.0	6.9	0.4	0.0
Delay (s)		89.0	86.9		138.2	87.9	108.9	31.5	32.3	111.8	12.2	9.5
Level of Service		F	F		F	F	F	C	C	F	B	A
Approach Delay (s)		87.8			113.8			32.6			15.1	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3380	1795	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3380	1795	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3674	1813	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3674	1813	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.72	0.36	
v/s Ratio Perm						
v/c Ratio				0.94	0.46	
Uniform Delay, d1				11.4	4.9	
Progression Factor				1.35	0.94	
Incremental Delay, d2				2.8	0.4	
Delay (s)				18.3	5.0	
Level of Service				B	A	
Approach Delay (s)	0.0			18.3	5.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	405	10	160	10	5	250	3065	15	5	1525	330
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		14.0	14.0	46.0	165.0		12.0	131.0	
Total Split (%)	20.4%	20.4%		5.8%	5.8%	19.2%	68.8%		5.0%	54.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	10	160	10	10	5	250	3065	15	5	1525	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1455		1817	1583	1770	5085	1438	1770	5085	1365
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)	440	11	174	11	11	5	272	3332	16	5	1658	359
RTOR Reduction (vph)	0	0	35	0	0	5	0	0	4	0	0	69
Lane Group Flow (vph)	224	227	139	0	22	0	272	3332	12	5	1658	290
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	40.1	40.1	84.8		5.9	5.9	38.7	167.8	180.7	1.2	130.3	170.4
Effective Green, g (s)	40.1	40.1	84.8		5.9	5.9	38.7	167.8	180.7	1.2	130.3	170.4
Actuated g/C Ratio	0.17	0.17	0.35		0.02	0.02	0.16	0.70	0.75	0.00	0.54	0.71
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	280	282	514		44	38	285	3555	1082	8	2760	969
v/s Ratio Prot	0.13	c0.13			c0.01		c0.15	c0.66		0.00	0.33	
v/s Ratio Perm			0.10			0.00			0.01			0.21
v/c Ratio	0.80	0.80	0.27		0.50	0.00	0.95	0.94	0.01	0.62	0.60	0.30
Uniform Delay, d1	96.1	96.2	55.5		115.6	114.2	99.8	31.5	7.4	119.2	37.2	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.80	1.15	1.25
Incremental Delay, d2	15.0	15.3	0.3		3.2	0.0	26.4	3.4	0.0	72.9	0.9	0.2
Delay (s)	111.1	111.4	55.8		118.8	114.2	123.9	34.8	7.4	168.3	43.6	16.1
Level of Service	F	F	E		F	F	F	C	A	F	D	B
Approach Delay (s)		95.8			118.0			41.4			39.0	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	118.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	520	50	50	85	505	40	2095	5	285	1295	60
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	57.0	57.0		35.0		20.0	115.0	115.0	33.0	128.0	128.0
Total Split (%)	23.8%	23.8%		14.6%		8.3%	47.9%	47.9%	13.8%	53.3%	53.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	50	50	15	85	505	40	2095	5	285	1295	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1583		1849	2787	1770	5085	1583	3433	5085	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)	565	54	54	16	92	549	43	2277	5	310	1408	65
RTOR Reduction (vph)	0	0	41	0	0	34	0	0	3	0	0	30
Lane Group Flow (vph)	311	308	13	0	108	515	43	2277	2	310	1408	35
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	47.7	47.7	58.6		29.0	60.9	10.9	112.4	112.4	25.9	127.4	127.4
Effective Green, g (s)	47.7	47.7	58.6		29.0	60.9	10.9	112.4	112.4	25.9	127.4	127.4
Actuated g/C Ratio	0.20	0.20	0.24		0.12	0.25	0.05	0.47	0.47	0.11	0.53	0.53
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	337	386		223	707	80	2381	741	370	2699	840
v/s Ratio Prot	c0.18	0.18			0.06		0.02	c0.45		c0.09	0.28	
v/s Ratio Perm			0.01			c0.18			0.00			0.02
v/c Ratio	0.93	0.91	0.03		0.48	0.73	0.54	0.96	0.00	0.84	0.52	0.04
Uniform Delay, d1	94.5	94.1	69.1		98.5	82.0	112.1	61.4	34.0	105.0	36.5	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.74	1.00	1.28	0.43	0.19
Incremental Delay, d2	31.9	28.1	0.0		1.7	3.8	5.8	9.5	0.0	12.9	0.6	0.1
Delay (s)	126.4	122.3	69.2		100.2	85.8	117.7	54.8	34.0	147.6	16.4	5.1
Level of Service	F	F	E		F	F	F	D	C	F	B	A
Approach Delay (s)		119.9			88.1			56.0			38.8	
Approach LOS		F			F			E			D	

Intersection Summary				
HCM 2000 Control Delay	62.2	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	89.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6 3
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	
Total Split (s)	47.0	47.0		52.0	52.0	52.0	25.0	113.0		28.0	116.0	
Total Split (%)	19.6%	19.6%		21.7%	21.7%	21.7%	10.4%	47.1%		11.7%	48.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	160	170	105	250	300	155	1500	50	180	1045	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3316	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	293	174	185	114	272	326	168	1630	54	196	1056	152
RTOR Reduction (vph)	0	0	52	0	0	49	0	0	16	0	0	42
Lane Group Flow (vph)	152	315	133	114	272	277	168	1630	38	196	1056	110
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6 3
Actuated Green, G (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Effective Green, g (s)	28.4	28.4	44.2	38.8	38.8	56.7	15.8	129.9	168.7	17.9	132.0	167.4
Actuated g/C Ratio	0.12	0.12	0.18	0.16	0.16	0.24	0.07	0.54	0.70	0.07	0.55	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	190	392	291	286	301	728	226	2752	1112	256	2796	1104
v/s Ratio Prot	0.09	c0.09		0.06	c0.15	0.06	0.05	c0.32		c0.06	0.21	
v/s Ratio Perm			0.08			0.04			0.02			0.07
v/c Ratio	0.80	0.80	0.46	0.40	0.90	0.38	0.74	0.59	0.03	0.77	0.38	0.10
Uniform Delay, d1	103.0	103.1	87.2	90.1	98.8	76.9	110.1	37.2	10.9	109.0	30.7	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.42	0.98
Incremental Delay, d2	19.9	10.7	0.4	0.3	28.0	0.1	11.0	0.9	0.0	10.3	0.3	0.0
Delay (s)	122.9	113.8	87.6	90.5	126.7	77.0	121.1	38.1	10.9	114.3	43.9	11.6
Level of Service	F	F	F	F	F	E	F	D	B	F	D	B
Approach Delay (s)		108.5			98.2			44.8			50.2	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	63.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1015	95	110	450	10	195
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1103	103	120	489	11	212
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked						
vC, conflicting volume			1207		1587	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1207		1587	552
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			79		86	56
cM capacity (veh/h)			574		78	478

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	552	552	103	120	245	245	223
Volume Left	0	0	0	120	0	0	11
Volume Right	0	0	103	0	0	0	212
cSH	1700	1700	1700	574	1700	1700	502
Volume to Capacity	0.32	0.32	0.06	0.21	0.14	0.14	0.44
Queue Length 95th (ft)	0	0	0	19	0	0	56
Control Delay (s)	0.0	0.0	0.0	12.9	0.0	0.0	20.4
Lane LOS				B			C
Approach Delay (s)	0.0			2.5			20.4
Approach LOS							C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	955	40	10	565	30	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1038	43	11	614	33	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1082		1389	541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1082		1389	541
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		75	99
cM capacity (veh/h)			641		131	486

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	692	389	216	409	38
Volume Left	0	0	11	0	33
Volume Right	0	43	0	0	5
cSH	1700	1700	641	1700	147
Volume to Capacity	0.41	0.23	0.02	0.24	0.26
Queue Length 95th (ft)	0	0	1	0	25
Control Delay (s)	0.0	0.0	0.7	0.0	37.9
Lane LOS			A		E
Approach Delay (s)	0.0		0.3		37.9
Approach LOS					E

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	920	0	55	585	0	40
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1000	0	60	636	0	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			1000		1438	500
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1000		1438	500
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	92
cM capacity (veh/h)			688		113	516

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	500	500	272	424	43
Volume Left	0	0	60	0	0
Volume Right	0	0	0	0	43
cSH	1700	1700	688	1700	516
Volume to Capacity	0.29	0.29	0.09	0.25	0.08
Queue Length 95th (ft)	0	0	7	0	7
Control Delay (s)	0.0	0.0	3.2	0.0	12.6
Lane LOS			A		B
Approach Delay (s)	0.0		1.2		12.6
Approach LOS					B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	35	10	25	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	38	11	27	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	49	60
Volume Left (vph)	0	38	27
Volume Right (vph)	27	0	33
Hadj (s)	-0.34	0.19	-0.20
Departure Headway (s)	3.7	4.3	3.9
Degree Utilization, x	0.05	0.06	0.06
Capacity (veh/h)	941	829	894
Control Delay (s)	6.9	7.5	7.2
Approach Delay (s)	6.9	7.5	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.2		
Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	895	325	560
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 56.3
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	895	0	325	560	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	973	0	353	609	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	973	0	353	609	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	26.2		18.0	56.2		
Effective Green, g (s)	26.2		18.0	56.2		
Actuated g/C Ratio	0.47		0.32	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1649		566	3539		
v/s Ratio Prot	c0.27		c0.20	0.17		
v/s Ratio Perm						
v/c Ratio	0.59		0.62	0.17		
Uniform Delay, d1	11.0		16.2	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.6		2.1	0.0		
Delay (s)	11.6		18.4	0.0		
Level of Service	B		B	A		
Approach Delay (s)	11.6			6.8	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	56.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	295	1235	885	175
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 49.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	295	1235	885	175	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	321	1342	962	190	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	321	1342	962	190	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	14.6	49.6	24.0	49.6		
Effective Green, g (s)	14.6	49.6	24.0	49.6		
Actuated g/C Ratio	0.29	1.00	0.48	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	521	3539	1712	1583		
v/s Ratio Prot	c0.18	0.38	c0.27			
v/s Ratio Perm				0.12		
v/c Ratio	0.62	0.38	0.56	0.12		
Uniform Delay, d1	15.1	0.0	9.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.2	0.1	0.4	0.2		
Delay (s)	17.2	0.1	9.5	0.2		
Level of Service	B	A	A	A		
Approach Delay (s)		3.4	8.0		0.0	
Approach LOS		A	A		A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	11.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	525	960	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	571	1043	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1065				1492	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1065				1492	533
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				73	94
cM capacity (veh/h)	650				101	492

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	285	285	696	370	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	650	1700	1700	1700	1700	101	492
Volume to Capacity	0.12	0.17	0.17	0.41	0.22	0.27	0.06
Queue Length 95th (ft)	10	0	0	0	0	25	4
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	53.4	12.8
Lane LOS	B					F	B
Approach Delay (s)	1.3			0.0		33.1	
Approach LOS						D	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	365	15	0	555	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	397	16	0	603	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	603			413			1120	1171	207	976	1179	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	603			413			1120	1171	207	976	1179	302
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			66	94	99	100	100	64
cM capacity (veh/h)	970			1142			97	175	800	182	173	694

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	264	149	0	402	201	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	970	1700	1700	1700	1700	1700	120	1700	694
Volume to Capacity	0.08	0.16	0.09	0.00	0.24	0.12	0.41	0.00	0.36
Queue Length 95th (ft)	7	0	0	0	0	0	43	0	41
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	54.0	0.0	13.1
Lane LOS	A						F	A	B
Approach Delay (s)	1.5			0.0			54.0	13.1	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.8	
Intersection Capacity Utilization		42.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	245	10	0	390	0	25	15	0	0	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	266	11	0	424	0	27	16	0	0	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	424			277			880	946	139	815	951	212
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			277			880	946	139	815	951	212
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			85	93	100	100	100	82
cM capacity (veh/h)	1132			1283			180	231	884	233	230	793

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	178	100	0	283	141	43	0	147
Volume Left	125	0	0	0	0	0	27	0	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	1132	1700	1700	1700	1700	1700	196	1700	793
Volume to Capacity	0.11	0.10	0.06	0.00	0.17	0.08	0.22	0.00	0.18
Queue Length 95th (ft)	9	0	0	0	0	0	20	0	17
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	0.0	28.5	0.0	10.6
Lane LOS	A						D	A	B
Approach Delay (s)	2.7			0.0			28.5	10.6	
Approach LOS							D	B	

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		32.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	145	5	0	265	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	158	5	0	288	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	293			163			620	649	82	571	649	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	293			163			620	649	82	571	649	147
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			93	97	100	100	100	86
cM capacity (veh/h)	1265			1413			303	357	962	371	357	874

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	105	58	0	192	101	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1265	1700	1700	1700	1700	1700	319	1700	874
Volume to Capacity	0.08	0.06	0.03	0.00	0.11	0.06	0.10	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	8	0	12
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	0.0	17.6	0.0	9.8
Lane LOS	A						C	A	A
Approach Delay (s)	3.0			0.0			17.6	9.8	
Approach LOS							C	A	

Intersection Summary			
Average Delay		3.6	
Intersection Capacity Utilization		27.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	80	10	0	150	0	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	87	11	0	163	0	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	163			98			397	386	49	364	391	82
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	163			98			397	386	49	364	391	82
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			91	90	100	100	98	91
cM capacity (veh/h)	1413			1493			464	522	1009	504	518	962

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	65	58	40	0	109	54	98	0	11	87
Volume Left	65	0	0	0	0	0	43	0	0	0
Volume Right	0	0	11	0	0	0	0	0	0	87
cSH	1413	1700	1700	1700	1700	1700	494	1700	518	962
Volume to Capacity	0.05	0.03	0.02	0.00	0.06	0.03	0.20	0.00	0.02	0.09
Queue Length 95th (ft)	4	0	0	0	0	0	18	0	2	7
Control Delay (s)	7.7	0.0	0.0	0.0	0.0	0.0	14.1	0.0	12.1	9.1
Lane LOS	A						B	A	B	A
Approach Delay (s)	3.1			0.0			14.1		9.4	
Approach LOS							B		A	

Intersection Summary			
Average Delay		5.4	
Intersection Capacity Utilization		29.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	0	40	0	0	0	60	15	0	0	0	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	0	43	0	0	0	65	16	0	0	0	98
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			43			207	109	22	95	130	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			43			207	109	22	95	130	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			90	98	100	100	100	91
cM capacity (veh/h)	1622			1563			653	760	1050	846	739	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	0	43	0	0	0	82	0	98
Volume Left	43	0	0	0	0	0	65	0	0
Volume Right	0	0	43	0	0	0	0	0	98
cSH	1622	1700	1700	1700	1700	1700	672	1700	1084
Volume to Capacity	0.03	0.00	0.03	0.00	0.00	0.00	0.12	0.00	0.09
Queue Length 95th (ft)	2	0	0	0	0	0	10	0	7
Control Delay (s)	7.3	0.0	0.0	0.0	0.0	0.0	11.1	0.0	8.6
Lane LOS	A						B	A	A
Approach Delay (s)	3.6			0.0			11.1	8.6	
Approach LOS							B	A	

Intersection Summary			
Average Delay		7.8	
Intersection Capacity Utilization		16.4%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	375	0	190	350	660	335	730
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 67.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	375	0	190	350	660	0	0	335	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1553	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1553	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	408	0	207	380	717	0	0	364	793
RTOR Reduction (vph)	0	0	0	0	0	153	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	204	204	54	380	717	0	0	364	793
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Effective Green, g (s)				16.1	16.1	16.1	20.3	38.8			12.5	66.9
Actuated g/C Ratio				0.24	0.24	0.24	0.30	0.58			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				404	404	373	537	2052			661	1583
v/s Ratio Prot							c0.21	0.20			0.10	
v/s Ratio Perm				0.12	0.12	0.04						c0.50
v/c Ratio				0.50	0.50	0.15	0.71	0.35			0.55	0.50
Uniform Delay, d1				22.0	22.0	20.0	20.7	7.4			24.7	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.0	1.0	0.2	4.2	0.1			1.0	1.1
Delay (s)				23.0	23.0	20.2	24.9	7.5			25.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			22.0			13.5			8.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	525	415	245	495
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	63.0	63.0	49.0	38.0	87.0
Total Split (%)	42.0%	42.0%	32.7%	25.3%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 136.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	580	90	525	0	0	0	0	415	345	245	495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3252		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3252		1770	3539	
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)	630	98	571	0	0	0	0	451	375	266	538	0
RTOR Reduction (vph)	0	0	173	0	0	0	0	103	0	0	0	0
Lane Group Flow (vph)	0	728	398	0	0	0	0	723	0	266	538	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		57.5	57.5					36.2		25.0	67.2	
Effective Green, g (s)		57.5	57.5					36.2		25.0	67.2	
Actuated g/C Ratio		0.42	0.42					0.26		0.18	0.49	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		750	657					861		323	1739	
v/s Ratio Prot								c0.22		c0.15	0.15	
v/s Ratio Perm		0.41	0.25									
v/c Ratio		0.97	0.61					0.84		0.82	0.31	
Uniform Delay, d1		38.8	30.8					47.5		53.7	20.8	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		25.7	1.6					7.2		15.5	0.1	
Delay (s)		64.4	32.4					54.8		69.2	20.9	
Level of Service		E	C					D		E	C	
Approach Delay (s)		50.3			0.0			54.8			36.9	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	136.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 85.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	890	500	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.39	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	723	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	967	543	114	54	33
RTOR Reduction (vph)	0	0	0	73	0	17
Lane Group Flow (vph)	22	967	543	41	54	16
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	30.9	30.9	30.9	30.9	42.2	42.2
Effective Green, g (s)	30.9	30.9	30.9	30.9	42.2	42.2
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.50	0.50
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	262	1285	1285	574	877	784
v/s Ratio Prot		c0.27	0.15		c0.03	
v/s Ratio Perm	0.03			0.03		0.01
v/c Ratio	0.08	0.75	0.42	0.07	0.06	0.02
Uniform Delay, d1	17.8	23.7	20.4	17.7	11.2	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.5	0.2	0.1	0.1	0.0
Delay (s)	17.9	26.3	20.6	17.8	11.3	11.0
Level of Service	B	C	C	B	B	B
Approach Delay (s)		26.1	20.1		11.2	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2023 with Mitigation and Rail PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1435	5	20	485	70	140	30
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	56.0	56.0	56.0	26.0	54.0	28.0	28.0
Total Split (%)	50.9%	50.9%	50.9%	23.6%	49.1%	25.5%	25.5%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1435	5	20	485	70	0	0	140	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1449	5	22	490	71	0	0	141	33
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	724	730	11	490	71	0	0	141	6
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				54.6	54.6	54.6	19.4	43.4			19.0	19.0
Effective Green, g (s)				54.6	54.6	54.6	19.4	43.4			19.0	19.0
Actuated g/C Ratio				0.50	0.50	0.50	0.18	0.39			0.17	0.17
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				834	836	785	605	735			611	273
v/s Ratio Prot				0.43	c0.43		c0.14	0.04			c0.04	
v/s Ratio Perm						0.01						0.00
v/c Ratio				0.87	0.87	0.01	0.81	0.10			0.23	0.02
Uniform Delay, d1				24.5	24.6	14.0	43.5	21.0			39.2	37.8
Progression Factor				1.01	1.01	1.00	1.01	1.58			1.00	1.00
Incremental Delay, d2				11.8	10.0	0.0	7.7	0.1			0.2	0.0
Delay (s)				36.5	34.8	14.1	51.9	33.3			39.4	37.8
Level of Service				D	C	B	D	C			D	D
Approach Delay (s)		0.0			35.3			49.6			39.1	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	350	590	1265	40	1595
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		8.0	36.0
Total Split (s)	22.0		73.0		15.0	88.0
Total Split (%)	20.0%		66.4%		13.6%	80.0%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	350	0	0	0	0	590	1265	40	1595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	4.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1779	1583					3539	2787	1770	3539	
Flt Permitted		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1779	1583					3539	2787	1770	3539	
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)	87	5	380	0	0	0	0	641	1375	43	1734	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	92	380	0	0	0	0	641	1375	43	1734	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		9.6	110.0					78.7	110.0	5.7	88.4	
Effective Green, g (s)		9.6	110.0					78.7	110.0	5.7	88.4	
Actuated g/C Ratio		0.09	1.00					0.72	1.00	0.05	0.80	
Clearance Time (s)		6.0						6.0		4.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		155	1583					2531	2787	91	2844	
v/s Ratio Prot		0.05						0.18		0.02	c0.49	
v/s Ratio Perm			0.24						c0.49			
v/c Ratio		0.59	0.24					0.25	0.49	0.47	0.61	
Uniform Delay, d1		48.3	0.0					5.4	0.0	50.7	4.2	
Progression Factor		1.00	1.00					1.00	1.00	0.90	1.21	
Incremental Delay, d2		6.0	0.4					0.2	0.6	2.6	0.7	
Delay (s)		54.3	0.4					5.7	0.6	48.2	5.7	
Level of Service		D	A					A	A	D	A	
Approach Delay (s)		10.9			0.0			2.2			6.7	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	175	0	1845	1835	230
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	190	0	1864	1854	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.76					
vC, conflicting volume	2475	618	2104			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1820	618	2104			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	56	100			
cM capacity (veh/h)	52	432	258			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	190	621	621	621	618	618	618	250
Volume Left	0	0	0	0	0	0	0	0
Volume Right	190	0	0	0	0	0	0	250
cSH	432	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.44	0.37	0.37	0.37	0.36	0.36	0.36	0.15
Queue Length 95th (ft)	55	0	0	0	0	0	0	0
Control Delay (s)	19.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C							
Approach Delay (s)	19.7	0.0			0.0			
Approach LOS	C							

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	280	470	120	390	1460	225	250	1595	375
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	10.0		4.0	10.0	
Minimum Split (s)	8.0	44.0		8.0	44.0		8.0	44.0		8.0	44.0	
Total Split (s)	23.0	45.0		22.0	44.0		23.0	48.0		20.0	45.0	
Total Split (%)	17.0%	33.3%		16.3%	32.6%		17.0%	35.6%		14.8%	33.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 135
Actuated Cycle Length: 115.7
Natural Cycle: 125
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	535	250	280	470	120	390	1460	225	250	1595	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	424	582	272	304	511	130	424	1587	245	272	1734	408
RTOR Reduction (vph)	0	0	28	0	0	31	0	0	31	0	0	36
Lane Group Flow (vph)	424	582	244	304	511	99	424	1587	214	272	1734	372
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	18.2	24.3	47.3	14.9	21.0	39.8	18.0	44.6	64.5	13.8	40.4	63.6
Effective Green, g (s)	18.2	24.3	47.3	14.9	21.0	39.8	18.0	44.6	64.5	13.8	40.4	63.6
Actuated g/C Ratio	0.16	0.21	0.41	0.13	0.18	0.34	0.16	0.39	0.56	0.12	0.35	0.55
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	540	1068	647	442	923	545	534	1961	883	409	1777	870
v/s Ratio Prot	c0.12	c0.11		0.09	0.10		c0.12	0.31		0.08	c0.34	
v/s Ratio Perm			0.15			0.06			0.13			0.24
v/c Ratio	0.79	0.54	0.38	0.69	0.55	0.18	0.79	0.81	0.24	0.67	0.98	0.43
Uniform Delay, d1	46.8	40.7	23.9	48.1	43.0	26.5	47.0	31.7	13.1	48.7	37.1	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	0.6	0.4	4.4	0.7	0.2	8.0	2.6	0.1	4.1	15.8	0.3
Delay (s)	54.2	41.3	24.2	52.5	43.8	26.7	55.0	34.3	13.2	52.7	53.0	15.6
Level of Service	D	D	C	D	D	C	D	C	B	D	D	B
Approach Delay (s)		41.9			44.2			35.9			46.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	115.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	135	160	390	135	1455	60	185	1535	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	20.0		4.0	20.0	
Minimum Split (s)	14.0	43.0		14.0	43.0		14.0	33.0		14.0	33.0	
Total Split (s)	25.0	43.0		25.0	43.0		15.0	45.0		17.0	47.0	
Total Split (%)	19.2%	33.1%		19.2%	33.1%		11.5%	34.6%		13.1%	36.2%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 116.4
Natural Cycle: 105
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	230	360	135	160	390	135	1455	60	185	1535	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	353	250	391	147	174	424	147	1582	65	201	1668	370
RTOR Reduction (vph)	0	0	70	0	0	31	0	0	27	0	0	164
Lane Group Flow (vph)	353	250	321	147	174	393	147	1582	38	201	1668	206
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	17.1	31.1	45.8	14.8	28.8	45.2	9.7	40.9	60.7	11.4	42.6	64.7
Effective Green, g (s)	17.1	31.1	45.8	14.8	28.8	45.2	9.7	40.9	60.7	11.4	42.6	64.7
Actuated g/C Ratio	0.15	0.27	0.39	0.13	0.25	0.39	0.08	0.35	0.52	0.10	0.37	0.56
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	505	498	623	225	461	615	286	1789	826	336	1864	881
v/s Ratio Prot	c0.10	0.13		0.08	0.09		0.04	0.31		0.06	c0.33	
v/s Ratio Perm			0.20			c0.25			0.02			0.13
v/c Ratio	0.70	0.50	0.51	0.65	0.38	0.64	0.51	0.88	0.05	0.60	0.89	0.23
Uniform Delay, d1	47.1	36.0	26.8	48.3	36.3	28.9	51.0	35.4	13.6	50.2	34.7	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.8	0.7	6.7	0.5	2.2	1.6	5.6	0.0	2.9	6.0	0.1
Delay (s)	51.3	36.8	27.5	54.9	36.8	31.1	52.6	41.0	13.6	53.1	40.7	13.3
Level of Service	D	D	C	D	D	C	D	D	B	D	D	B
Approach Delay (s)		38.3			37.1			41.0			37.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	116.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	100	110	620	1090	310	645	1385	105
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		44.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		44.0		37.0	37.0	39.0	76.0	76.0
Total Split (%)		36.7%		30.8%	30.8%	32.5%	63.3%	63.3%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 110.8
Natural Cycle: 105
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	100	110	0	620	0	1090	310	645	1385	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	120	0	674	0	1185	337	701	1505	114
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	242	0	0	46
Lane Group Flow (vph)	0	0	109	120	0	663	0	1185	95	701	1505	68
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			110.6	33.1		67.5		31.1	31.1	28.4	65.5	65.5
Effective Green, g (s)			110.6	33.1		67.5		31.1	31.1	28.4	65.5	65.5
Actuated g/C Ratio			1.00	0.30		0.61		0.28	0.28	0.26	0.59	0.59
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	529		966		1429	445	881	3011	937
v/s Ratio Prot				0.07				c0.23		c0.20	0.30	
v/s Ratio Perm			0.07			c0.42			0.06			0.04
v/c Ratio			0.07	0.23		0.69		0.83	0.21	0.80	0.50	0.07
Uniform Delay, d1			0.0	29.1		14.5		37.3	30.4	38.4	13.1	9.6
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	0.2		2.0		4.1	0.2	5.0	0.1	0.0
Delay (s)			0.1	29.4		16.5		41.4	30.6	43.4	13.2	9.6
Level of Service			A	C		B		D	C	D	B	A
Approach Delay (s)		0.1			18.4			39.0			22.2	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	280	210	285	215	290	360	255	820	390	930	330
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	10.0	4.0	10.0	
Minimum Split (s)	8.0	40.0		8.0	40.0		8.0	40.0	8.0	40.0	
Total Split (s)	18.0	43.0		15.0	40.0		20.0	41.0	26.0	47.0	
Total Split (%)	14.4%	34.4%		12.0%	32.0%		16.0%	32.8%	20.8%	37.6%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0		4.0	6.0		4.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 125
Actuated Cycle Length: 111
Natural Cycle: 100
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	210	285	215	290	360	255	820	340	390	930	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0		4.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4861		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4861		3433	5085	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)	304	228	310	234	315	391	277	891	370	424	1011	359
RTOR Reduction (vph)	0	0	55	0	0	53	0	58	0	0	0	87
Lane Group Flow (vph)	304	228	255	234	315	338	277	1203	0	424	1011	272
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	13.4	27.7	47.4	10.8	25.1	49.7	13.7	33.5		18.6	38.4	57.8
Effective Green, g (s)	13.4	27.7	47.4	10.8	25.1	49.7	13.7	33.5		18.6	38.4	57.8
Actuated g/C Ratio	0.12	0.25	0.43	0.10	0.23	0.45	0.12	0.30		0.17	0.35	0.52
Clearance Time (s)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	415	466	678	335	422	711	425	1472		577	1765	827
v/s Ratio Prot	c0.09	c0.12		0.07	c0.17		0.08	c0.25		c0.12	0.20	
v/s Ratio Perm			0.16			0.21						0.17
v/c Ratio	0.73	0.49	0.38	0.70	0.75	0.48	0.65	0.82		0.73	0.57	0.33
Uniform Delay, d1	46.9	35.4	21.5	48.3	39.8	21.3	46.2	35.7		43.7	29.4	15.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.6	0.8	0.4	6.2	7.0	0.5	3.6	3.6		4.8	0.5	0.2
Delay (s)	53.4	36.2	21.9	54.6	46.8	21.8	49.7	39.4		48.5	29.9	15.4
Level of Service	D	D	C	D	D	C	D	D		D	C	B
Approach Delay (s)		37.2			38.4			41.2			31.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	435	65	360	355	300	70	345	230	495	350	530
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	44.0		10.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	29.0	44.0		29.0	44.0		17.0	44.0		23.0	50.0	
Total Split (%)	20.7%	31.4%		20.7%	31.4%		12.1%	31.4%		16.4%	35.7%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None		None	None	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 100.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	435	65	360	355	300	70	345	230	495	350	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	772	473	71	391	386	326	76	375	250	538	380	576
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	56	0	0	160
Lane Group Flow (vph)	772	473	28	391	386	326	76	375	194	538	380	416
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	custom	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4 5						2 3			
Actuated Green, G (s)	24.8	25.4	39.8	16.8	17.4	41.0	9.4	19.0	40.8	18.6	28.2	58.0
Effective Green, g (s)	24.8	25.4	39.8	16.8	17.4	41.0	9.4	19.0	40.8	18.6	28.2	58.0
Actuated g/C Ratio	0.25	0.25	0.40	0.17	0.17	0.41	0.09	0.19	0.41	0.19	0.28	0.58
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	853	900	631	577	886	1144	166	673	647	639	999	1619
v/s Ratio Prot	c0.22	c0.13		0.11	0.08	0.12	0.04	c0.11		c0.16	0.11	0.15
v/s Ratio Perm			0.02						0.12			
v/c Ratio	0.91	0.53	0.04	0.68	0.44	0.28	0.46	0.56	0.30	0.84	0.38	0.26
Uniform Delay, d1	36.4	32.0	18.4	39.0	36.8	19.6	42.8	36.6	19.9	39.2	28.8	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.0	0.6	0.0	3.2	0.3	0.1	2.0	1.0	0.3	9.8	0.2	0.1
Delay (s)	49.3	32.6	18.4	42.1	37.2	19.8	44.8	37.6	20.1	49.0	29.0	10.4
Level of Service	D	C	B	D	D	B	D	D	C	D	C	B
Approach Delay (s)		41.6			33.8			32.2			29.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	570	0	50	5	765	130	1240
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	8.0	34.0	34.0	34.0	16.0	47.0	21.0	52.0
Total Split (%)	7.3%	30.9%	30.9%	30.9%	14.5%	42.7%	19.1%	47.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	570	0	50	5	765	505	130	1240	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3328		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3328		1770	3539	
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	0	11	620	0	54	5	832	549	141	1348	0
RTOR Reduction (vph)	0	11	0	0	0	42	0	87	0	0	0	0
Lane Group Flow (vph)	0	0	0	310	310	12	5	1294	0	141	1348	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Effective Green, g (s)		0.8		25.0	25.0	25.0	1.3	50.9		13.3	62.9	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.46		0.12	0.57	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		11		382	382	359	20	1539		214	2023	
v/s Ratio Prot		c0.00		c0.18	0.18		0.00	c0.39		c0.08	c0.38	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.81	0.81	0.03	0.25	0.84		0.66	0.67	
Uniform Delay, d1		54.2		40.3	40.3	33.1	53.9	26.0		46.2	16.3	
Progression Factor		1.00		1.00	1.00	1.00	1.40	0.68		1.00	1.00	
Incremental Delay, d2		0.3		12.3	12.3	0.0	5.6	5.0		7.1	1.8	
Delay (s)		54.5		52.6	52.6	33.1	81.0	22.7		53.3	18.0	
Level of Service		D		D	D	C	F	C		D	B	
Approach Delay (s)		54.5			51.0			22.9			21.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	405	25	1260	915	1870
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	26.0	26.0	84.0	84.0	84.0
Total Split (%)	23.6%	23.6%	76.4%	76.4%	76.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	405	25	1260	915	0	1870
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	440	27	1370	995	0	2033
RTOR Reduction (vph)	0	23	0	273	0	0
Lane Group Flow (vph)	440	4	1370	722	0	2033
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	18.2	18.2	79.8	79.8		79.8
Effective Green, g (s)	18.2	18.2	79.8	79.8		79.8
Actuated g/C Ratio	0.17	0.17	0.73	0.73		0.73
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	568	261	2567	1148		2567
v/s Ratio Prot	c0.13		0.39			c0.57
v/s Ratio Perm		0.00		0.46		
v/c Ratio	0.77	0.02	0.53	0.63		0.79
Uniform Delay, d1	43.9	38.4	6.8	7.6		9.7
Progression Factor	1.00	1.00	1.00	1.00		0.98
Incremental Delay, d2	6.5	0.0	0.8	2.6		2.1
Delay (s)	50.5	38.4	7.6	10.2		11.7
Level of Service	D	D	A	B		B
Approach Delay (s)	49.8		8.7			11.7
Approach LOS	D		A			B

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2025	1510	675	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2201	1641	734	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.56				0.56	0.56
vC, conflicting volume	2375				2742	1188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1877				2536	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	176				12	603

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	734	734	734	1094	1281
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	734
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.64	0.75
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	120	2025	1510
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 70.6
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	120	2025	1510	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	130	2201	1641	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	130	2201	1641	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			9.0	71.8	50.8	
Effective Green, g (s)			9.0	71.8	50.8	
Actuated g/C Ratio			0.13	1.00	0.71	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			221	5085	2503	
v/s Ratio Prot			0.07	c0.43	c0.46	
v/s Ratio Perm						
v/c Ratio			0.59	0.43	0.66	
Uniform Delay, d1			29.7	0.0	5.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.0	0.1	0.6	
Delay (s)			33.6	0.1	6.4	
Level of Service			C	A	A	
Approach Delay (s)	0.0			1.9	6.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	370	190	915	615	3165
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 159.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	0	190	0	0	0	0	915	0	615	3165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	402	0	207	0	0	0	0	995	0	668	3440	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	402	0	207	0	0	0	0	995	0	668	3440	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	23.8		159.9					83.2		34.9	124.1	
Effective Green, g (s)	23.8		159.9					83.2		34.9	124.1	
Actuated g/C Ratio	0.15		1.00					0.52		0.22	0.78	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	510		1583					1841		749	3946	
v/s Ratio Prot	c0.12							0.28		0.19	c0.68	
v/s Ratio Perm			0.13									
v/c Ratio	0.79		0.13					0.54		0.89	0.87	
Uniform Delay, d1	65.6		0.0					25.6		60.7	12.4	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	7.9		0.2					0.3		12.9	2.4	
Delay (s)	73.5		0.2					25.9		73.5	14.8	
Level of Service	E		A					C		E	B	
Approach Delay (s)		48.6			0.0			25.9			24.3	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	159.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1745	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1745	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1897	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1897	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.54			
v/s Ratio Perm						
v/c Ratio			0.60			
Uniform Delay, d1			1.7			
Progression Factor			1.00			
Incremental Delay, d2			0.8			
Delay (s)			2.5			
Level of Service			A			
Approach Delay (s)	0.0		2.5			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	2.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	915	1745	0	3355	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	995	1897	0	3647	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.24			
vC, conflicting volume			2891		2210	497		
vC1, stage 1 conf vol					995			
vC2, stage 2 conf vol					1216			
vCu, unblocked vol			2891		0	497		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			125		245	518		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	497	497	948	948	1216	1216	1216
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	948	948	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.29	0.56	0.56	0.72	0.72	0.72
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		68.2%	ICU Level of Service	C
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	110	0	2685	65	0	3360	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	0	0	0	120	0	2918	71	0	3394	0
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.26	0.26	0.26	0.26	0.26		0.26					
vC, conflicting volume	4367	6314	1131	4052	6314	975	3394			2920		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3997	11348	0	2808	11348	975	326			2920		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	52	100			100		
cM capacity (veh/h)	0	0	287	2	0	251	326			121		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	0	120	973	973	973	71	1131	1131	1131	0
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	0	120	0	0	0	71	0	0	0	0
cSH	1700	251	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.48	0.57	0.57	0.57	0.04	0.67	0.67	0.67	0.00
Queue Length 95th (ft)	0	60	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	31.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	D								
Approach Delay (s)	0.0	31.8	0.0				0.0			
Approach LOS	A	D								

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		68.3%	ICU Level of Service	C
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	120	100	40	5	110	35	1955	40	120	2920	130
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	10.0	10.0		10.0	39.0	39.0	10.0	29.0	29.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	100	35	40	5	110	35	1955	40	120	2920	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1773		1738	1863	1583	1770	5085	1543	1770	5085	1501
Flt Permitted	0.75	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1773		794	1863	1583	1770	5085	1543	1770	5085	1501
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	130	109	38	43	5	120	38	2058	43	130	2949	141
RTOR Reduction (vph)	0	5	0	0	0	13	0	0	14	0	0	22
Lane Group Flow (vph)	130	142	0	43	5	107	38	2058	29	130	2949	119
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Effective Green, g (s)	35.3	35.3		35.3	35.3	62.7	7.2	164.3	164.3	21.4	178.5	178.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.26	0.03	0.68	0.68	0.09	0.74	0.74
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	260		116	274	413	53	3481	1056	157	3781	1116
v/s Ratio Prot		0.08			0.00		0.02	0.40		c0.07	c0.58	
v/s Ratio Perm	c0.09			0.05		0.07			0.02			0.08
v/c Ratio	0.63	0.55		0.37	0.02	0.26	0.72	0.59	0.03	0.83	0.78	0.11
Uniform Delay, d1	96.2	94.9		92.3	87.5	70.2	115.4	20.1	12.2	107.5	18.8	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.76	0.98	7.02	1.00	1.00	1.00
Incremental Delay, d2	6.2	2.3		2.0	0.0	0.3	31.3	0.6	0.0	28.7	1.7	0.2
Delay (s)	102.4	97.2		94.3	87.6	70.6	119.4	20.2	85.5	136.2	20.4	8.8
Level of Service	F	F		F	F	E	F	C	F	F	C	A
Approach Delay (s)		99.7			77.2			23.3			24.6	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Detector Phase	4	4	4 5	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	47.0	47.0		10.0	10.0	10.0	10.0	23.0	23.0	10.0	26.0	26.0
Total Split (s)	47.0	47.0		47.0	47.0	47.0	24.0	148.0	148.0	45.0	169.0	169.0
Total Split (%)	19.6%	19.6%		19.6%	19.6%	19.6%	10.0%	61.7%	61.7%	18.8%	70.4%	70.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 145
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	80	90	35	10	105	60	1945	50	160	2890	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1858	1540		1775	1583	1770	5085	1543	1770	5085	1558
Flt Permitted		0.99	1.00		0.56	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1837	1540		1024	1583	1770	5085	1543	1770	5085	1558
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	5	87	98	38	11	114	65	2114	54	174	2919	22
RTOR Reduction (vph)	0	0	37	0	0	102	0	0	16	0	0	5
Lane Group Flow (vph)	0	92	61	0	49	12	65	2114	38	174	2919	17
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	custom	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4 5	8		8			2			6
Actuated Green, G (s)		25.1	45.0		25.1	25.1	13.9	167.1	167.1	28.8	182.0	182.0
Effective Green, g (s)		25.1	45.0		25.1	25.1	13.9	167.1	167.1	28.8	182.0	182.0
Actuated g/C Ratio		0.10	0.19		0.10	0.10	0.06	0.70	0.70	0.12	0.76	0.76
Clearance Time (s)		6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		192	288		107	165	102	3540	1074	212	3856	1181
v/s Ratio Prot							0.04	0.42		c0.10	c0.57	
v/s Ratio Perm		c0.05	0.04		0.05	0.01			0.02			0.01
v/c Ratio		0.48	0.21		0.46	0.07	0.64	0.60	0.04	0.82	0.76	0.01
Uniform Delay, d1		101.3	82.5		101.1	96.9	110.6	19.0	11.3	103.1	16.5	7.1
Progression Factor		1.00	1.00		1.00	1.00	0.83	1.09	4.76	0.89	0.83	4.68
Incremental Delay, d2		1.9	0.4		3.1	0.2	10.9	0.7	0.1	15.2	0.9	0.0
Delay (s)		103.2	82.9		104.1	97.1	102.8	21.3	54.1	106.7	14.5	33.1
Level of Service		F	F		F	F	F	C	D	F	B	C
Approach Delay (s)		92.7			99.2			24.5			19.8	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2015	3150	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2015	3150	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2190	3182	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2190	3182	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.43	c0.63	
v/s Ratio Perm						
v/c Ratio				0.56	0.81	
Uniform Delay, d1				5.6	8.5	
Progression Factor				1.08	1.30	
Incremental Delay, d2				0.5	1.4	
Delay (s)				6.5	12.4	
Level of Service				A	B	
Approach Delay (s)	0.0			6.5	12.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	25	155	15	20	170	1615	35	40	2495	365
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2 3			6 4
Detector Phase	4	4	4 5	3	3	5	2	2 3	1	6	6 4
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0		5.0	20.0	
Minimum Split (s)	49.0	49.0		11.0	11.0	11.0	38.0		11.0	28.0	
Total Split (s)	49.0	49.0		15.0	15.0	36.0	156.0		20.0	140.0	
Total Split (%)	20.4%	20.4%		6.3%	6.3%	15.0%	65.0%		8.3%	58.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0		6.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	25	155	25	15	20	170	1615	35	40	2495	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.92		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1698	1455		1806	1583	1770	5085	1438	1770	5085	1365
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)	326	27	168	27	16	22	185	1755	38	43	2712	397
RTOR Reduction (vph)	0	0	31	0	0	21	0	0	10	0	0	72
Lane Group Flow (vph)	176	177	137	0	43	1	185	1755	28	43	2712	325
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2 3			6 4
Actuated Green, G (s)	39.0	39.0	72.6		8.4	8.4	27.6	158.7	174.1	8.9	140.0	179.0
Effective Green, g (s)	39.0	39.0	72.6		8.4	8.4	27.6	158.7	174.1	8.9	140.0	179.0
Actuated g/C Ratio	0.16	0.16	0.30		0.04	0.04	0.12	0.66	0.73	0.04	0.58	0.75
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	273	275	440		63	55	203	3362	1043	65	2966	1018
v/s Ratio Prot	c0.10	0.10			c0.02		c0.10	0.35		0.02	c0.53	
v/s Ratio Perm			0.09			0.00			0.02			0.24
v/c Ratio	0.64	0.64	0.31		0.68	0.01	0.91	0.52	0.03	0.66	0.91	0.32
Uniform Delay, d1	94.0	94.0	64.4		114.5	111.8	105.0	21.0	9.2	114.1	44.6	10.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.92	1.31	3.12	0.85	1.13	1.99
Incremental Delay, d2	5.1	5.1	0.4		21.6	0.0	35.6	0.5	0.0	11.8	3.8	0.1
Delay (s)	99.2	99.1	64.8		136.0	111.8	131.7	28.0	28.7	108.8	54.4	20.3
Level of Service	F	F	E		F	F	F	C	C	F	D	C
Approach Delay (s)		88.1			127.9			37.7			50.8	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	225	70	50	80	360	40	1250	5	410	1995	455
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	50.0	50.0		10.0		10.0	46.0	46.0	10.0	42.0	42.0
Total Split (s)	50.0	50.0		35.0		20.0	110.0	110.0	45.0	135.0	135.0
Total Split (%)	20.8%	20.8%		14.6%		8.3%	45.8%	45.8%	18.8%	56.3%	56.3%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	70	50	10	80	360	40	1250	5	410	1995	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1724	1583		1852	2787	1770	5085	1583	3433	5085	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)	245	76	54	11	87	391	43	1359	5	446	2168	495
RTOR Reduction (vph)	0	0	45	0	0	84	0	0	2	0	0	171
Lane Group Flow (vph)	159	162	9	0	98	307	43	1359	3	446	2168	324
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	28.0	28.0	38.9		24.9	67.1	10.9	125.9	125.9	36.2	151.2	151.2
Effective Green, g (s)	28.0	28.0	38.9		24.9	67.1	10.9	125.9	125.9	36.2	151.2	151.2
Actuated g/C Ratio	0.12	0.12	0.16		0.10	0.28	0.05	0.52	0.52	0.15	0.63	0.63
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	196	201	256		192	779	80	2667	830	517	3203	997
v/s Ratio Prot	c0.09	0.09			c0.05		0.02	0.27		c0.13	c0.43	
v/s Ratio Perm			0.01			0.11			0.00			0.20
v/c Ratio	0.81	0.81	0.03		0.51	0.39	0.54	0.51	0.00	0.86	0.68	0.33
Uniform Delay, d1	103.4	103.4	84.7		101.8	70.0	112.1	37.0	27.2	99.5	28.6	20.7
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.84	0.90	1.00	1.11	0.91	2.53
Incremental Delay, d2	21.8	20.5	0.1		2.3	0.3	6.2	0.6	0.0	8.2	0.6	0.5
Delay (s)	125.3	123.8	84.8		104.1	70.3	100.4	34.1	27.2	118.2	26.8	52.7
Level of Service	F	F	F		F	E	F	C	C	F	C	D
Approach Delay (s)		118.8			77.1			36.1			44.1	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	47.0	47.0		15.0	15.0	15.0	9.0	46.0		9.0	31.0	31.0
Total Split (s)	47.0	47.0		57.0	57.0	57.0	27.0	93.0		43.0	109.0	109.0
Total Split (%)	19.6%	19.6%		23.8%	23.8%	23.8%	11.3%	38.8%		17.9%	45.4%	45.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	270	185	30	260	185	175	955	35	375	1465	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3359	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	239	293	201	33	283	201	190	1038	38	408	1480	266
RTOR Reduction (vph)	0	0	58	0	0	86	0	0	14	0	0	85
Lane Group Flow (vph)	172	360	143	33	283	115	190	1038	24	408	1480	181
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	31.2	31.2	48.6	40.8	40.8	73.1	17.4	110.7	151.5	32.3	125.6	125.6
Effective Green, g (s)	31.2	31.2	48.6	40.8	40.8	73.1	17.4	110.7	151.5	32.3	125.6	125.6
Actuated g/C Ratio	0.13	0.13	0.20	0.17	0.17	0.30	0.07	0.46	0.63	0.13	0.52	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	209	436	320	300	316	918	248	2345	999	462	2661	828
v/s Ratio Prot	0.11	c0.11		0.02	c0.15	0.02	0.06	0.20		c0.12	c0.29	
v/s Ratio Perm			0.09			0.02			0.02			0.11
v/c Ratio	0.82	0.83	0.45	0.11	0.90	0.13	0.77	0.44	0.02	0.88	0.56	0.22
Uniform Delay, d1	101.7	101.7	83.9	84.2	97.5	60.3	109.3	43.8	16.6	102.0	38.5	30.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.24	0.99	1.43
Incremental Delay, d2	21.3	11.5	0.4	0.1	25.4	0.0	12.0	0.6	0.0	13.6	0.6	0.5
Delay (s)	123.1	113.3	84.3	84.3	122.9	60.4	121.3	44.4	16.6	140.4	38.8	44.6
Level of Service	F	F	F	F	F	E	F	D	B	F	D	D
Approach Delay (s)		107.6			96.1			55.1			58.8	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	780	235	305	880	20	135
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	848	255	332	957	22	147
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				1217		
pX, platoon unblocked					0.96	
vC, conflicting volume			1103		1989	424
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1103		1951	424
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			47		15	75
cM capacity (veh/h)			629		26	579

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	424	424	255	332	478	478	168
Volume Left	0	0	0	332	0	0	22
Volume Right	0	0	255	0	0	0	147
cSH	1700	1700	1700	629	1700	1700	199
Volume to Capacity	0.25	0.25	0.15	0.53	0.28	0.28	0.85
Queue Length 95th (ft)	0	0	0	77	0	0	157
Control Delay (s)	0.0	0.0	0.0	16.9	0.0	0.0	56.2
Lane LOS				C			F
Approach Delay (s)	0.0			4.4			56.2
Approach LOS							F

Intersection Summary			
Average Delay		5.9	
Intersection Capacity Utilization		51.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	855	30	15	1145	40	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	929	33	16	1245	43	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			962		1601	481
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			962		1601	481
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		54	97
cM capacity (veh/h)			711		94	531

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	620	342	431	830	60
Volume Left	0	0	16	0	43
Volume Right	0	33	0	0	16
cSH	1700	1700	711	1700	122
Volume to Capacity	0.36	0.20	0.02	0.49	0.49
Queue Length 95th (ft)	0	0	2	0	56
Control Delay (s)	0.0	0.0	0.7	0.0	60.2
Lane LOS			A		F
Approach Delay (s)	0.0		0.2		60.2
Approach LOS					F

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		52.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	875	0	170	1140	0	55
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	951	0	185	1239	0	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				818		
pX, platoon unblocked						
vC, conflicting volume			951		1940	476
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			951		1940	476
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			74		100	89
cM capacity (veh/h)			718		42	536

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	476	476	598	826	60
Volume Left	0	0	185	0	0
Volume Right	0	0	0	0	60
cSH	1700	1700	718	1700	536
Volume to Capacity	0.28	0.28	0.26	0.49	0.11
Queue Length 95th (ft)	0	0	26	0	9
Control Delay (s)	0.0	0.0	6.4	0.0	12.6
Lane LOS			A		B
Approach Delay (s)	0.0		2.7		12.6
Approach LOS					B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	155	5	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	168	5	33	33

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	174	65
Volume Left (vph)	0	168	33
Volume Right (vph)	43	0	33
Hadj (s)	-0.45	0.23	-0.17
Departure Headway (s)	3.8	4.3	4.2
Degree Utilization, x	0.06	0.21	0.08
Capacity (veh/h)	923	817	801
Control Delay (s)	7.0	8.5	7.6
Approach Delay (s)	7.0	8.5	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	925	655	1145
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 100.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	925	0	655	1145	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1005	0	712	1245	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1005	0	712	1245	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	35.9		52.2	100.1		
Effective Green, g (s)	35.9		52.2	100.1		
Actuated g/C Ratio	0.36		0.52	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1269		923	3539		
v/s Ratio Prot	c0.28		c0.40	0.35		
v/s Ratio Perm						
v/c Ratio	0.79		0.77	0.35		
Uniform Delay, d1	28.8		19.2	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	3.5		4.0	0.1		
Delay (s)	32.2		23.2	0.1		
Level of Service	C		C	A		
Approach Delay (s)	32.2			8.5	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	290	1265	1800	515
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 100.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	290	1265	1800	515	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	1375	1957	560	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	315	1375	1957	560	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	23.8	100.7	65.9	100.7		
Effective Green, g (s)	23.8	100.7	65.9	100.7		
Actuated g/C Ratio	0.24	1.00	0.65	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	418	3539	2315	1583		
v/s Ratio Prot	c0.18	0.39	c0.55			
v/s Ratio Perm				0.35		
v/c Ratio	0.75	0.39	0.85	0.35		
Uniform Delay, d1	35.7	0.0	13.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	7.5	0.1	3.0	0.6		
Delay (s)	43.2	0.1	16.5	0.6		
Level of Service	D	A	B	A		
Approach Delay (s)		8.1	13.0		0.0	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.7	Sum of lost time (s)	11.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	985	700	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1071	761	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	777				1359	389
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777				1359	389
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				84	85
cM capacity (veh/h)	835				135	610

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	535	535	507	270	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	835	1700	1700	1700	1700	135	610
Volume to Capacity	0.03	0.31	0.31	0.30	0.16	0.16	0.15
Queue Length 95th (ft)	3	0	0	0	0	14	13
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	36.6	12.0
Lane LOS	A					E	B
Approach Delay (s)	0.2			0.0		16.7	
Approach LOS						C	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	695	45	5	510	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	755	49	5	554	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565			804			1367	1562	402	1160	1582	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565			804			1367	1562	402	1160	1582	283
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			68	100	99	100	100	87
cM capacity (veh/h)	1003			816			84	99	598	137	96	714

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	103	504	301	5	370	196	33	0	92
Volume Left	103	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	1003	1700	1700	816	1700	1700	99	1700	714
Volume to Capacity	0.10	0.30	0.18	0.01	0.22	0.12	0.33	0.00	0.13
Queue Length 95th (ft)	9	0	0	1	0	0	32	0	11
Control Delay (s)	9.0	0.0	0.0	9.4	0.0	0.0	58.6	0.0	10.8
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.0			0.1			58.6	10.8	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		37.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	515	40	5	435	10	20	5	0	5	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	560	43	5	473	11	22	5	0	5	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	484			603			1215	1391	302	1087	1408	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	484			603			1215	1391	302	1087	1408	242
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	85			99			80	95	100	96	100	91
cM capacity (veh/h)	1075			970			110	120	694	146	117	759

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	373	230	5	315	168	27	5	71
Volume Left	158	0	0	5	0	0	22	5	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	1075	1700	1700	970	1700	1700	112	146	759
Volume to Capacity	0.15	0.22	0.14	0.01	0.19	0.10	0.24	0.04	0.09
Queue Length 95th (ft)	13	0	0	0	0	0	22	3	8
Control Delay (s)	8.9	0.0	0.0	8.7	0.0	0.0	47.2	30.7	10.2
Lane LOS	A			A			E	D	B
Approach Delay (s)	1.8			0.1			47.2	11.7	
Approach LOS							E	B	

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		38.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	375	25	5	335	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	408	27	5	364	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	375			435			978	1057	217	834	1065	188
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	375			435			978	1057	217	834	1065	188
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			90	100	100	100	100	86
cM capacity (veh/h)	1180			1121			161	199	787	239	197	823

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	272	163	5	243	132	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	1180	1700	1700	1121	1700	1700	161	1700	823
Volume to Capacity	0.11	0.16	0.10	0.00	0.14	0.08	0.10	0.00	0.14
Queue Length 95th (ft)	9	0	0	0	0	0	8	0	12
Control Delay (s)	8.4	0.0	0.0	8.2	0.0	0.0	29.8	0.0	10.1
Lane LOS	A			A			D	A	B
Approach Delay (s)	1.9			0.1			29.8	10.1	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		29.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	210	45	0	215	0	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	228	49	0	234	0	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	234			277			671	736	139	606	761	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			277			671	736	139	606	761	117
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			64	95	100	100	91	96
cM capacity (veh/h)	1331			1283			284	312	884	340	302	913

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	125	152	125	0	156	78	120	0	27	38
Volume Left	125	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	0	0	0	0	38
cSH	1331	1700	1700	1700	1700	1700	287	1700	302	913
Volume to Capacity	0.09	0.09	0.07	0.00	0.09	0.05	0.42	0.00	0.09	0.04
Queue Length 95th (ft)	8	0	0	0	0	0	49	0	7	3
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	0.0	26.2	0.0	18.1	9.1
Lane LOS	A						D	A	C	A
Approach Delay (s)	2.5			0.0			26.2		12.9	
Approach LOS							D		B	

Intersection Summary			
Average Delay		6.1	
Intersection Capacity Utilization		35.0%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	0	100	0	0	0	75	15	0	0	0	140
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	0	109	0	0	0	82	16	0	0	0	152
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0			109			457	304	54	258	359	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			109			457	304	54	258	359	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			79	97	100	100	100	86
cM capacity (veh/h)	1622			1480			394	561	1001	620	523	1084

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	0	109	0	0	0	98	0	152
Volume Left	125	0	0	0	0	0	82	0	0
Volume Right	0	0	109	0	0	0	0	0	152
cSH	1622	1700	1700	1700	1700	1700	415	1700	1084
Volume to Capacity	0.08	0.00	0.06	0.00	0.00	0.00	0.24	0.00	0.14
Queue Length 95th (ft)	6	0	0	0	0	0	23	0	12
Control Delay (s)	7.4	0.0	0.0	0.0	0.0	0.0	16.3	0.0	8.9
Lane LOS	A						C	A	A
Approach Delay (s)	4.0			0.0			16.3	8.9	
Approach LOS							C	A	

Intersection Summary			
Average Delay		8.0	
Intersection Capacity Utilization		20.3%	ICU Level of Service	A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	440	0	475	395	530	455	725
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 79.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	440	0	475	395	530	0	0	455	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1551	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1551	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	0	516	429	576	0	0	495	788
RTOR Reduction (vph)	0	0	0	0	0	204	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	239	239	312	429	576	0	0	495	788
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Effective Green, g (s)				22.0	22.0	22.0	24.1	45.0			14.9	79.0
Actuated g/C Ratio				0.28	0.28	0.28	0.31	0.57			0.19	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				468	468	431	539	2015			667	1583
v/s Ratio Prot							c0.24	0.16			c0.14	
v/s Ratio Perm				0.14	0.14	c0.20						0.50
v/c Ratio				0.51	0.51	0.72	0.80	0.29			0.74	0.50
Uniform Delay, d1				24.0	24.0	25.8	25.2	8.7			30.2	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.9	0.9	5.9	8.0	0.1			4.5	1.1
Delay (s)				24.9	24.9	31.7	33.2	8.8			34.7	1.1
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			28.4			19.2			14.1	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	420	450	225	585
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	63.0	63.0	49.0	38.0	87.0
Total Split (%)	42.0%	42.0%	32.7%	25.3%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 113.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	10	420	0	0	0	0	450	255	225	585	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3314		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3314		1770	3539	
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)	478	11	457	0	0	0	0	489	277	245	636	0
RTOR Reduction (vph)	0	0	151	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	0	489	306	0	0	0	0	713	0	245	636	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		40.3	40.3					32.5		22.0	60.5	
Effective Green, g (s)		40.3	40.3					32.5		22.0	60.5	
Actuated g/C Ratio		0.36	0.36					0.29		0.20	0.54	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		634	558					954		345	1898	
v/s Ratio Prot								c0.22		c0.14	0.18	
v/s Ratio Perm		0.28	0.20									
v/c Ratio		0.77	0.55					0.75		0.71	0.34	
Uniform Delay, d1		32.2	29.0					36.4		42.4	14.8	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		5.8	1.1					3.2		6.7	0.1	
Delay (s)		37.9	30.1					39.7		49.2	14.9	
Level of Service		D	C					D		D	B	
Approach Delay (s)		34.1			0.0			39.7			24.4	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	112.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	740	495	295	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 86
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	40	815	740	495	295	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	428	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	886	804	538	321	103
RTOR Reduction (vph)	0	0	0	340	0	52
Lane Group Flow (vph)	43	886	804	198	321	51
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	31.6	31.6	31.6	31.6	42.4	42.4
Effective Green, g (s)	31.6	31.6	31.6	31.6	42.4	42.4
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.49	0.49
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	1300	1300	581	872	780
v/s Ratio Prot		c0.25	0.23		c0.18	
v/s Ratio Perm	0.10			0.12		0.03
v/c Ratio	0.27	0.68	0.62	0.34	0.37	0.07
Uniform Delay, d1	19.1	23.0	22.3	19.7	13.5	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.5	0.9	0.4	1.2	0.2
Delay (s)	20.1	24.4	23.1	20.0	14.7	11.6
Level of Service	C	C	C	C	B	B
Approach Delay (s)		24.2	21.9		13.9	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2035 with Rail AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1490	0	180	635	360	895	60
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	63.0	63.0	63.0	29.0	57.0	28.0	28.0
Total Split (%)	52.5%	52.5%	52.5%	24.2%	47.5%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1490	0	180	635	360	0	0	895	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1505	0	196	641	364	0	0	904	65
RTOR Reduction (vph)	0	0	0	0	0	103	0	0	0	0	0	53
Lane Group Flow (vph)	0	0	0	752	753	93	641	364	0	0	904	12
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				57.1	57.1	57.1	23.9	50.9			22.0	22.0
Effective Green, g (s)				57.1	57.1	57.1	23.9	50.9			22.0	22.0
Actuated g/C Ratio				0.48	0.48	0.48	0.20	0.42			0.18	0.18
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				799	799	753	683	790			648	290
v/s Ratio Prot				0.45	c0.45		c0.19	0.20			c0.26	
v/s Ratio Perm						0.06						0.01
v/c Ratio				0.94	0.94	0.12	0.94	0.46			1.40	0.04
Uniform Delay, d1				29.9	29.9	17.5	47.3	24.7			49.0	40.3
Progression Factor				1.00	1.00	1.00	0.81	1.54			1.00	1.00
Incremental Delay, d2				20.4	19.2	0.3	18.1	0.4			187.1	0.1
Delay (s)				50.2	49.1	17.9	56.6	38.5			236.1	40.4
Level of Service				D	D	B	E	D			F	D
Approach Delay (s)		0.0			46.0			50.1			223.0	
Approach LOS		A			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	93.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	610	950	1900	425	1950
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	32.0		51.0		37.0	88.0
Total Split (%)	26.7%		42.5%		30.8%	73.3%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	5	610	0	0	0	0	950	1900	425	1950	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1790	1583					3539	2787	1770	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	5	663	0	0	0	0	1033	2065	462	2120	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	663	0	0	0	0	1033	2065	462	2120	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		5.0	120.0					58.9	120.0	39.1	103.0	
Effective Green, g (s)		5.0	120.0					58.9	120.0	39.1	103.0	
Actuated g/C Ratio		0.04	1.00					0.49	1.00	0.33	0.86	
Clearance Time (s)		6.0						6.0		5.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		74	1583					1737	2787	576	3037	
v/s Ratio Prot		0.02						0.29		0.26	0.60	
v/s Ratio Perm			0.42						c0.74			
v/c Ratio		0.36	0.42					0.59	0.74	0.80	0.70	
Uniform Delay, d1		56.0	0.0					22.0	0.0	36.9	3.0	
Progression Factor		1.00	1.00					1.00	1.00	1.27	0.90	
Incremental Delay, d2		3.0	0.8					1.5	1.8	0.8	0.1	
Delay (s)		59.0	0.8					23.5	1.8	47.8	2.8	
Level of Service		E	A					C	A	D	A	
Approach Delay (s)		3.1			0.0			9.0			10.9	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	2750	2515	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	38	0	2778	2540	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.71	0.95	0.95			
vC, conflicting volume	3466	847	2595			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2542	640	2487			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	100			
cM capacity (veh/h)	16	396	172			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	38	926	926	926	847	847	847	54
Volume Left	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	54
cSH	396	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.10	0.54	0.54	0.54	0.50	0.50	0.50	0.03
Queue Length 95th (ft)	8	0	0	0	0	0	0	0
Control Delay (s)	15.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C							
Approach Delay (s)	15.1	0.0			0.0			
Approach LOS	C							

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	740	110	170	300	705	360	1760	410	730	1550	265
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	20.0	44.0	44.0	20.0	44.0		34.0	65.0		51.0	82.0	
Total Split (%)	11.1%	24.4%	24.4%	11.1%	24.4%		18.9%	36.1%		28.3%	45.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 178.9
Natural Cycle: 180
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	740	110	170	300	705	360	1760	410	730	1550	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	315	804	120	185	326	766	391	1913	446	793	1685	288
RTOR Reduction (vph)	0	0	94	0	0	28	0	0	44	0	0	44
Lane Group Flow (vph)	315	804	26	185	326	738	391	1913	402	793	1685	244
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	14.0	38.8	38.8	13.2	38.0	88.9	25.0	59.0	78.2	44.9	78.9	98.9
Effective Green, g (s)	14.0	38.8	38.8	13.2	38.0	88.9	25.0	59.0	78.2	44.9	78.9	98.9
Actuated g/C Ratio	0.08	0.22	0.22	0.07	0.21	0.50	0.14	0.33	0.44	0.25	0.44	0.55
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	1102	343	253	1080	786	479	1676	691	861	2242	875
v/s Ratio Prot	c0.09	0.16		0.05	0.06		0.11	c0.38		0.23	0.33	
v/s Ratio Perm			0.02			c0.47			0.25			0.15
v/c Ratio	1.18	0.73	0.08	0.73	0.30	0.94	0.82	1.14	0.58	0.92	0.75	0.28
Uniform Delay, d1	82.5	65.2	55.8	81.1	59.3	42.5	74.7	60.0	38.0	65.3	41.8	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	110.9	2.5	0.1	10.4	0.2	18.7	10.3	71.4	1.2	15.0	1.5	0.2
Delay (s)	193.4	67.6	55.9	91.5	59.4	61.2	85.1	131.3	39.2	80.2	43.3	21.3
Level of Service	F	E	E	F	E	E	F	F	D	F	D	C
Approach Delay (s)		98.5			65.1			109.8			51.6	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	80.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	178.9	Sum of lost time (s)	23.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	110	190	30	65	360	80	2270	65	220	1365	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	20.0	54.0		17.0	51.0		25.0	141.0		28.0	144.0	
Total Split (%)	8.3%	22.5%		7.1%	21.3%		10.4%	58.8%		11.7%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	110	190	30	65	360	80	2270	65	220	1365	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	125	120	207	33	71	391	87	2467	71	239	1484	386
RTOR Reduction (vph)	0	0	46	0	0	29	0	0	13	0	0	117
Lane Group Flow (vph)	125	120	161	33	71	362	87	2467	58	239	1484	269
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	12.9	48.1	65.6	9.2	44.4	70.9	11.5	138.2	153.4	20.5	148.2	167.1
Effective Green, g (s)	12.9	48.1	65.6	9.2	44.4	70.9	11.5	138.2	153.4	20.5	148.2	167.1
Actuated g/C Ratio	0.05	0.20	0.27	0.04	0.18	0.30	0.05	0.58	0.64	0.09	0.62	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	184	373	432	67	344	467	164	2928	1011	293	3139	1102
v/s Ratio Prot	c0.04	0.06		0.02	0.04		0.03	c0.49		c0.07	0.29	
v/s Ratio Perm			c0.10			c0.23			0.04			0.17
v/c Ratio	0.68	0.32	0.37	0.49	0.21	0.78	0.53	0.84	0.06	0.82	0.47	0.24
Uniform Delay, d1	111.5	82.0	70.6	113.1	82.9	77.3	111.6	41.9	16.2	107.9	24.8	13.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	0.5	0.5	5.6	0.3	7.9	3.3	3.1	0.0	15.9	0.5	0.1
Delay (s)	121.1	82.5	71.1	118.7	83.2	85.1	114.9	45.1	16.2	123.8	25.3	13.5
Level of Service	F	F	E	F	F	F	F	D	B	F	C	B
Approach Delay (s)		88.0			87.1			46.6			34.3	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	48.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	35	95	685	1745	130	205	1200	125
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		49.0		55.0	55.0	36.0	91.0	91.0
Total Split (%)		35.0%		39.3%	39.3%	25.7%	65.0%	65.0%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 132.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	35	95	0	685	0	1745	130	205	1200	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	38	103	0	745	0	1897	141	223	1304	136
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	89	0	0	56
Lane Group Flow (vph)	0	0	38	103	0	734	0	1897	52	223	1304	80
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			132.6	42.2		71.4		49.2	49.2	23.2	78.4	78.4
Effective Green, g (s)			132.6	42.2		71.4		49.2	49.2	23.2	78.4	78.4
Actuated g/C Ratio			1.00	0.32		0.54		0.37	0.37	0.17	0.59	0.59
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	563		852		1886	587	600	3006	935
v/s Ratio Prot				0.06				c0.37		0.06	0.26	
v/s Ratio Perm			0.02			c0.46			0.03			0.05
v/c Ratio			0.02	0.18		0.86		1.01	0.09	0.37	0.43	0.09
Uniform Delay, d1			0.0	32.7		26.4		41.7	27.1	48.3	14.9	11.7
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0	0.2		8.9		22.1	0.1	0.4	0.1	0.0
Delay (s)			0.0	32.9		35.3		63.8	27.2	48.7	15.0	11.7
Level of Service			A	C		D		E	C	D	B	B
Approach Delay (s)		0.0			35.0			61.3			19.2	
Approach LOS		A			D			E			B	

Intersection Summary			
HCM 2000 Control Delay	40.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	132.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	160	280	220	205	245	820	185	820	320	770	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	26.0	40.0		26.0	40.0		24.0	51.0	33.0	60.0	
Total Split (%)	17.3%	26.7%		17.3%	26.7%		16.0%	34.0%	22.0%	40.0%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 143.3
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	280	220	205	245	820	185	820	135	320	770	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4977		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4977		3433	5085	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)	174	304	239	223	266	891	201	891	147	348	837	174
RTOR Reduction (vph)	0	0	60	0	0	42	0	15	0	0	0	79
Lane Group Flow (vph)	174	304	179	223	266	849	201	1023	0	348	837	95
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	12.6	33.7	53.4	14.6	35.7	69.7	13.7	45.1		28.0	59.4	78.0
Effective Green, g (s)	12.6	33.7	53.4	14.6	35.7	69.7	13.7	45.1		28.0	59.4	78.0
Actuated g/C Ratio	0.09	0.24	0.37	0.10	0.25	0.49	0.10	0.31		0.20	0.41	0.54
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	437	589	349	463	769	327	1565		670	2106	861
v/s Ratio Prot	0.05	0.16		c0.06	0.14		0.06	c0.21		0.10	0.16	
v/s Ratio Perm			0.11			c0.54						0.06
v/c Ratio	0.58	0.70	0.30	0.64	0.57	1.10	0.61	0.65		0.52	0.40	0.11
Uniform Delay, d1	62.8	50.2	31.9	61.9	47.2	36.9	62.3	42.4		51.7	29.5	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	4.8	0.3	3.8	1.7	64.9	3.4	1.0		0.7	0.1	0.1
Delay (s)	65.5	54.9	32.1	65.7	48.9	101.8	65.7	43.4		52.4	29.6	15.9
Level of Service	E	D	C	E	D	F	E	D		D	C	B
Approach Delay (s)		49.9			85.8			47.0			33.7	
Approach LOS		D			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	55.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	143.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	725	175	35	180	965	320	20	105	35	540	200	460
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	52.0	52.0	52.0	44.0	44.0		11.0	46.0		38.0	73.0	
Total Split (%)	28.9%	28.9%	28.9%	24.4%	24.4%		6.1%	25.6%		21.1%	40.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 169.2
Natural Cycle: 155
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	725	175	35	180	965	320	20	105	35	540	200	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	788	190	38	196	1049	348	22	114	38	587	217	500
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	25	0	0	39
Lane Group Flow (vph)	788	190	14	196	1049	348	22	114	13	587	217	461
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	44.3	63.9	63.9	18.9	38.5	76.8	3.4	33.1	58.0	32.3	62.0	112.3
Effective Green, g (s)	44.3	63.9	63.9	18.9	38.5	76.8	3.4	33.1	58.0	32.3	62.0	112.3
Actuated g/C Ratio	0.26	0.37	0.37	0.11	0.22	0.45	0.02	0.19	0.34	0.19	0.36	0.66
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	888	1320	590	378	1143	1250	35	684	536	647	1281	1828
v/s Ratio Prot	c0.23	0.05		0.06	c0.21	0.12	0.01	0.03		c0.17	0.06	c0.17
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.89	0.14	0.02	0.52	0.92	0.28	0.63	0.17	0.02	0.91	0.17	0.25
Uniform Delay, d1	61.0	35.5	33.9	71.9	64.8	29.7	83.3	57.6	37.7	68.0	37.1	12.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	0.1	0.0	1.2	11.5	0.1	30.3	0.1	0.0	16.4	0.1	0.1
Delay (s)	71.7	35.6	33.9	73.1	76.3	29.9	113.6	57.7	37.7	84.4	37.2	12.2
Level of Service	E	D	C	E	E	C	F	E	D	F	D	B
Approach Delay (s)		63.5			65.7			60.4			48.9	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	59.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	171.2	Sum of lost time (s)	23.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	370	5	75	10	1760	40	960
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	370	5	75	10	1760	215	40	960	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1687	1583	1770	3481		1770	3537	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1687	1583	1770	3481		1770	3537	
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	0	5	402	5	82	11	1913	234	43	1043	5
RTOR Reduction (vph)	0	5	0	0	0	69	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	205	202	13	11	2143	0	43	1048	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		1.1		28.0	28.0	28.0	3.2	122.3		8.6	127.7	
Effective Green, g (s)		1.1		28.0	28.0	28.0	3.2	122.3		8.6	127.7	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.02	0.68		0.05	0.71	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		9		261	262	246	31	2365		84	2509	
v/s Ratio Prot		c0.00		c0.12	0.12		0.01	c0.62		c0.02	0.30	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.79	0.77	0.05	0.35	0.91		0.51	0.42	
Uniform Delay, d1		88.9		73.1	72.9	64.7	87.4	24.1		83.7	10.8	
Progression Factor		1.00		1.00	1.00	1.00	1.35	0.30		1.00	1.00	
Incremental Delay, d2		0.1		14.3	13.1	0.1	3.7	3.6		5.2	0.5	
Delay (s)		89.1		87.4	86.0	64.8	121.8	10.8		88.8	11.3	
Level of Service		F		F	F	E	F	B		F	B	
Approach Delay (s)		89.1			83.1			11.3			14.4	
Approach LOS		F			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	515	25	2000	415	1380
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	515	25	2000	415	0	1380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	560	27	2174	451	0	1500
RTOR Reduction (vph)	0	7	0	60	0	0
Lane Group Flow (vph)	560	20	2174	391	0	1500
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	35.3	35.3	132.7	132.7		132.7
Effective Green, g (s)	35.3	35.3	132.7	132.7		132.7
Actuated g/C Ratio	0.20	0.20	0.74	0.74		0.74
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	673	310	2609	1167		2609
v/s Ratio Prot	c0.16		c0.61			0.42
v/s Ratio Perm		0.01		0.25		
v/c Ratio	0.83	0.06	0.83	0.33		0.57
Uniform Delay, d1	69.5	58.9	16.1	8.3		10.8
Progression Factor	1.00	1.00	1.00	1.00		1.15
Incremental Delay, d2	8.7	0.1	3.3	0.8		0.9
Delay (s)	78.2	59.0	19.4	9.0		13.3
Level of Service	E	E	B	A		B
Approach Delay (s)	77.3		17.6			13.3
Approach LOS	E		B			B

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2225	1405	540	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2418	1527	587	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.80				0.80	0.80
vC, conflicting volume	2114				2627	1057
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1888				2532	561
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	249				18	375

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	806	806	806	1018	1096
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	587
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.47	0.47	0.47	0.60	0.64
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	225	2225	1405
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 69.7
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	225	2225	1405	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	245	2418	1527	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	245	2418	1527	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			14.3	69.7	43.4	
Effective Green, g (s)			14.3	69.7	43.4	
Actuated g/C Ratio			0.21	1.00	0.62	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			363	5085	2203	
v/s Ratio Prot			0.14	c0.48	c0.43	
v/s Ratio Perm						
v/c Ratio			0.67	0.48	0.69	
Uniform Delay, d1			25.6	0.0	8.7	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			4.9	0.1	1.0	
Delay (s)			30.5	0.1	9.7	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.9	9.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	600	175	1305	590	2495
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 156.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	600	0	175	0	0	0	0	1305	0	590	2495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	652	0	190	0	0	0	0	1418	0	641	2712	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	652	0	190	0	0	0	0	1418	0	641	2712	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	32.7		156.2					72.1		33.4	111.5	
Effective Green, g (s)	32.7		156.2					72.1		33.4	111.5	
Actuated g/C Ratio	0.21		1.00					0.46		0.21	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	718		1583					1633		734	3629	
v/s Ratio Prot	c0.19							c0.40		c0.19	0.53	
v/s Ratio Perm			0.12									
v/c Ratio	0.91		0.12					0.87		0.87	0.75	
Uniform Delay, d1	60.3		0.0					37.8		59.4	13.7	
Progression Factor	1.00		1.00					1.00		0.99	0.98	
Incremental Delay, d2	15.2		0.2					5.2		11.2	0.9	
Delay (s)	75.5		0.2					43.0		70.2	14.4	
Level of Service	E		A					D		E	B	
Approach Delay (s)		58.5			0.0			43.0			25.0	
Approach LOS		E			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	156.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2675	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 160
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2675	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2908	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2908	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.82			
v/s Ratio Perm						
v/c Ratio			0.91			
Uniform Delay, d1			4.4			
Progression Factor			1.00			
Incremental Delay, d2			5.3			
Delay (s)			9.7			
Level of Service			A			
Approach Delay (s)	0.0		9.7			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	1305	2675	0	2670	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	1418	2908	0	2902	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.65			
vC, conflicting volume			4326		2386	709		
vC1, stage 1 conf vol					1418			
vC2, stage 2 conf vol					967			
vCu, unblocked vol			4326		1236	709		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			32		164	376		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	709	709	1454	1454	967	967	967
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1454	1454	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.42	0.42	0.86	0.86	0.57	0.57	0.57
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		96.9%	ICU Level of Service	F
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	20	0	0	135	0	3690	125	0	2580	150
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	22	0	0	147	0	4011	136	0	2606	163
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.66	0.66	0.66	0.66	0.66		0.66					
vC, conflicting volume	3943	6619	869	4882	6782	1339	2769			4013		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3658	7703	0	5077	7950	1339	1883			4013		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	97	100	100	0	100			100		
cM capacity (veh/h)	0	0	717	0	0	143	208			43		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	22	147	1337	1337	1337	136	869	869	869	163
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	22	147	0	0	0	136	0	0	0	163
cSH	717	143	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	1.03	0.79	0.79	0.79	0.08	0.51	0.51	0.51	0.10
Queue Length 95th (ft)	2	192	0	0	0	0	0	0	0	0
Control Delay (s)	10.2	144.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	F								
Approach Delay (s)	10.2	144.9	0.0				0.0			
Approach LOS	B	F								

Intersection Summary				
Average Delay		3.0		
Intersection Capacity Utilization		86.3%	ICU Level of Service	E
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	20	35	135	5	165	65	3350	30	40	1980	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	35	20	135	5	165	65	3350	30	40	1980	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1736		1728	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1736		1271	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	22	38	22	147	5	179	71	3526	33	43	2000	109
RTOR Reduction (vph)	0	9	0	0	0	14	0	0	9	0	0	27
Lane Group Flow (vph)	22	51	0	147	5	165	71	3526	24	43	2000	82
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Effective Green, g (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.05	0.72	0.72	0.05	0.71	0.71
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	267		195	287	357	92	3661	1110	82	3633	1070
v/s Ratio Prot		0.03			0.00		c0.04	c0.69		0.02	0.39	
v/s Ratio Perm	0.02			c0.12		0.10			0.02			0.05
v/c Ratio	0.10	0.19		0.75	0.02	0.46	0.77	0.96	0.02	0.52	0.55	0.08
Uniform Delay, d1	87.2	88.4		97.1	86.1	80.3	112.3	30.7	9.6	111.8	16.1	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.77	1.01	1.00	1.01	1.03	1.10
Incremental Delay, d2	0.2	0.3		15.2	0.0	1.0	3.7	1.1	0.0	5.9	0.6	0.1
Delay (s)	87.4	88.8		112.3	86.1	81.3	90.2	32.2	9.6	118.4	17.1	11.5
Level of Service	F	F		F	F	F	F	C	A	F	B	B
Approach Delay (s)		88.4			95.1			33.2			18.9	
Approach LOS		F			F			C			B	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	150	225	190	15	150	160	2970	45	45	1910	125
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	63.0	63.0	63.0	63.0	63.0	63.0	24.0	163.0	163.0	14.0	153.0	153.0
Total Split (%)	26.3%	26.3%	26.3%	26.3%	26.3%	26.3%	10.0%	67.9%	67.9%	5.8%	63.8%	63.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	150	225	190	15	150	160	2970	45	45	1910	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1801	1533		1780	1583	1770	5085	1551	1770	5085	1560
Flt Permitted		0.43	1.00		0.07	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		804	1533		126	1583	1770	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	359	163	245	207	16	163	174	3228	49	49	1929	136
RTOR Reduction (vph)	0	0	63	0	0	56	0	0	15	0	0	53
Lane Group Flow (vph)	0	522	182	0	223	107	174	3228	34	49	1929	83
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		57.0	57.0		57.0	57.0	18.0	156.0	156.0	8.0	146.0	146.0
Effective Green, g (s)		57.0	57.0		57.0	57.0	18.0	156.0	156.0	8.0	146.0	146.0
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.08	0.65	0.65	0.03	0.61	0.61
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		190	364		29	375	132	3305	1008	59	3093	949
v/s Ratio Prot							c0.10	c0.63		0.03	0.38	
v/s Ratio Perm		0.65	0.12		c1.77	0.07			0.02			0.05
v/c Ratio		2.75	0.50		7.69	0.29	1.32	0.98	0.03	0.83	0.62	0.09
Uniform Delay, d1		91.5	79.2		91.5	74.9	111.0	40.3	15.0	115.3	29.7	19.4
Progression Factor		1.00	1.00		1.00	1.00	0.91	1.11	1.45	1.01	0.72	0.48
Incremental Delay, d2		800.9	1.1		3080.1	0.4	166.5	6.7	0.0	53.8	0.8	0.2
Delay (s)		892.4	80.2		3171.6	75.3	267.9	51.4	21.8	169.7	22.1	9.4
Level of Service		F	F		F	E	F	D	C	F	C	A
Approach Delay (s)		633.0			1864.1			61.9			24.7	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	219.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.68		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	119.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3345	2245	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3345	2245	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3636	2268	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3636	2268	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.72	0.45	
v/s Ratio Perm						
v/c Ratio				0.93	0.58	
Uniform Delay, d1				11.1	5.7	
Progression Factor				1.24	1.07	
Incremental Delay, d2				1.9	0.1	
Delay (s)				15.7	6.2	
Level of Service				B	A	
Approach Delay (s)	0.0			15.7	6.2	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	395	10	205	10	5	355	3045	15	50	1955	480
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2			6
Detector Phase	4	4	4 5	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0		11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0		14.0	14.0	40.0	153.0	153.0	30.0	143.0	143.0
Total Split (%)	17.9%	17.9%		5.8%	5.8%	16.7%	63.8%	63.8%	12.5%	59.6%	59.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	10	205	10	10	5	355	3045	15	50	1955	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
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)	429	11	223	11	11	5	386	3310	16	54	2125	522
RTOR Reduction (vph)	0	0	30	0	0	5	0	0	5	0	0	229
Lane Group Flow (vph)	219	221	193	0	22	0	386	3310	11	54	2125	293
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2			6
Actuated Green, G (s)	35.0	35.0	80.3		5.9	5.9	39.3	162.4	162.4	11.7	134.8	134.8
Effective Green, g (s)	35.0	35.0	80.3		5.9	5.9	39.3	162.4	162.4	11.7	134.8	134.8
Actuated g/C Ratio	0.15	0.15	0.33		0.02	0.02	0.16	0.68	0.68	0.05	0.56	0.56
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	245	246	478		44	38	289	3440	941	86	2856	756
v/s Ratio Prot	0.13	c0.13			c0.01		c0.22	c0.65		0.03	0.42	
v/s Ratio Perm			0.13			0.00			0.01			0.22
v/c Ratio	0.89	0.90	0.40		0.50	0.00	1.34	0.96	0.01	0.63	0.74	0.39
Uniform Delay, d1	100.7	100.8	61.4		115.6	114.2	100.3	36.0	12.6	112.0	39.6	29.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.87	1.43	1.00	1.08	0.64	1.79
Incremental Delay, d2	30.9	31.5	0.6		3.2	0.0	163.0	5.3	0.0	9.0	1.6	1.4
Delay (s)	131.6	132.3	62.0		118.8	114.2	250.7	56.6	12.7	130.5	27.2	54.2
Level of Service	F	F	E		F	F	F	E	B	F	C	D
Approach Delay (s)		108.4			118.0			76.6			34.5	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	63.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	480	45	45	85	510	40	2190	5	350	1700	75
Turn Type	Split	NA	custom	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3 5		4 1			2			6
Detector Phase	3	3	3 5	4	4 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0		10.0		10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	65.0	65.0		33.0		27.0	110.0	110.0	32.0	115.0	115.0
Total Split (%)	27.1%	27.1%		13.8%		11.3%	45.8%	45.8%	13.3%	47.9%	47.9%
Yellow Time (s)	4.0	4.0		4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	480	45	45	15	85	510	40	2190	5	350	1700	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	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)	522	49	49	16	92	554	43	2380	5	380	1848	82
RTOR Reduction (vph)	0	0	34	0	0	34	0	0	3	0	0	35
Lane Group Flow (vph)	282	289	15	0	108	520	43	2380	2	380	1848	47
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3 5			4 1			2			6
Actuated Green, G (s)	46.8	46.8	58.0		27.0	59.0	11.2	115.2	115.2	26.0	130.0	130.0
Effective Green, g (s)	46.8	46.8	58.0		27.0	59.0	11.2	115.2	115.2	26.0	130.0	130.0
Actuated g/C Ratio	0.19	0.19	0.24		0.11	0.25	0.05	0.48	0.48	0.11	0.54	0.54
Clearance Time (s)	6.0	6.0			6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	331	382		208	685	82	2440	759	371	2754	857
v/s Ratio Prot	0.17	c0.17			0.06		0.02	c0.47		c0.11	0.36	
v/s Ratio Perm			0.01			c0.19			0.00			0.03
v/c Ratio	0.86	0.87	0.04		0.52	0.76	0.52	0.98	0.00	1.02	0.67	0.06
Uniform Delay, d1	93.5	93.7	69.7		100.4	83.9	111.8	61.0	32.5	107.0	39.6	26.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.36	0.85	1.00	1.40	0.28	0.05
Incremental Delay, d2	20.2	21.5	0.0		2.2	4.8	4.4	10.9	0.0	45.2	0.9	0.1
Delay (s)	113.7	115.2	69.7		102.6	88.8	156.4	63.0	32.5	195.1	12.1	1.5
Level of Service	F	F	E		F	F	F	E	C	F	B	A
Approach Delay (s)		110.9			91.0			64.6			41.8	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	63.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	275	325	165	1625	65	220	1415	170
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	275	325	165	1625	65	220	1415	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	353	212	223	125	299	353	179	1766	71	239	1429	185
RTOR Reduction (vph)	0	0	58	0	0	33	0	0	23	0	0	64
Lane Group Flow (vph)	184	381	165	125	299	320	179	1766	48	239	1429	121
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	32.1	32.1	48.9	42.7	42.7	63.8	16.8	119.1	161.8	21.1	123.4	123.4
Effective Green, g (s)	32.1	32.1	48.9	42.7	42.7	63.8	16.8	119.1	161.8	21.1	123.4	123.4
Actuated g/C Ratio	0.13	0.13	0.20	0.18	0.18	0.27	0.07	0.50	0.67	0.09	0.51	0.51
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	215	443	322	314	331	810	240	2523	1067	301	2614	813
v/s Ratio Prot	0.11	c0.11		0.07	c0.16	0.07	0.05	c0.35		c0.07	c0.28	
v/s Ratio Perm			0.10			0.04			0.03			0.08
v/c Ratio	0.86	0.86	0.51	0.40	0.90	0.40	0.75	0.70	0.04	0.79	0.55	0.15
Uniform Delay, d1	101.7	101.8	84.9	87.3	96.6	72.3	109.5	46.7	13.1	107.3	39.4	30.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.59	2.17	4.37
Incremental Delay, d2	25.9	15.1	0.6	0.3	26.1	0.1	10.5	1.6	0.0	9.8	0.6	0.3
Delay (s)	127.6	116.8	85.5	87.6	122.7	72.4	120.0	48.3	13.1	72.6	86.3	134.3
Level of Service	F	F	F	F	F	E	F	D	B	E	F	F
Approach Delay (s)		110.5			94.2			53.4			89.3	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	79.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1825	45	20	1325	35	65	15	25	35	10	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	28.0	28.0	28.0	26.0	26.0	26.0
Total Split (s)	24.0	76.0	76.0	16.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	63.3%	63.3%	13.3%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1825	45	20	1325	35	65	15	25	35	10	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1790	1583		1793	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.73	1.00		0.77	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1363	1583		1430	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)	168	1984	49	22	1440	38	71	16	27	38	11	158
RTOR Reduction (vph)	0	0	16	0	0	16	0	0	23	0	0	130
Lane Group Flow (vph)	168	1984	33	22	1440	22	0	87	4	0	49	28
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.1	80.1	80.1	4.8	70.8	70.8		19.1	19.1		21.1	21.1
Effective Green, g (s)	16.1	80.1	80.1	4.8	70.8	70.8		19.1	19.1		21.1	21.1
Actuated g/C Ratio	0.13	0.67	0.67	0.04	0.59	0.59		0.16	0.16		0.18	0.18
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	237	2362	1056	70	2088	933		216	251		251	278
v/s Ratio Prot	c0.09	c0.56		0.01	0.41							
v/s Ratio Perm			0.02			0.01		c0.06	0.00		0.03	0.02
v/c Ratio	0.71	0.84	0.03	0.31	0.69	0.02		0.40	0.02		0.20	0.10
Uniform Delay, d1	49.7	15.1	6.8	56.0	17.0	10.2		45.3	42.5		42.2	41.5
Progression Factor	1.00	1.00	1.00	0.82	0.80	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	9.3	3.8	0.1	2.0	1.5	0.0		1.2	0.0		0.4	0.2
Delay (s)	59.0	18.9	6.8	48.1	15.1	10.3		46.6	42.6		42.6	41.6
Level of Service	E	B	A	D	B	B		D	D		D	D
Approach Delay (s)		21.7			15.4			45.6			41.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1630	75	35	1165	45	105	15	40	50	15	115
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	24.0	75.0	75.0	17.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	62.5%	62.5%	14.2%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1630	75	35	1165	45	105	15	40	50	15	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1785	1583		1794	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.70	1.00		0.63	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1309	1583		1168	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)	185	1772	82	38	1266	49	114	16	43	54	16	125
RTOR Reduction (vph)	0	0	30	0	0	22	0	0	36	0	0	105
Lane Group Flow (vph)	185	1772	52	38	1266	27	0	130	7	0	70	20
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.2	76.8	76.8	5.6	66.2	66.2		19.6	19.6		19.6	19.6
Effective Green, g (s)	16.2	76.8	76.8	5.6	66.2	66.2		19.6	19.6		19.6	19.6
Actuated g/C Ratio	0.13	0.64	0.64	0.05	0.55	0.55		0.16	0.16		0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	238	2264	1013	82	1952	873		213	258		190	258
v/s Ratio Prot	c0.10	c0.50		0.02	0.36							
v/s Ratio Perm			0.03			0.02		c0.10	0.00		0.06	0.01
v/c Ratio	0.78	0.78	0.05	0.46	0.65	0.03		0.61	0.03		0.37	0.08
Uniform Delay, d1	50.2	15.6	8.0	55.7	18.8	12.3		46.7	42.2		44.7	42.6
Progression Factor	1.07	0.76	1.88	1.11	0.50	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.9	1.6	0.1	3.7	1.5	0.1		5.1	0.0		1.2	0.1
Delay (s)	62.4	13.5	15.2	65.5	10.9	12.3		51.7	42.2		45.9	42.7
Level of Service	E	B	B	E	B	B		D	D		D	D
Approach Delay (s)		18.0			12.5			49.4			43.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1665	60	1125	130	85
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	28.0	28.0
Total Split (s)	66.0	22.0	88.0	32.0	32.0
Total Split (%)	55.0%	18.3%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1665	40	60	1125	130	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3527		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3527		1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1810	43	65	1223	141	92
RTOR Reduction (vph)	1	0	0	0	0	77
Lane Group Flow (vph)	1852	0	65	1223	141	15
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	73.9		8.6	88.5	19.5	19.5
Effective Green, g (s)	73.9		8.6	88.5	19.5	19.5
Actuated g/C Ratio	0.62		0.07	0.74	0.16	0.16
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2172		126	2610	287	257
v/s Ratio Prot	c0.53		0.04	c0.35	c0.08	
v/s Ratio Perm						0.01
v/c Ratio	0.85		0.52	0.47	0.49	0.06
Uniform Delay, d1	18.6		53.7	6.3	45.7	42.5
Progression Factor	0.52		1.28	0.48	1.00	1.00
Incremental Delay, d2	3.0		3.2	0.5	1.3	0.1
Delay (s)	12.8		71.8	3.6	47.1	42.6
Level of Service	B		E	A	D	D
Approach Delay (s)	12.8			7.0	45.3	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1680	30	50	1055	10	50	5	95	20	10	85
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	15.0	73.0	73.0	19.0	77.0	77.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	12.5%	60.8%	60.8%	15.8%	64.2%	64.2%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1680	30	50	1055	10	50	5	95	20	10	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1781	1583		1803	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.80	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1341	1583		1499	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)	43	1826	33	54	1147	11	54	5	103	22	11	92
RTOR Reduction (vph)	0	0	12	0	0	4	0	0	87	0	0	78
Lane Group Flow (vph)	43	1826	21	54	1147	7	0	59	16	0	33	14
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.0	76.3	76.3	7.9	77.2	77.2		18.8	18.8		18.8	18.8
Effective Green, g (s)	7.0	76.3	76.3	7.9	77.2	77.2		18.8	18.8		18.8	18.8
Actuated g/C Ratio	0.06	0.64	0.64	0.07	0.64	0.64		0.16	0.16		0.16	0.16
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	103	2250	1006	116	2276	1018		210	248		234	248
v/s Ratio Prot	0.02	c0.52		c0.03	0.32							
v/s Ratio Perm			0.01			0.00		c0.04	0.01		0.02	0.01
v/c Ratio	0.42	0.81	0.02	0.47	0.50	0.01		0.28	0.07		0.14	0.06
Uniform Delay, d1	54.5	16.4	8.1	54.0	11.3	7.7		44.6	43.1		43.6	43.1
Progression Factor	1.06	0.47	1.00	1.17	1.45	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	1.9	0.0	2.7	0.7	0.0		0.7	0.1		0.3	0.1
Delay (s)	59.5	9.7	8.1	65.7	17.1	7.7		45.4	43.2		43.9	43.2
Level of Service	E	A	A	E	B	A		D	D		D	D
Approach Delay (s)		10.8			19.2			44.0			43.4	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	70.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1740	55	70	995	125	115
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	28.0
Total Split (s)	69.0	69.0	22.0	91.0	29.0	29.0
Total Split (%)	57.5%	57.5%	18.3%	75.8%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1740	55	70	995	125	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1891	60	76	1082	136	125
RTOR Reduction (vph)	0	7	0	0	0	105
Lane Group Flow (vph)	1891	53	76	1082	136	20
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	75.4	75.4	9.2	89.6	19.4	19.4
Effective Green, g (s)	75.4	75.4	9.2	89.6	19.4	19.4
Actuated g/C Ratio	0.63	0.63	0.08	0.75	0.16	0.16
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2223	994	135	2642	286	255
v/s Ratio Prot	c0.53		c0.04	0.31	c0.08	
v/s Ratio Perm		0.03				0.01
v/c Ratio	0.85	0.05	0.56	0.41	0.48	0.08
Uniform Delay, d1	17.8	8.6	53.5	5.5	45.7	42.7
Progression Factor	0.57	0.96	0.87	1.61	1.00	1.00
Incremental Delay, d2	2.7	0.1	4.9	0.4	1.2	0.1
Delay (s)	13.0	8.3	51.5	9.4	46.9	42.8
Level of Service	B	A	D	A	D	D
Approach Delay (s)	12.8			12.1	45.0	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations												
Volume (vph)	1800	50	95	935	25	120	20	120	10	5	15	
Turn Type	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	2		1	6			8			4		5
Permitted Phases		2			6	8		8	4		4	
Detector Phase	2	2	1	6	6	8	8	8	4	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	10.0
Total Split (s)	58.0	58.0	32.0	62.0	62.0	30.0	30.0	30.0	30.0	30.0	30.0	28.0
Total Split (%)	48.3%	48.3%	26.7%	51.7%	51.7%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	23%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lag	Lag							Lead
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1800	50	95	935	25	120	20	120	10	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)		3539	1583	1770	3539	1583		1786	1583		1801	1583
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.75	1.00		0.80	1.00
Satd. Flow (perm)		3539	1583	1770	3539	1583		1389	1583		1495	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1957	54	103	1016	27	130	22	130	11	5	16
RTOR Reduction (vph)	0	0	23	0	0	7	0	0	108	0	0	13
Lane Group Flow (vph)	0	1957	31	103	1016	20	0	152	22	0	16	3
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)		69.5	69.5	12.3	87.8	87.8		20.2	20.2		20.2	20.2
Effective Green, g (s)		69.5	69.5	12.3	87.8	87.8		20.2	20.2		20.2	20.2
Actuated g/C Ratio		0.58	0.58	0.10	0.73	0.73		0.17	0.17		0.17	0.17
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2049	916	181	2589	1158		233	266		251	266
v/s Ratio Prot		c0.55		c0.06	0.29							
v/s Ratio Perm			0.02			0.01		c0.11	0.01		0.01	0.00
v/c Ratio		0.96	0.03	0.57	0.39	0.02		0.65	0.08		0.06	0.01
Uniform Delay, d1		23.8	10.8	51.3	6.1	4.4		46.6	42.1		42.0	41.6
Progression Factor		0.61	1.10	1.09	0.37	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		7.7	0.0	3.7	0.4	0.0		6.4	0.1		0.1	0.0
Delay (s)		22.1	12.0	59.6	2.7	4.4		53.0	42.2		42.1	41.6
Level of Service		C	B	E	A	A		D	D		D	D
Approach Delay (s)		21.9			7.8			48.0			41.8	
Approach LOS		C			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1710	30	250	980	45	65	40	275	70	35	20
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	26.0	55.0	55.0	36.0	65.0	65.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	21.7%	45.8%	45.8%	30.0%	54.2%	54.2%	24.2%	24.2%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1710	30	250	980	45	65	40	275	70	35	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1364	1863	1583	1358	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1859	33	272	1065	49	71	43	299	76	38	22
RTOR Reduction (vph)	0	0	14	0	0	17	0	0	252	0	0	19
Lane Group Flow (vph)	27	1859	19	272	1065	32	71	43	47	76	38	3
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.0	68.3	68.3	14.8	78.1	78.1	18.9	18.9	18.9	18.9	18.9	18.9
Effective Green, g (s)	5.0	68.3	68.3	14.8	78.1	78.1	18.9	18.9	18.9	18.9	18.9	18.9
Actuated g/C Ratio	0.04	0.57	0.57	0.12	0.65	0.65	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	73	2014	900	423	2303	1030	214	293	249	213	293	249
v/s Ratio Prot	0.02	c0.53		c0.08	0.30			0.02			0.02	
v/s Ratio Perm			0.01			0.02	0.05		0.03	c0.06		0.00
v/c Ratio	0.37	0.92	0.02	0.64	0.46	0.03	0.33	0.15	0.19	0.36	0.13	0.01
Uniform Delay, d1	56.0	23.5	11.3	50.1	10.5	7.5	44.9	43.6	43.9	45.1	43.5	42.7
Progression Factor	0.65	1.04	1.00	1.30	0.52	0.94	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	3.8	0.0	2.9	0.6	0.0	0.9	0.2	0.4	1.0	0.2	0.0
Delay (s)	37.4	28.2	11.3	68.1	6.0	7.1	45.9	43.8	44.3	46.2	43.7	42.7
Level of Service	D	C	B	E	A	A	D	D	D	D	D	D
Approach Delay (s)		28.1			18.2			44.5			44.9	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL
Lane Configurations			
Volume (vph)	1785	1220	50
Turn Type	NA	NA	NA
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0
Total Split (s)	89.0	89.0	31.0
Total Split (%)	74.2%	74.2%	25.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1785	50	0	1220	50	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	1.00			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3525			3539	1761	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3525			3539	1761	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1940	54	0	1326	54	5
RTOR Reduction (vph)	1	0	0	0	3	0
Lane Group Flow (vph)	1993	0	0	1326	56	0
Turn Type	NA		Perm	NA	NA	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	84.4			84.4	23.6	
Effective Green, g (s)	84.4			84.4	23.6	
Actuated g/C Ratio	0.70			0.70	0.20	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2479			2489	346	
v/s Ratio Prot	c0.57			0.37	c0.03	
v/s Ratio Perm						
v/c Ratio	0.80			0.53	0.16	
Uniform Delay, d1	12.1			8.4	40.0	
Progression Factor	2.46			2.98	1.00	
Incremental Delay, d2	1.0			0.2	1.0	
Delay (s)	30.8			25.3	41.0	
Level of Service	C			C	D	
Approach Delay (s)	30.8			25.3	41.0	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	28.8	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)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	40	1730	80	1200	110	50	40	425	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	28.0
Total Split (s)	20.0	54.0	26.0	60.0		12.0	12.0	28.0	40.0
Total Split (%)	16.7%	45.0%	21.7%	50.0%		10.0%	10.0%	23.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1730	0	80	1200	110	0	50	40	425	5	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1863	1583	3433	1612	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1863	1583	3433	1612	
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)	43	1880	0	87	1304	120	0	54	43	462	5	43
RTOR Reduction (vph)	0	0	0	0	0	18	0	0	41	0	32	0
Lane Group Flow (vph)	43	1880	0	87	1304	102	0	54	2	462	16	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	7.2	60.4		11.2	64.4	101.8		5.3	5.3	20.1	31.4	
Effective Green, g (s)	7.2	60.4		11.2	64.4	101.8		5.3	5.3	20.1	31.4	
Actuated g/C Ratio	0.06	0.50		0.09	0.54	0.85		0.04	0.04	0.17	0.26	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	106	1781		165	1899	1342		82	69	575	421	
v/s Ratio Prot	0.02	c0.53		c0.05	c0.37			c0.03		c0.13	0.01	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.41	1.06		0.53	0.69	0.08		0.66	0.03	0.80	0.04	
Uniform Delay, d1	54.3	29.8		51.9	20.4	1.5		56.5	54.9	48.1	33.0	
Progression Factor	1.23	0.74		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	33.3		3.0	2.0	0.0		17.5	0.2	8.0	0.0	
Delay (s)	68.3	55.4		54.9	22.4	1.5		73.9	55.0	56.0	33.1	
Level of Service	E	E		D	C	A		E	E	E	C	
Approach Delay (s)		55.7			22.7			65.6			53.9	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	45	10	40	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	49	11	43	87

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	60	130
Volume Left (vph)	0	49	43
Volume Right (vph)	27	0	87
Hadj (s)	-0.34	0.20	-0.30
Departure Headway (s)	3.9	4.4	3.8
Degree Utilization, x	0.05	0.07	0.14
Capacity (veh/h)	888	789	909
Control Delay (s)	7.1	7.8	7.4
Approach Delay (s)	7.1	7.8	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay		7.5	
Level of Service		A	
Intersection Capacity Utilization		23.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	2085	390	1080
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 122.5
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2085	0	390	1080	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2266	0	424	1174	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2266	0	424	1174	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	76.4		34.1	122.5		
Effective Green, g (s)	76.4		34.1	122.5		
Actuated g/C Ratio	0.62		0.28	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	2207		492	3539		
v/s Ratio Prot	c0.64		c0.24	0.33		
v/s Ratio Perm						
v/c Ratio	1.03		0.86	0.33		
Uniform Delay, d1	23.0		42.0	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	26.3		14.4	0.1		
Delay (s)	49.4		56.3	0.1		
Level of Service	D		E	A		
Approach Delay (s)	49.4			15.0	0.0	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	35.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	122.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	905	1905	1395	205
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 95.2
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	905	1905	1395	205	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	984	2071	1516	223	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	984	2071	1516	223	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	33.4	95.2	50.8	95.2		
Effective Green, g (s)	33.4	95.2	50.8	95.2		
Actuated g/C Ratio	0.35	1.00	0.53	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	620	3539	1888	1583		
v/s Ratio Prot	c0.56	0.59	c0.43			
v/s Ratio Perm				0.14		
v/c Ratio	1.59	0.59	0.80	0.14		
Uniform Delay, d1	30.9	0.0	18.1	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	271.8	0.2	2.6	0.2		
Delay (s)	302.7	0.2	20.7	0.2		
Level of Service	F	A	C	A		
Approach Delay (s)		97.7	18.1		0.0	
Approach LOS		F	B		A	

Intersection Summary			
HCM 2000 Control Delay	68.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	95.2	Sum of lost time (s)	11.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	645	1210	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	701	1315	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1337				1829	668
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1337				1829	668
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				53	93
cM capacity (veh/h)	512				58	400

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	351	351	877	460	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	512	1700	1700	1700	1700	58	400
Volume to Capacity	0.15	0.21	0.21	0.52	0.27	0.47	0.07
Queue Length 95th (ft)	13	0	0	0	0	45	5
Control Delay (s)	13.3	0.0	0.0	0.0	0.0	113.3	14.6
Lane LOS	B					F	B
Approach Delay (s)	1.3			0.0		64.0	
Approach LOS						F	

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		51.3%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	490	15	0	805	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	533	16	0	875	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	875			549			1391	1579	274	1315	1587	438
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	875			549			1391	1579	274	1315	1587	438
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			37	89	99	100	100	56
cM capacity (veh/h)	767			1017			52	97	723	97	96	567

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	355	194	0	583	292	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	767	1700	1700	1700	1700	1700	66	1700	567
Volume to Capacity	0.11	0.21	0.11	0.00	0.34	0.17	0.75	0.00	0.44
Queue Length 95th (ft)	9	0	0	0	0	0	84	0	56
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	149.8	0.0	16.3
Lane LOS	B						F	A	C
Approach Delay (s)	1.3			0.0			149.8	16.3	
Approach LOS							F	C	

Intersection Summary			
Average Delay		6.8	
Intersection Capacity Utilization		49.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	375	10	0	640	0	25	15	0	20	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	408	11	0	696	0	27	16	0	22	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	696			418			1158	1359	209	1158	1364	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	696			418			1158	1359	209	1158	1364	348
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			74	87	100	82	100	77
cM capacity (veh/h)	896			1137			104	127	797	122	126	648

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	272	147	0	464	232	43	22	147
Volume Left	125	0	0	0	0	0	27	22	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	896	1700	1700	1700	1700	1700	112	122	648
Volume to Capacity	0.14	0.16	0.09	0.00	0.27	0.14	0.39	0.18	0.23
Queue Length 95th (ft)	12	0	0	0	0	0	40	15	22
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	56.3	40.8	12.2
Lane LOS	A						F	E	B
Approach Delay (s)	2.2			0.0			56.3	15.9	
Approach LOS							F	C	

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization		42.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	295	5	0	515	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	321	5	0	560	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565			326			918	1084	163	924	1084	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565			326			918	1084	163	924	1084	283
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			88	94	100	100	100	83
cM capacity (veh/h)	1003			1230			174	194	853	199	194	714

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	214	112	0	373	192	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1003	1700	1700	1700	1700	1700	181	1700	714
Volume to Capacity	0.10	0.13	0.07	0.00	0.22	0.11	0.18	0.00	0.17
Queue Length 95th (ft)	8	0	0	0	0	0	16	0	15
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	29.3	0.0	11.0
Lane LOS	A						D	A	B
Approach Delay (s)	2.1			0.0			29.3	11.0	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.8	
Intersection Capacity Utilization		34.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	230	15	0	400	25	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	250	16	0	435	27	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	462			266			688	840	133	720	834	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	462			266			688	840	133	720	834	231
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			84	81	100	100	96	89
cM capacity (veh/h)	1096			1295			275	284	891	258	286	771

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	60	167	100	0	290	172	98	0	11	87
Volume Left	60	0	0	0	0	0	43	0	0	0
Volume Right	0	0	16	0	0	27	0	0	0	87
cSH	1096	1700	1700	1700	1700	1700	280	1700	286	771
Volume to Capacity	0.05	0.10	0.06	0.00	0.17	0.10	0.35	0.00	0.04	0.11
Queue Length 95th (ft)	4	0	0	0	0	0	38	0	3	9
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	24.6	0.0	18.1	10.3
Lane LOS	A						C	A	C	B
Approach Delay (s)	1.6			0.0			24.6		11.1	
Approach LOS							C		B	

Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		36.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	85	110	40	25	240	60	40	0	30	210	5	140
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	120	43	27	261	65	43	0	33	228	5	152
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	326			163			666	707	82	625	696	163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326			163			666	707	82	625	696	163
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			98			83	100	97	31	98	82
cM capacity (veh/h)	1230			1413			260	325	962	331	330	853

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	92	80	83	27	174	152	76	234	152
Volume Left	92	0	0	27	0	0	43	228	0
Volume Right	0	0	43	0	0	65	33	0	152
cSH	1230	1700	1700	1413	1700	1700	378	331	853
Volume to Capacity	0.08	0.05	0.05	0.02	0.10	0.09	0.20	0.71	0.18
Queue Length 95th (ft)	6	0	0	1	0	0	19	127	16
Control Delay (s)	8.2	0.0	0.0	7.6	0.0	0.0	16.9	38.1	10.1
Lane LOS	A			A			C	E	B
Approach Delay (s)	3.0			0.6			16.9	27.1	
Approach LOS							C	D	

Intersection Summary			
Average Delay		11.9	
Intersection Capacity Utilization		41.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	295	5	10	220	30	10	0	30	65	5	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	321	5	11	239	33	11	0	33	71	5	98
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	272			326			674	726	163	579	712	136
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272			326			674	726	163	579	712	136
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			96	100	96	81	98	89
cM capacity (veh/h)	1289			1230			288	332	853	368	338	888

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	54	214	112	11	159	112	43	76	98
Volume Left	54	0	0	11	0	0	11	71	0
Volume Right	0	0	5	0	0	33	33	0	98
cSH	1289	1700	1700	1230	1700	1700	572	366	888
Volume to Capacity	0.04	0.13	0.07	0.01	0.09	0.07	0.08	0.21	0.11
Queue Length 95th (ft)	3	0	0	1	0	0	6	19	9
Control Delay (s)	7.9	0.0	0.0	8.0	0.0	0.0	11.8	17.4	9.6
Lane LOS	A			A			B	C	A
Approach Delay (s)	1.1			0.3			11.8	13.0	
Approach LOS							B	B	

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		32.2%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	350	5	5	135	50	10	0	25	100	5	115
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	380	5	5	147	54	11	0	27	109	5	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	201			386			682	682	193	489	658	101
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	201			386			682	682	193	489	658	101
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			96	100	97	75	99	87
cM capacity (veh/h)	1368			1169			280	357	816	434	369	935

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	254	132	5	98	103	38	114	125
Volume Left	43	0	0	5	0	0	11	109	0
Volume Right	0	0	5	0	0	54	27	0	125
cSH	1368	1700	1700	1169	1700	1700	527	431	935
Volume to Capacity	0.03	0.15	0.08	0.00	0.06	0.06	0.07	0.27	0.13
Queue Length 95th (ft)	2	0	0	0	0	0	6	26	12
Control Delay (s)	7.7	0.0	0.0	8.1	0.0	0.0	12.4	16.4	9.4
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.8			0.2			12.4	12.7	
Approach LOS							B	B	

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization		35.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	465	175	105	235	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	505	190	114	255	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	304				696	190
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	304				696	190
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				37	99
cM capacity (veh/h)	1256				408	852

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	505	190	114	266
Volume Left	0	0	0	0	255
Volume Right	0	0	0	114	11
cSH	1700	1700	1700	1700	425
Volume to Capacity	0.00	0.30	0.11	0.07	0.63
Queue Length 95th (ft)	0	0	0	0	104
Control Delay (s)	0.0	0.0	0.0	0.0	26.8
Lane LOS					D
Approach Delay (s)	0.0		0.0		26.8
Approach LOS					D

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	460	0	200	375	730	335	740
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 71.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	460	0	200	375	730	0	0	335	740
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1552	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1552	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	500	0	217	408	793	0	0	364	804
RTOR Reduction (vph)	0	0	0	0	0	124	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	250	250	93	408	793	0	0	364	804
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Effective Green, g (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Actuated g/C Ratio				0.26	0.26	0.26	0.31	0.57			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				434	434	401	549	2027			631	1583
v/s Ratio Prot							c0.23	0.22			0.10	
v/s Ratio Perm				0.15	0.15	0.06						c0.51
v/c Ratio				0.58	0.58	0.23	0.74	0.39			0.58	0.51
Uniform Delay, d1				23.0	23.0	20.8	22.0	8.4			26.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.9	1.9	0.3	5.4	0.1			1.3	1.2
Delay (s)				24.9	24.9	21.1	27.4	8.5			28.1	1.2
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			23.7			14.9			9.6	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	550	355	240	605
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	64.0	64.0	46.0	30.0	76.0
Total Split (%)	45.7%	45.7%	32.9%	21.4%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 129.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	635	90	550	0	0	0	0	355	335	240	605	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3234		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3234		1770	3539	
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)	690	98	598	0	0	0	0	386	364	261	658	0
RTOR Reduction (vph)	0	0	107	0	0	0	0	129	0	0	0	0
Lane Group Flow (vph)	0	788	491	0	0	0	0	621	0	261	658	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		58.3	58.3					31.0		22.2	59.2	
Effective Green, g (s)		58.3	58.3					31.0		22.2	59.2	
Actuated g/C Ratio		0.45	0.45					0.24		0.17	0.46	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		803	703					774		303	1617	
v/s Ratio Prot								c0.19		c0.15	0.19	
v/s Ratio Perm		0.44	0.31									
v/c Ratio		0.98	0.70					0.80		0.86	0.41	
Uniform Delay, d1		35.1	28.5					46.4		52.2	23.4	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		27.0	3.0					6.0		21.3	0.2	
Delay (s)		62.1	31.6					52.4		73.5	23.6	
Level of Service		E	C					D		E	C	
Approach Delay (s)		48.9			0.0			52.4			37.8	
Approach LOS		D			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	129.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1115	785	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 96.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1115	785	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.24	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	443	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1212	853	114	54	33
RTOR Reduction (vph)	0	0	0	64	0	19
Lane Group Flow (vph)	22	1212	853	50	54	14
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	42.5	42.5	42.5	42.5	42.3	42.3
Effective Green, g (s)	42.5	42.5	42.5	42.5	42.3	42.3
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	194	1553	1553	695	773	691
v/s Ratio Prot		c0.34	0.24		c0.03	
v/s Ratio Perm	0.05			0.03		0.01
v/c Ratio	0.11	0.78	0.55	0.07	0.07	0.02
Uniform Delay, d1	16.0	23.2	20.1	15.7	15.8	15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	2.6	0.4	0.0	0.2	0.1
Delay (s)	16.3	25.8	20.5	15.8	16.0	15.5
Level of Service	B	C	C	B	B	B
Approach Delay (s)		25.6	19.9		15.8	
Approach LOS		C	B		B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2035 with Rail PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	2115	5	315	590	415	315	145
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	63.0	63.0	63.0	29.0	57.0	28.0	28.0
Total Split (%)	52.5%	52.5%	52.5%	24.2%	47.5%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	2115	5	315	590	415	0	0	315	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1686	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1686	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2136	5	342	596	419	0	0	318	158
RTOR Reduction (vph)	0	0	0	0	0	152	0	0	0	0	0	132
Lane Group Flow (vph)	0	0	0	1068	1073	190	596	419	0	0	318	26
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				59.7	59.7	59.7	23.3	48.3			20.0	20.0
Effective Green, g (s)				59.7	59.7	59.7	23.3	48.3			20.0	20.0
Actuated g/C Ratio				0.50	0.50	0.50	0.19	0.40			0.17	0.17
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				836	838	787	666	749			589	263
v/s Ratio Prot				0.64	c0.64		c0.17	c0.22			0.09	
v/s Ratio Perm						0.12						0.02
v/c Ratio				1.28	1.28	0.24	0.89	0.56			0.54	0.10
Uniform Delay, d1				30.1	30.1	17.2	47.2	27.6			45.8	42.4
Progression Factor				1.00	1.00	1.00	0.94	1.56			1.00	1.00
Incremental Delay, d2				134.1	135.3	0.7	13.5	0.8			1.0	0.2
Delay (s)				164.3	165.5	17.9	57.8	44.1			46.7	42.5
Level of Service				F	F	B	E	D			D	D
Approach Delay (s)		0.0			144.6			52.1			45.3	
Approach LOS		A			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	109.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	630	885	1540	95	2330
Turn Type	NA	Free	NA	Free	Prot	NA
Protected Phases	4		2		1	6
Permitted Phases		Free		Free		
Detector Phase	4		2		1	6
Switch Phase						
Minimum Initial (s)	4.0		30.0		4.0	30.0
Minimum Split (s)	10.0		36.0		10.0	36.0
Total Split (s)	32.0		51.0		37.0	88.0
Total Split (%)	26.7%		42.5%		30.8%	73.3%
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None		C-Max		None	C-Max

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	630	0	0	0	0	885	1540	95	2330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	4.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	1.00					0.95	0.88	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1780	1583					3539	2787	1770	3539	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1780	1583					3539	2787	1770	3539	
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)	158	11	685	0	0	0	0	962	1674	103	2533	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	169	685	0	0	0	0	962	1674	103	2533	0
Turn Type	Split	NA	Free					NA	Free	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						Free			
Actuated Green, G (s)		16.7	120.0					74.0	120.0	12.3	91.3	
Effective Green, g (s)		16.7	120.0					74.0	120.0	12.3	91.3	
Actuated g/C Ratio		0.14	1.00					0.62	1.00	0.10	0.76	
Clearance Time (s)		6.0						6.0		5.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		247	1583					2182	2787	181	2692	
v/s Ratio Prot		0.09						0.27		0.06	c0.72	
v/s Ratio Perm			0.43						c0.60			
v/c Ratio		0.68	0.43					0.44	0.60	0.57	0.94	
Uniform Delay, d1		49.1	0.0					12.1	0.0	51.3	12.1	
Progression Factor		1.00	1.00					1.00	1.00	1.08	1.35	
Incremental Delay, d2		7.6	0.9					0.6	1.0	0.4	0.9	
Delay (s)		56.8	0.9					12.8	1.0	55.8	17.2	
Level of Service		E	A					B	A	E	B	
Approach Delay (s)		11.9			0.0			5.3			18.7	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	175	0	2040	2800	160
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	190	0	2061	2828	174
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.71	0.60	0.60			
vC, conflicting volume	3515	943	3002			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1042	0	1996			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	71	100			
cM capacity (veh/h)	159	649	170			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	190	687	687	687	943	943	943	174
Volume Left	0	0	0	0	0	0	0	0
Volume Right	190	0	0	0	0	0	0	174
cSH	649	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.40	0.40	0.40	0.55	0.55	0.55	0.10
Queue Length 95th (ft)	30	0	0	0	0	0	0	0
Control Delay (s)	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B							
Approach Delay (s)	12.8	0.0			0.0			
Approach LOS	B							

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		71.6%	ICU Level of Service C
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	565	215	375	755	550	480	1110	500	715	1965	410
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0	44.0	10.0	44.0		9.0	44.0		9.0	44.0	
Total Split (s)	20.0	44.0	44.0	30.0	54.0		34.0	56.0		50.0	72.0	
Total Split (%)	11.1%	24.4%	24.4%	16.7%	30.0%		18.9%	31.1%		27.8%	40.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 178.5
Natural Cycle: 180
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	565	215	375	755	550	480	1110	500	715	1965	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	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)	272	614	234	408	821	598	522	1207	543	777	2136	446
RTOR Reduction (vph)	0	0	185	0	0	25	0	0	43	0	0	44
Lane Group Flow (vph)	272	614	49	408	821	573	522	1207	500	777	2136	402
Turn Type	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8 1			2 3			6 7
Actuated Green, G (s)	14.0	37.5	37.5	23.4	46.9	96.5	28.6	51.0	80.4	43.6	66.0	86.0
Effective Green, g (s)	14.0	37.5	37.5	23.4	46.9	96.5	28.6	51.0	80.4	43.6	66.0	86.0
Actuated g/C Ratio	0.08	0.21	0.21	0.13	0.26	0.54	0.16	0.29	0.45	0.24	0.37	0.48
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	269	1068	332	450	1336	855	550	1452	713	838	1880	762
v/s Ratio Prot	0.08	0.12		c0.12	0.16		0.15	0.24		c0.23	c0.42	
v/s Ratio Perm			0.03			c0.36			0.32			0.25
v/c Ratio	1.01	0.57	0.15	0.91	0.61	0.67	0.95	0.83	0.70	0.93	1.14	0.53
Uniform Delay, d1	82.2	63.3	57.5	76.5	57.9	29.5	74.2	59.7	39.4	65.9	56.2	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	57.7	0.8	0.2	21.6	0.8	2.0	25.9	4.2	3.1	16.0	68.4	0.7
Delay (s)	140.0	64.1	57.7	98.0	58.7	31.5	100.1	63.9	42.5	81.9	124.7	32.8
Level of Service	F	E	E	F	E	C	F	E	D	F	F	C
Approach Delay (s)		81.2			58.6			67.1			102.6	
Approach LOS		F			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	81.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	178.5	Sum of lost time (s)	23.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	250	360	125	145	325	130	1670	110	540	1920	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	21.0	51.0		44.0	74.0		34.0	87.0		58.0	111.0	
Total Split (%)	8.8%	21.3%		18.3%	30.8%		14.2%	36.3%		24.2%	46.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Max		None	Max	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 211.5
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	250	360	125	145	325	130	1670	110	540	1920	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	3433	5085	1583	3433	5085	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)	136	272	391	136	158	353	141	1815	120	587	2087	370
RTOR Reduction (vph)	0	0	67	0	0	22	0	0	31	0	0	125
Lane Group Flow (vph)	136	272	324	136	158	331	141	1815	89	587	2087	245
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	13.0	42.1	62.7	21.7	50.8	98.6	14.6	81.8	109.5	41.8	110.0	129.0
Effective Green, g (s)	13.0	42.1	62.7	21.7	50.8	98.6	14.6	81.8	109.5	41.8	110.0	129.0
Actuated g/C Ratio	0.06	0.20	0.30	0.10	0.24	0.47	0.07	0.39	0.52	0.20	0.52	0.61
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	211	371	469	181	447	738	237	1967	819	678	2645	965
v/s Ratio Prot	0.04	0.15		c0.08	0.08		0.04	c0.36		c0.17	0.41	
v/s Ratio Perm			c0.20			0.21			0.06			0.15
v/c Ratio	0.64	0.73	0.69	0.75	0.35	0.45	0.59	0.92	0.11	0.87	0.79	0.25
Uniform Delay, d1	96.9	79.4	65.8	92.2	66.7	38.1	95.5	61.8	26.0	82.1	41.3	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	7.3	4.4	16.0	0.5	0.4	4.0	8.7	0.1	11.2	2.5	0.1
Delay (s)	103.5	86.7	70.1	108.3	67.1	38.5	99.5	70.5	26.1	93.3	43.7	19.1
Level of Service	F	F	E	F	E	D	F	E	C	F	D	B
Approach Delay (s)		81.5			60.2			69.9			50.3	
Approach LOS		F			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	61.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	211.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR
Lane Configurations								
Volume (vph)	95	300	430	1440	365	625	1600	105
Turn Type	Free	Prot	custom	NA	Perm	Prot	NA	Perm
Protected Phases		3		2		1	6	
Permitted Phases	Free		3 1		2			6
Detector Phase		3	3 1	2	2	1	6	6
Switch Phase								
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0
Minimum Split (s)		10.0		37.0	37.0	10.0	37.0	37.0
Total Split (s)		49.0		55.0	55.0	36.0	91.0	91.0
Total Split (%)		35.0%		39.3%	39.3%	25.7%	65.0%	65.0%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0
Lead/Lag				Lag	Lag	Lead		
Lead-Lag Optimize?								
Recall Mode		None		Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 125.4
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	95	300	0	430	0	1440	365	625	1600	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	6.0		6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00	1.00		1.00		0.91	1.00	0.97	0.91	1.00
Frt			0.86	1.00		0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611	1770		1583		5085	1583	3433	5085	1583
Flt Permitted			1.00	0.95		1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611	1770		1583		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	103	326	0	467	0	1565	397	679	1739	114
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	244	0	0	38
Lane Group Flow (vph)	0	0	103	326	0	456	0	1565	153	679	1739	76
Turn Type			Free	Prot		custom		NA	Perm	Prot	NA	Perm
Protected Phases				3				2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			125.3	30.2		65.1		48.2	48.2	28.9	83.1	83.1
Effective Green, g (s)			125.3	30.2		65.1		48.2	48.2	28.9	83.1	83.1
Actuated g/C Ratio			1.00	0.24		0.52		0.38	0.38	0.23	0.66	0.66
Clearance Time (s)				6.0				6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)				3.0				3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611	426		822		1956	608	791	3372	1049
v/s Ratio Prot				c0.18				c0.31		c0.20	0.34	
v/s Ratio Perm			0.06			0.29			0.10			0.05
v/c Ratio			0.06	0.77		0.55		0.80	0.25	0.86	0.52	0.07
Uniform Delay, d1			0.0	44.3		20.3		34.3	26.3	46.2	10.8	7.5
Progression Factor			1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1	8.0		0.8		2.4	0.2	9.2	0.1	0.0
Delay (s)			0.1	52.2		21.1		36.7	26.5	55.4	10.9	7.5
Level of Service			A	D		C		D	C	E	B	A
Approach Delay (s)		0.1			33.9			34.6			22.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	125.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	200	210	365	280	275	485	250	980	685	975	325
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	26.0	40.0		26.0	40.0		24.0	51.0	33.0	60.0	
Total Split (%)	17.3%	26.7%		17.3%	26.7%		16.0%	34.0%	22.0%	40.0%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 144.6
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	210	365	280	275	485	250	980	425	685	975	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	4855		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	4855		3433	5085	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)	217	228	397	304	299	527	272	1065	462	745	1060	353
RTOR Reduction (vph)	0	0	60	0	0	30	0	51	0	0	0	68
Lane Group Flow (vph)	217	228	337	304	299	497	272	1476	0	745	1060	285
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	14.6	31.7	53.9	17.6	34.7	68.8	16.2	45.1		28.1	57.0	77.6
Effective Green, g (s)	14.6	31.7	53.9	17.6	34.7	68.8	16.2	45.1		28.1	57.0	77.6
Actuated g/C Ratio	0.10	0.22	0.37	0.12	0.24	0.48	0.11	0.31		0.19	0.39	0.54
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	346	408	590	418	447	753	384	1515		667	2005	850
v/s Ratio Prot	0.06	0.12		c0.09	c0.16		0.08	c0.30		c0.22	0.21	
v/s Ratio Perm			0.21			c0.31						0.18
v/c Ratio	0.63	0.56	0.57	0.73	0.67	0.66	0.71	0.97		1.12	0.53	0.34
Uniform Delay, d1	62.3	50.2	36.1	61.1	49.7	28.9	61.9	49.1		58.2	33.5	18.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.5	1.7	1.3	6.2	3.8	2.1	5.9	17.2		71.6	0.3	0.2
Delay (s)	65.9	51.8	37.4	67.3	53.5	31.0	67.8	66.4		129.8	33.7	19.1
Level of Service	E	D	D	E	D	C	E	E		F	C	B
Approach Delay (s)		48.7			46.7			66.6			64.5	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	59.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	144.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	910	780	65	360	490	380	70	380	230	525	385	710
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	52.0	52.0	52.0	44.0	44.0		11.0	46.0		38.0	73.0	
Total Split (%)	28.9%	28.9%	28.9%	24.4%	24.4%		6.1%	25.6%		21.1%	40.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 162
Natural Cycle: 175
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	910	780	65	360	490	380	70	380	230	525	385	710
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.97	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	5085	2787	1770	3539	1583	3433	3539	2787
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)	989	848	71	391	533	413	76	413	250	571	418	772
RTOR Reduction (vph)	0	0	50	0	0	0	0	0	69	0	0	21
Lane Group Flow (vph)	989	848	21	391	533	413	76	413	181	571	418	751
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	46.5	48.5	48.5	25.6	27.6	65.1	6.1	33.2	64.8	31.5	58.6	111.1
Effective Green, g (s)	46.5	48.5	48.5	25.6	27.6	65.1	6.1	33.2	64.8	31.5	58.6	111.1
Actuated g/C Ratio	0.29	0.30	0.30	0.16	0.17	0.40	0.04	0.21	0.40	0.19	0.36	0.69
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	986	1060	474	543	867	1121	66	726	633	668	1281	1913
v/s Ratio Prot	c0.29	c0.24		0.11	0.10	0.15	0.04	c0.12		c0.17	0.12	0.27
v/s Ratio Perm			0.01						0.11			
v/c Ratio	1.00	0.80	0.04	0.72	0.61	0.37	1.15	0.57	0.29	0.85	0.33	0.39
Uniform Delay, d1	57.7	52.2	40.2	64.7	62.2	33.9	77.9	57.9	32.8	62.9	37.3	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.4	4.4	0.0	4.7	1.3	0.2	157.8	1.0	0.3	10.4	0.1	0.1
Delay (s)	87.0	56.6	40.2	69.4	63.5	34.1	235.6	58.9	33.1	73.3	37.5	11.0
Level of Service	F	E	D	E	E	C	F	E	C	E	D	B
Approach Delay (s)		71.8			56.1			68.3			37.5	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	161.8	Sum of lost time (s)	23.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	665	0	55	5	1165	150	1600
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	665	0	55	5	1165	615	150	1600	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.95	
Frt		0.86		1.00	1.00	0.85	1.00	0.95		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3356		1770	3539	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3356		1770	3539	
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	0	11	723	0	60	5	1266	668	163	1739	0
RTOR Reduction (vph)	0	11	0	0	0	46	0	35	0	0	0	0
Lane Group Flow (vph)	0	0	0	361	362	14	5	1899	0	163	1739	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		2.2		41.6	41.6	41.6	1.5	97.1		19.1	114.7	
Effective Green, g (s)		2.2		41.6	41.6	41.6	1.5	97.1		19.1	114.7	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.54		0.11	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		19		388	388	365	14	1810		187	2255	
v/s Ratio Prot		c0.00		0.21	c0.22		0.00	c0.57		c0.09	0.49	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.93	0.93	0.04	0.36	1.05		0.87	0.77	
Uniform Delay, d1		87.8		67.8	67.8	53.7	88.8	41.5		79.2	23.3	
Progression Factor		1.00		1.00	1.00	1.00	1.34	0.70		1.00	1.00	
Incremental Delay, d2		0.1		28.7	29.2	0.0	11.1	32.5		33.0	2.6	
Delay (s)		88.0		96.5	97.0	53.7	130.0	61.5		112.2	25.9	
Level of Service		F		F	F	D	F	E		F	C	
Approach Delay (s)		88.0			93.5			61.7			33.3	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	55.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	455	25	1720	950	2355
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	25	1720	950	0	2355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		3539
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	495	27	1870	1033	0	2560
RTOR Reduction (vph)	0	15	0	148	0	0
Lane Group Flow (vph)	495	12	1870	885	0	2560
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	31.7	31.7	136.3	136.3		136.3
Effective Green, g (s)	31.7	31.7	136.3	136.3		136.3
Actuated g/C Ratio	0.18	0.18	0.76	0.76		0.76
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	604	278	2679	1198		2679
v/s Ratio Prot	c0.14		0.53			c0.72
v/s Ratio Perm		0.01		0.56		
v/c Ratio	0.82	0.04	0.70	0.74		0.96
Uniform Delay, d1	71.4	61.6	11.3	12.0		19.2
Progression Factor	1.00	1.00	1.00	1.00		0.97
Incremental Delay, d2	8.5	0.1	1.5	4.1		6.9
Delay (s)	79.9	61.6	12.8	16.1		25.5
Level of Service	E	E	B	B		C
Approach Delay (s)	79.0		14.0			25.5
Approach LOS	E		B			C

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2500	2075	760	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2717	2255	826	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.25				0.25	0.25
vC, conflicting volume	3082				3574	1541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3322				5269	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	21				0	274

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	906	906	906	1504	1578
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	826
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.53	0.53	0.53	0.88	0.93
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					
Approach Delay (s)	0.0			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	190	2500	2075
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90.6
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	190	2500	2075	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.95	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	3539	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	207	2717	2255	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	207	2717	2255	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			15.2	90.6	63.4	
Effective Green, g (s)			15.2	90.6	63.4	
Actuated g/C Ratio			0.17	1.00	0.70	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			296	5085	2476	
v/s Ratio Prot			0.12	c0.53	c0.64	
v/s Ratio Perm						
v/c Ratio			0.70	0.53	0.91	
Uniform Delay, d1			35.5	0.0	11.3	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			7.0	0.1	5.6	
Delay (s)			42.6	0.1	16.8	
Level of Service			D	A	B	
Approach Delay (s)	0.0			3.1	16.8	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	485	355	1480	665	4115
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 165.8
Natural Cycle: 170
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	0	355	0	0	0	0	1480	0	665	4115	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.91	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	5085	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	5085	
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)	527	0	386	0	0	0	0	1609	0	723	4473	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	527	0	386	0	0	0	0	1609	0	723	4473	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	29.7		165.8					81.4		36.7	124.1	
Effective Green, g (s)	29.7		165.8					81.4		36.7	124.1	
Actuated g/C Ratio	0.18		1.00					0.49		0.22	0.75	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	614		1583					1737		759	3806	
v/s Ratio Prot	c0.15							0.45		0.21	c0.88	
v/s Ratio Perm			0.24									
v/c Ratio	0.86		0.24					0.93		0.95	1.18	
Uniform Delay, d1	66.0		0.0					39.4		63.7	20.9	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	11.4		0.4					8.9		21.7	81.9	
Delay (s)	77.5		0.4					48.3		85.4	102.8	
Level of Service	E		A					D		F	F	
Approach Delay (s)		44.9			0.0			48.3			100.4	
Approach LOS		D			A			D			F	

Intersection Summary			
HCM 2000 Control Delay	82.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	165.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	101.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1950	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1950	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2120	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2120	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.60			
v/s Ratio Perm						
v/c Ratio			0.67			
Uniform Delay, d1			1.9			
Progression Factor			1.00			
Incremental Delay, d2			1.1			
Delay (s)			3.1			
Level of Service			A			
Approach Delay (s)	0.0		3.1		0.0	
Approach LOS	A		A		A	

Intersection Summary			
HCM 2000 Control Delay	3.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR		
Lane Configurations								
Volume (veh/h)	1480	1950	0	4470	0	0		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	1609	2120	0	4859	0	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None			Raised				
Median storage veh)				1				
Upstream signal (ft)				498				
pX, platoon unblocked					0.26			
vC, conflicting volume			3728		3228	804		
vC1, stage 1 conf vol					1609			
vC2, stage 2 conf vol					1620			
vCu, unblocked vol			3728		0	804		
tC, single (s)			4.1		6.8	6.9		
tC, 2 stage (s)					5.8			
tF (s)			2.2		3.5	3.3		
p0 queue free %			100		100	100		
cM capacity (veh/h)			57		265	326		

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	804	804	1060	1060	1620	1620	1620
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	1060	1060	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.47	0.47	0.62	0.62	0.95	0.95	0.95
Queue Length 95th (ft)	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS							
Approach Delay (s)	0.0				0.0		
Approach LOS							

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		89.7%	ICU Level of Service	E
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	80	0	0	120	0	3490	65	0	3760	660
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Hourly flow rate (vph)	0	0	87	0	0	130	0	3793	71	0	3798	717
Pedestrians					2							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					4.0							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											1003	
pX, platoon unblocked	0.28	0.28	0.28	0.28	0.28		0.28					
vC, conflicting volume	5062	7593	1266	5061	8311	1266	4515			3795		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6537	15702	0	6533	18299	1266	4556			3795		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	71	100	100	18	100			100		
cM capacity (veh/h)	0	0	299	0	0	160	7			53		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	87	130	1264	1264	1264	71	1266	1266	1266	717
Volume Left	0	0	0	0	0	0	0	0	0	0
Volume Right	87	130	0	0	0	71	0	0	0	717
cSH	299	160	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.82	0.74	0.74	0.74	0.04	0.74	0.74	0.74	0.42
Queue Length 95th (ft)	29	135	0	0	0	0	0	0	0	0
Control Delay (s)	21.9	86.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	F								
Approach Delay (s)	21.9	86.2	0.0				0.0			
Approach LOS	C	F								

Intersection Summary				
Average Delay		1.5		
Intersection Capacity Utilization		84.3%	ICU Level of Service	E
Analysis Period (min)		15		

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	125	150	40	115	50	2335	35	115	3185	125
Turn Type	Perm	NA	Perm	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			5	2		1	6	
Permitted Phases	4		8	8 1			2			6
Detector Phase	4	4	8	8 1	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	150	35	40	0	115	50	2335	35	115	3185	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0		6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00		1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797		1743		1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.76	1.00		0.30		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1410	1797		547		1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	136	163	38	43	0	125	54	2458	38	125	3217	136
RTOR Reduction (vph)	0	3	0	0	0	13	0	0	12	0	0	20
Lane Group Flow (vph)	136	198	0	43	0	112	54	2458	26	125	3217	116
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm		custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0		63.9	9.6	163.1	163.1	20.9	174.4	174.4
Effective Green, g (s)	37.0	37.0		37.0		63.9	9.6	163.1	163.1	20.9	174.4	174.4
Actuated g/C Ratio	0.15	0.15		0.15		0.27	0.04	0.68	0.68	0.09	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0			6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0			3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	217	277		84		421	70	3455	1048	154	3695	1088
v/s Ratio Prot		c0.11					0.03	0.48		c0.07	c0.63	
v/s Ratio Perm	0.10			0.08		0.07			0.02			0.08
v/c Ratio	0.63	0.71		0.51		0.27	0.77	0.71	0.02	0.81	0.87	0.11
Uniform Delay, d1	95.0	96.5		93.2		69.5	114.1	23.9	12.5	107.6	24.4	9.7
Progression Factor	1.00	1.00		1.00		1.00	0.71	1.27	58.48	1.00	1.00	1.00
Incremental Delay, d2	5.6	8.4		5.2		0.3	22.6	0.6	0.0	26.7	3.1	0.2
Delay (s)	100.6	104.9		98.4		69.9	103.3	31.0	732.8	134.5	27.6	10.0
Level of Service	F	F		F		E	F	C	F	F	C	A
Approach Delay (s)		103.1			77.2			43.0			30.8	
Approach LOS		F			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	295	105	220	35	10	115	255	2130	50	160	2920	355
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	4	4	4	8	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	68.0	68.0	68.0	68.0	68.0	68.0	26.0	134.0	134.0	38.0	146.0	146.0
Total Split (%)	28.3%	28.3%	28.3%	28.3%	28.3%	28.3%	10.8%	55.8%	55.8%	15.8%	60.8%	60.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 155
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	295	105	220	35	10	115	255	2130	50	160	2920	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1796	1533		1793	1583	1770	5085	1551	1770	5085	1560
Flt Permitted		0.75	1.00		0.21	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1399	1533		396	1583	1770	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	321	114	239	38	11	125	277	2315	54	174	2949	386
RTOR Reduction (vph)	0	0	74	0	0	93	0	0	24	0	0	123
Lane Group Flow (vph)	0	435	165	0	49	32	277	2315	30	174	2949	263
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)		62.0	62.0		62.0	62.0	20.0	131.3	131.3	27.7	139.0	139.0
Effective Green, g (s)		62.0	62.0		62.0	62.0	20.0	131.3	131.3	27.7	139.0	139.0
Actuated g/C Ratio		0.26	0.26		0.26	0.26	0.08	0.55	0.55	0.12	0.58	0.58
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		361	396		102	408	147	2781	848	204	2945	903
v/s Ratio Prot							c0.16	0.46		0.10	c0.58	
v/s Ratio Perm		c0.31	0.11		0.12	0.02			0.02			0.17
v/c Ratio		1.20	0.42		0.48	0.08	1.88	0.83	0.03	0.85	1.00	0.29
Uniform Delay, d1		89.0	74.0		75.4	67.4	110.0	45.2	25.1	104.2	50.5	25.6
Progression Factor		1.00	1.00		1.00	1.00	0.87	1.04	4.34	1.03	0.79	1.47
Incremental Delay, d2		115.6	0.7		3.5	0.1	417.9	2.5	0.1	17.2	12.7	0.5
Delay (s)		204.6	74.7		78.9	67.5	513.2	49.5	109.1	124.1	52.8	38.1
Level of Service		F	E		E	E	F	D	F	F	D	D
Approach Delay (s)		158.5			70.7			99.2			54.7	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	81.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	114.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2380	3335	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2380	3335	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2587	3369	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2587	3369	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.51	c0.66	
v/s Ratio Perm						
v/c Ratio				0.66	0.86	
Uniform Delay, d1				6.5	9.4	
Progression Factor				0.94	2.32	
Incremental Delay, d2				0.7	1.1	
Delay (s)				6.8	22.9	
Level of Service				A	C	
Approach Delay (s)	0.0			6.8	22.9	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	30	165	15	20	185	1945	35	70	2725	395
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2			6
Detector Phase	4	4	4 5	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0		11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0		14.0	14.0	38.0	153.0	153.0	30.0	145.0	145.0
Total Split (%)	17.9%	17.9%		5.8%	5.8%	15.8%	63.8%	63.8%	12.5%	60.4%	60.4%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	30	165	25	15	20	185	1945	35	70	2725	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
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)	326	33	179	27	16	22	201	2114	38	76	2962	429
RTOR Reduction (vph)	0	0	32	0	0	21	0	0	13	0	0	171
Lane Group Flow (vph)	179	180	147	0	43	1	201	2114	25	76	2962	258
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2			6
Actuated Green, G (s)	33.0	33.0	69.0		7.7	7.7	30.0	159.6	159.6	14.7	144.3	144.3
Effective Green, g (s)	33.0	33.0	69.0		7.7	7.7	30.0	159.6	159.6	14.7	144.3	144.3
Actuated g/C Ratio	0.14	0.14	0.29		0.03	0.03	0.12	0.66	0.66	0.06	0.60	0.60
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	231	233	411		57	50	221	3381	925	108	3057	809
v/s Ratio Prot	c0.11	0.11			c0.02		c0.11	0.42		0.04	c0.58	
v/s Ratio Perm			0.10			0.00			0.02			0.19
v/c Ratio	0.77	0.77	0.36		0.75	0.01	0.91	0.63	0.03	0.70	0.97	0.32
Uniform Delay, d1	99.9	99.9	67.9		115.2	112.5	103.7	23.1	13.7	110.5	45.7	23.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.92	1.34	62.64	1.08	0.39	2.38
Incremental Delay, d2	14.9	14.6	0.5		38.8	0.0	31.2	0.7	0.0	9.8	7.3	0.6
Delay (s)	114.8	114.5	68.4		154.0	112.5	126.2	31.6	859.2	129.6	25.3	56.8
Level of Service	F	F	E		F	F	F	C	F	F	C	E
Approach Delay (s)		99.3			139.9			53.1			31.5	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	46.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	235	75	50	85	405	35	1545	5	420	2215	450
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3		4			2			6
Detector Phase	3	3	3	4	4	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	10.0	10.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	62.0	62.0	62.0	33.0	33.0	27.0	110.0	110.0	35.0	118.0	118.0
Total Split (%)	25.8%	25.8%	25.8%	13.8%	13.8%	11.3%	45.8%	45.8%	14.6%	49.2%	49.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	75	50	10	85	405	35	1545	5	420	2215	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	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)	255	82	54	11	92	440	38	1679	5	457	2408	489
RTOR Reduction (vph)	0	0	47	0	0	359	0	0	2	0	0	123
Lane Group Flow (vph)	166	171	7	0	103	81	38	1679	3	457	2408	366
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	29.3	29.3	29.3		19.0	19.0	9.3	137.7	137.7	29.0	157.4	157.4
Effective Green, g (s)	29.3	29.3	29.3		19.0	19.0	9.3	137.7	137.7	29.0	157.4	157.4
Actuated g/C Ratio	0.12	0.12	0.12		0.08	0.08	0.04	0.57	0.57	0.12	0.66	0.66
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	210	193		146	220	68	2917	908	414	3334	1038
v/s Ratio Prot	0.10	c0.10			c0.06		0.02	0.33		c0.13	c0.47	
v/s Ratio Perm			0.00			0.03			0.00			0.23
v/c Ratio	0.81	0.81	0.03		0.71	0.37	0.56	0.58	0.00	1.10	0.72	0.35
Uniform Delay, d1	102.6	102.7	92.9		107.8	104.8	113.3	32.6	21.8	105.5	27.0	18.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.15	0.53	1.00	1.33	0.23	0.03
Incremental Delay, d2	20.5	20.9	0.1		14.4	1.0	7.8	0.7	0.0	62.5	0.6	0.4
Delay (s)	123.1	123.6	92.9		122.2	105.8	138.4	18.1	21.8	202.4	6.9	1.0
Level of Service	F	F	F		F	F	F	B	C	F	A	A
Approach Delay (s)		119.2			108.9			20.7			32.7	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1770	255
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1770	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	266	332	223	38	375	266	228	1337	43	424	1788	277
RTOR Reduction (vph)	0	0	57	0	0	46	0	0	16	0	0	84
Lane Group Flow (vph)	194	404	166	38	375	220	228	1337	27	424	1788	193
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Effective Green, g (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Actuated g/C Ratio	0.14	0.14	0.22	0.21	0.21	0.35	0.08	0.41	0.62	0.14	0.47	0.47
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	224	467	346	367	386	1032	273	2091	979	473	2387	743
v/s Ratio Prot	c0.12	0.12		0.02	c0.20	0.04	0.07	0.26		c0.12	c0.35	
v/s Ratio Perm			0.10			0.03			0.02			0.12
v/c Ratio	0.87	0.87	0.48	0.10	0.97	0.21	0.84	0.64	0.03	0.90	0.75	0.26
Uniform Delay, d1	101.1	101.1	81.8	77.0	94.4	55.5	108.9	56.4	17.7	101.8	52.1	38.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.68	1.64	2.62
Incremental Delay, d2	26.9	14.9	0.4	0.0	38.0	0.0	18.5	1.5	0.0	14.3	1.6	0.6
Delay (s)	128.0	115.9	82.2	77.1	132.4	55.5	127.4	57.9	17.7	83.7	87.1	101.5
Level of Service	F	F	F	E	F	E	F	E	B	F	F	F
Approach Delay (s)		109.6			99.2			66.7			88.1	
Approach LOS		F			F			E			F	

Intersection Summary				
HCM 2000 Control Delay	86.5	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0	
Intersection Capacity Utilization	89.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1565	120	70	1935	40	120	15	45	40	15	140
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	28.0	28.0	28.0	26.0	26.0	26.0
Total Split (s)	24.0	76.0	76.0	16.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	63.3%	63.3%	13.3%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1565	120	70	1935	40	120	15	45	40	15	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1783	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.74	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1318	1583		1382	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)	207	1701	130	76	2103	43	130	16	49	43	16	152
RTOR Reduction (vph)	0	0	35	0	0	18	0	0	41	0	0	124
Lane Group Flow (vph)	207	1701	95	76	2103	25	0	146	8	0	59	28
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	17.8	75.5	75.5	8.7	68.4	68.4		19.8	19.8		21.8	21.8
Effective Green, g (s)	17.8	75.5	75.5	8.7	68.4	68.4		19.8	19.8		21.8	21.8
Actuated g/C Ratio	0.15	0.63	0.63	0.07	0.57	0.57		0.17	0.17		0.18	0.18
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	262	2226	995	128	2017	902		217	261		251	287
v/s Ratio Prot	c0.12	0.48		0.04	c0.59							
v/s Ratio Perm			0.06			0.02		c0.11	0.01		0.04	0.02
v/c Ratio	0.79	0.76	0.10	0.59	1.04	0.03		0.67	0.03		0.24	0.10
Uniform Delay, d1	49.3	15.9	8.8	53.9	25.8	11.3		47.1	42.0		42.0	40.9
Progression Factor	1.00	1.00	1.00	0.78	0.84	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	14.9	2.6	0.2	2.3	24.4	0.0		8.0	0.0		0.5	0.1
Delay (s)	64.2	18.4	9.0	44.2	46.1	11.3		55.0	42.1		42.5	41.0
Level of Service	E	B	A	D	D	B		E	D		D	D
Approach Delay (s)		22.5			45.4			51.8			41.4	
Approach LOS		C			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	89.8%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1325	55	65	1845	50	95	15	20	40	15	140
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	24.0	75.0	75.0	17.0	68.0	68.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	20.0%	62.5%	62.5%	14.2%	56.7%	56.7%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1325	55	65	1845	50	95	15	20	40	15	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1785	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.70	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1328	1583		1303	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)	190	1440	60	71	2005	54	103	16	22	43	16	152
RTOR Reduction (vph)	0	0	23	0	0	24	0	0	18	0	0	127
Lane Group Flow (vph)	190	1440	37	71	2005	30	0	119	4	0	59	25
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.4	74.5	74.5	8.1	66.2	66.2		19.4	19.4		19.4	19.4
Effective Green, g (s)	16.4	74.5	74.5	8.1	66.2	66.2		19.4	19.4		19.4	19.4
Actuated g/C Ratio	0.14	0.62	0.62	0.07	0.55	0.55		0.16	0.16		0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	241	2197	982	119	1952	873		214	255		210	255
v/s Ratio Prot	c0.11	c0.41		0.04	c0.57							
v/s Ratio Perm			0.02			0.02		c0.09	0.00		0.05	0.02
v/c Ratio	0.79	0.66	0.04	0.60	1.03	0.03		0.56	0.01		0.28	0.10
Uniform Delay, d1	50.1	14.5	8.8	54.4	26.9	12.3		46.3	42.3		44.2	42.8
Progression Factor	1.05	0.75	2.51	1.15	0.73	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	10.9	1.0	0.0	5.2	24.0	0.0		3.1	0.0		0.7	0.2
Delay (s)	63.4	11.9	22.2	67.6	43.5	12.3		49.4	42.3		44.9	43.0
Level of Service	E	B	C	E	D	B		D	D		D	D
Approach Delay (s)		18.1			43.5			48.3			43.5	
Approach LOS		B			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	88.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1275	115	1840	110	65
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	28.0	28.0
Total Split (s)	66.0	22.0	88.0	32.0	32.0
Total Split (%)	55.0%	18.3%	73.3%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1275	95	115	1840	110	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3502		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3502		1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1386	103	125	2000	120	71
RTOR Reduction (vph)	4	0	0	0	0	60
Lane Group Flow (vph)	1485	0	125	2000	120	11
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	69.0		13.7	88.7	19.3	19.3
Effective Green, g (s)	69.0		13.7	88.7	19.3	19.3
Actuated g/C Ratio	0.58		0.11	0.74	0.16	0.16
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2013		202	2615	284	254
v/s Ratio Prot	0.42		0.07	c0.57	c0.07	
v/s Ratio Perm						0.01
v/c Ratio	0.74		0.62	0.76	0.42	0.04
Uniform Delay, d1	18.8		50.7	9.4	45.3	42.6
Progression Factor	0.63		1.19	0.66	1.00	1.00
Incremental Delay, d2	1.9		3.0	1.2	1.0	0.1
Delay (s)	13.7		63.3	7.3	46.3	42.6
Level of Service	B		E	A	D	D
Approach Delay (s)	13.7			10.6	45.0	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1235	65	120	1825	10	95	5	85	10	5	45
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	15.0	73.0	73.0	19.0	77.0	77.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	12.5%	60.8%	60.8%	15.8%	64.2%	64.2%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1235	65	120	1825	10	95	5	85	10	5	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1778	1583		1801	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.82	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1349	1583		1520	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)	49	1342	71	130	1984	11	103	5	92	11	5	49
RTOR Reduction (vph)	0	0	29	0	0	4	0	0	77	0	0	41
Lane Group Flow (vph)	49	1342	42	130	1984	7	0	108	15	0	16	8
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.2	71.2	71.2	12.5	76.5	76.5		19.3	19.3		19.3	19.3
Effective Green, g (s)	7.2	71.2	71.2	12.5	76.5	76.5		19.3	19.3		19.3	19.3
Actuated g/C Ratio	0.06	0.59	0.59	0.10	0.64	0.64		0.16	0.16		0.16	0.16
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	106	2099	939	184	2256	1009		216	254		244	254
v/s Ratio Prot	0.03	0.38		c0.07	c0.56							
v/s Ratio Perm			0.03			0.00		c0.08	0.01		0.01	0.00
v/c Ratio	0.46	0.64	0.04	0.71	0.88	0.01		0.50	0.06		0.07	0.03
Uniform Delay, d1	54.5	16.0	10.2	52.0	17.9	7.9		45.9	42.7		42.7	42.5
Progression Factor	1.03	0.62	0.93	1.18	0.68	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.2	1.0	0.1	8.1	3.7	0.0		1.8	0.1		0.1	0.0
Delay (s)	58.5	11.0	9.5	69.3	15.9	7.9		47.8	42.7		42.8	42.5
Level of Service	E	B	A	E	B	A		D	D		D	D
Approach Delay (s)		12.6			19.1			45.5			42.6	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	80.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1210	115	140	1795	155	100
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	28.0
Total Split (s)	69.0	69.0	22.0	91.0	29.0	29.0
Total Split (%)	57.5%	57.5%	18.3%	75.8%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1210	115	140	1795	155	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1315	125	152	1951	168	109
RTOR Reduction (vph)	0	24	0	0	0	91
Lane Group Flow (vph)	1315	101	152	1951	168	18
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	69.3	69.3	14.9	89.2	19.8	19.8
Effective Green, g (s)	69.3	69.3	14.9	89.2	19.8	19.8
Actuated g/C Ratio	0.58	0.58	0.12	0.74	0.17	0.17
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2043	914	219	2630	292	261
v/s Ratio Prot	0.37		0.09	c0.55	c0.09	
v/s Ratio Perm		0.06				0.01
v/c Ratio	0.64	0.11	0.69	0.74	0.58	0.07
Uniform Delay, d1	17.0	11.4	50.4	8.8	46.2	42.3
Progression Factor	0.62	0.80	1.06	0.99	1.00	1.00
Incremental Delay, d2	1.3	0.2	5.6	1.2	2.7	0.1
Delay (s)	11.8	9.4	59.0	9.8	49.0	42.4
Level of Service	B	A	E	A	D	D
Approach Delay (s)	11.6			13.4	46.4	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1170	95	185	1695	15	120	25	115	25	5	120
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	28.0	58.0	58.0	32.0	62.0	62.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	23.3%	48.3%	48.3%	26.7%	51.7%	51.7%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1170	95	185	1695	15	120	25	115	25	5	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583		1789	1583		1787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.69	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583		1379	1583		1291	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)	54	1272	103	201	1842	16	130	27	125	27	5	130
RTOR Reduction (vph)	0	0	39	0	0	6	0	0	104	0	0	108
Lane Group Flow (vph)	54	1272	64	201	1842	10	0	157	21	0	32	22
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.9	62.9	62.9	18.8	73.8	73.8		20.3	20.3		20.3	20.3
Effective Green, g (s)	7.9	62.9	62.9	18.8	73.8	73.8		20.3	20.3		20.3	20.3
Actuated g/C Ratio	0.07	0.52	0.52	0.16	0.61	0.61		0.17	0.17		0.17	0.17
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	116	1855	829	277	2176	973		233	267		218	267
v/s Ratio Prot	0.03	0.36		c0.11	c0.52							
v/s Ratio Perm			0.04			0.01		c0.11	0.01		0.02	0.01
v/c Ratio	0.47	0.69	0.08	0.73	0.85	0.01		0.67	0.08		0.15	0.08
Uniform Delay, d1	54.0	21.2	14.2	48.1	18.6	8.9		46.7	42.0		42.5	42.0
Progression Factor	1.03	0.75	0.90	0.80	1.34	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.3	1.7	0.1	3.0	1.4	0.0		7.5	0.1		0.3	0.1
Delay (s)	57.7	17.5	12.8	41.4	26.3	9.0		54.2	42.1		42.8	42.1
Level of Service	E	B	B	D	C	A		D	D		D	D
Approach Delay (s)		18.7			27.6			48.8			42.3	
Approach LOS		B			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	79.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	1070	55	535	1770	100	75	100	275	95	95	50
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	26.0	55.0	55.0	36.0	65.0	65.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	21.7%	45.8%	45.8%	30.0%	54.2%	54.2%	24.2%	24.2%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	1070	55	535	1770	100	75	100	275	95	95	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1279	1863	1583	1247	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	1163	60	582	1924	109	82	109	299	103	103	54
RTOR Reduction (vph)	0	0	31	0	0	38	0	0	251	0	0	45
Lane Group Flow (vph)	201	1163	29	582	1924	71	82	109	48	103	103	9
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	17.9	57.3	57.3	25.4	64.8	64.8	19.3	19.3	19.3	19.3	19.3	19.3
Effective Green, g (s)	17.9	57.3	57.3	25.4	64.8	64.8	19.3	19.3	19.3	19.3	19.3	19.3
Actuated g/C Ratio	0.15	0.48	0.48	0.21	0.54	0.54	0.16	0.16	0.16	0.16	0.16	0.16
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	264	1689	755	726	1911	854	205	299	254	200	299	254
v/s Ratio Prot	0.11	0.33		c0.17	c0.54			0.06			0.06	
v/s Ratio Perm			0.02			0.04	0.06		0.03	c0.08		0.01
v/c Ratio	0.76	0.69	0.04	0.80	1.01	0.08	0.40	0.36	0.19	0.52	0.34	0.03
Uniform Delay, d1	49.0	24.4	16.7	44.9	27.6	13.3	45.2	44.9	43.6	46.1	44.7	42.5
Progression Factor	0.77	1.18	1.00	1.17	0.55	0.31	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.5	1.8	0.1	2.7	14.8	0.1	1.3	0.8	0.4	2.2	0.7	0.1
Delay (s)	47.0	30.5	16.8	55.1	29.9	4.2	46.4	45.6	43.9	48.3	45.4	42.5
Level of Service	D	C	B	E	C	A	D	D	D	D	D	D
Approach Delay (s)		32.3			34.5			44.7			46.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL
Lane Configurations			
Volume (vph)	1405	2275	95
Turn Type	NA	NA	NA
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0
Total Split (s)	89.0	89.0	31.0
Total Split (%)	74.2%	74.2%	25.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1405	35	0	2275	95	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	
Lane Util. Factor	0.95			0.95	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3526			3539	1753	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3526			3539	1753	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1527	38	0	2473	103	16
RTOR Reduction (vph)	1	0	0	0	5	0
Lane Group Flow (vph)	1564	0	0	2473	114	0
Turn Type	NA		Perm	NA	NA	
Protected Phases	4			8	2	
Permitted Phases			8			
Actuated Green, G (s)	88.8			88.8	19.2	
Effective Green, g (s)	88.8			88.8	19.2	
Actuated g/C Ratio	0.74			0.74	0.16	
Clearance Time (s)	6.0			6.0	6.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2609			2618	280	
v/s Ratio Prot	0.44			c0.70	c0.07	
v/s Ratio Perm						
v/c Ratio	0.60			0.94	0.41	
Uniform Delay, d1	7.3			13.5	45.3	
Progression Factor	2.55			2.25	1.00	
Incremental Delay, d2	0.3			0.9	4.3	
Delay (s)	18.8			31.2	49.6	
Level of Service	B			C	D	
Approach Delay (s)	18.8			31.2	49.6	
Approach LOS	B			C	D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	145	1305	205	1995	525	105	60	800	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	28.0
Total Split (s)	20.0	54.0	26.0	60.0		12.0	12.0	28.0	40.0
Total Split (%)	16.7%	45.0%	21.7%	50.0%		10.0%	10.0%	23.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	1305	0	205	1995	525	0	105	60	800	5	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539		1770	3539	1583		1863	1583	3433	1588	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539		1770	3539	1583		1863	1583	3433	1588	
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)	158	1418	0	223	2168	571	0	114	65	870	5	304
RTOR Reduction (vph)	0	0	0	0	0	43	0	0	62	0	184	0
Lane Group Flow (vph)	158	1418	0	223	2168	528	0	114	3	870	125	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	13.9	50.2		18.8	55.1	95.1		6.0	6.0	22.0	34.0	
Effective Green, g (s)	13.9	50.2		18.8	55.1	95.1		6.0	6.0	22.0	34.0	
Actuated g/C Ratio	0.12	0.42		0.16	0.46	0.79		0.05	0.05	0.18	0.28	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	205	1480		277	1624	1254		93	79	629	449	
v/s Ratio Prot	0.09	0.40		c0.13	c0.61			c0.06		c0.25	0.08	
v/s Ratio Perm						0.33			0.00			
v/c Ratio	0.77	0.96		0.81	1.33	0.42		1.23	0.04	1.38	0.28	
Uniform Delay, d1	51.5	33.9		48.8	32.5	3.9		57.0	54.3	49.0	33.5	
Progression Factor	1.06	0.88		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.6	13.3		15.5	155.0	0.2		165.9	0.2	182.2	0.3	
Delay (s)	68.1	43.2		64.3	187.5	4.1		222.9	54.5	231.2	33.8	
Level of Service	E	D		E	F	A		F	D	F	C	
Approach Delay (s)		45.7			142.9			161.8			179.5	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	124.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	106.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	170	5	75	135
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	185	5	82	147

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	190	228
Volume Left (vph)	0	185	82
Volume Right (vph)	43	0	147
Hadj (s)	-0.45	0.23	-0.28
Departure Headway (s)	4.2	4.7	4.2
Degree Utilization, x	0.06	0.25	0.27
Capacity (veh/h)	790	725	814
Control Delay (s)	7.5	9.3	8.7
Approach Delay (s)	7.5	9.3	8.7
Approach LOS	A	A	A

Intersection Summary			
Delay		8.8	
Level of Service		A	
Intersection Capacity Utilization		35.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	2155	665	1800
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Natural Cycle: 130
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2155	0	665	1800	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.95		1.00	0.95		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	3539		1770	3539		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	3539		1770	3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2342	0	723	1957	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2342	0	723	1957	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	76.0		52.0	140.0		
Effective Green, g (s)	76.0		52.0	140.0		
Actuated g/C Ratio	0.54		0.37	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	1921		657	3539		
v/s Ratio Prot	c0.66		c0.41	0.55		
v/s Ratio Perm						
v/c Ratio	1.22		1.10	0.55		
Uniform Delay, d1	32.0		44.0	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	103.6		65.8	0.2		
Delay (s)	135.6		109.8	0.2		
Level of Service	F		F	A		
Approach Delay (s)	135.6			29.8	0.0	
Approach LOS	F			C	A	

Intersection Summary			
HCM 2000 Control Delay	79.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	1050	1645	2520	565
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1050	1645	2520	565	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	1.00	0.95	0.95	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	1770	3539	3539	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	1770	3539	3539	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1141	1788	2739	614	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1141	1788	2739	614	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	33.0	120.0	76.0	120.0		
Effective Green, g (s)	33.0	120.0	76.0	120.0		
Actuated g/C Ratio	0.28	1.00	0.63	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	486	3539	2241	1583		
v/s Ratio Prot	c0.64	0.51	c0.77			
v/s Ratio Perm				0.39		
v/c Ratio	2.35	0.51	1.22	0.39		
Uniform Delay, d1	43.5	0.0	22.0	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	612.9	0.1	104.2	0.7		
Delay (s)	656.4	0.1	126.2	0.7		
Level of Service	F	A	F	A		
Approach Delay (s)		255.8	103.3		0.0	
Approach LOS		F	F		A	

Intersection Summary			
HCM 2000 Control Delay	174.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	136.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	1230	905	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1337	984	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1000				1715	500
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1000				1715	500
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				72	82
cM capacity (veh/h)	688				78	516

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	668	668	656	344	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	688	1700	1700	1700	1700	78	516
Volume to Capacity	0.04	0.39	0.39	0.39	0.20	0.28	0.18
Queue Length 95th (ft)	3	0	0	0	0	25	16
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	68.2	13.5
Lane LOS	B					F	B
Approach Delay (s)	0.2			0.0		23.9	
Approach LOS						C	

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization		44.0%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	135	915	45	5	715	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	995	49	5	777	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	788			1043			1804	2111	522	1590	2130	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	788			1043			1804	2111	522	1590	2130	394
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			25	100	99	100	100	85
cM capacity (veh/h)	827			662			36	41	500	61	40	605

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	147	663	380	5	518	270	33	0	92
Volume Left	147	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	827	1700	1700	662	1700	1700	43	1700	605
Volume to Capacity	0.18	0.39	0.22	0.01	0.30	0.16	0.76	0.00	0.15
Queue Length 95th (ft)	16	0	0	1	0	0	73	0	13
Control Delay (s)	10.3	0.0	0.0	10.5	0.0	0.0	213.7	0.0	12.0
Lane LOS	B			B			F	A	B
Approach Delay (s)	1.3			0.1			213.7	12.0	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.6	
Intersection Capacity Utilization		43.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	745	40	5	640	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	810	43	5	696	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	707			853			1576	1864	427	1435	1880	353
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	707			853			1576	1864	427	1435	1880	353
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			62	91	100	100	100	89
cM capacity (veh/h)	888			782			57	59	576	75	57	643

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	540	313	5	464	243	27	0	71
Volume Left	158	0	0	5	0	0	22	0	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	888	1700	1700	782	1700	1700	57	1700	643
Volume to Capacity	0.18	0.32	0.18	0.01	0.27	0.14	0.48	0.00	0.11
Queue Length 95th (ft)	16	0	0	1	0	0	46	0	9
Control Delay (s)	9.9	0.0	0.0	9.6	0.0	0.0	116.1	0.0	11.3
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.5			0.1			116.1	11.3	
Approach LOS							F	B	

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization		39.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	600	25	5	540	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	652	27	5	587	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	598			679			1334	1524	340	1179	1533	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	598			679			1334	1524	340	1179	1533	299
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			99			81	100	100	100	100	84
cM capacity (veh/h)	975			909			84	101	656	131	100	697

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	435	245	5	391	207	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	975	1700	1700	909	1700	1700	84	1700	697
Volume to Capacity	0.13	0.26	0.14	0.01	0.23	0.12	0.19	0.00	0.16
Queue Length 95th (ft)	11	0	0	0	0	0	17	0	15
Control Delay (s)	9.2	0.0	0.0	9.0	0.0	0.0	57.9	0.0	11.2
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.4			0.1			57.9	11.2	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		35.1%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	465	45	0	420	15	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	505	49	0	457	16	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	473			554			1016	1209	277	932	1226	236
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	473			554			1016	1209	277	932	1226	236
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			30	90	100	100	83	95
cM capacity (veh/h)	1085			1012			148	164	720	190	161	765

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	103	337	217	0	304	168	120	0	27	38
Volume Left	103	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	16	0	0	0	38
cSH	1085	1700	1700	1700	1700	1700	150	1700	161	765
Volume to Capacity	0.10	0.20	0.13	0.00	0.18	0.10	0.80	0.00	0.17	0.05
Queue Length 95th (ft)	8	0	0	0	0	0	127	0	15	4
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	0.0	87.3	0.0	31.9	10.0
Lane LOS	A						F	A	D	A
Approach Delay (s)	1.4			0.0			87.3		19.1	
Approach LOS							F		C	

Intersection Summary			
Average Delay		9.6	
Intersection Capacity Utilization		40.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	180	100	60	165	125	90	0	60	200	5	185
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	207	196	109	65	179	136	98	0	65	217	5	201
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	315			304			1087	1109	152	954	1095	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	315			304			1087	1109	152	954	1095	158
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			95			8	100	92	0	97	77
cM capacity (veh/h)	1242			1253			107	165	867	165	168	860

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	207	130	174	65	120	196	163	223	201
Volume Left	207	0	0	65	0	0	98	217	0
Volume Right	0	0	109	0	0	136	65	0	201
cSH	1242	1700	1700	1253	1700	1700	165	165	860
Volume to Capacity	0.17	0.08	0.10	0.05	0.07	0.12	0.99	1.35	0.23
Queue Length 95th (ft)	15	0	0	4	0	0	193	335	23
Control Delay (s)	8.5	0.0	0.0	8.0	0.0	0.0	123.4	243.5	10.5
Lane LOS	A			A			F	F	B
Approach Delay (s)	3.4			1.4			123.4	132.9	
Approach LOS							F	F	

Intersection Summary			
Average Delay		53.3	
Intersection Capacity Utilization		45.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	105	330	10	15	260	70	5	0	15	75	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	359	11	16	283	76	5	0	16	82	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	359			370			859	984	185	777	951	179
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	359			370			859	984	185	777	951	179
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			97	100	98	68	95	90
cM capacity (veh/h)	1197			1186			198	220	826	258	230	833

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	114	239	130	16	188	170	22	92	87
Volume Left	114	0	0	16	0	0	5	82	0
Volume Right	0	0	11	0	0	76	16	0	87
cSH	1197	1700	1700	1186	1700	1700	461	254	833
Volume to Capacity	0.10	0.14	0.08	0.01	0.11	0.10	0.05	0.36	0.10
Queue Length 95th (ft)	8	0	0	1	0	0	4	40	9
Control Delay (s)	8.3	0.0	0.0	8.1	0.0	0.0	13.2	27.0	9.8
Lane LOS	A			A			B	D	A
Approach Delay (s)	2.0			0.4			13.2	18.7	
Approach LOS							B	C	

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		36.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	320	10	15	265	90	5	0	15	100	10	95
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	348	11	16	288	98	5	0	16	109	11	103
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	386			359			834	967	179	755	924	193
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	386			359			834	967	179	755	924	193
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			97	100	98	60	96	87
cM capacity (veh/h)	1169			1197			204	228	833	270	242	816

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	232	127	16	192	194	22	120	103
Volume Left	98	0	0	16	0	0	5	109	0
Volume Right	0	0	11	0	0	98	16	0	103
cSH	1169	1700	1700	1197	1700	1700	470	267	816
Volume to Capacity	0.08	0.14	0.07	0.01	0.11	0.11	0.05	0.45	0.13
Queue Length 95th (ft)	7	0	0	1	0	0	4	54	11
Control Delay (s)	8.4	0.0	0.0	8.1	0.0	0.0	13.0	28.9	10.0
Lane LOS	A			A			B	D	B
Approach Delay (s)	1.8			0.3			13.0	20.2	
Approach LOS							B	C	

Intersection Summary			
Average Delay		5.2	
Intersection Capacity Utilization		37.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	425	345	245	190	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	462	375	266	207	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	641				837	375
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	641				837	375
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				39	98
cM capacity (veh/h)	943				337	671

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	462	375	266	223
Volume Left	0	0	0	0	207
Volume Right	0	0	0	266	16
cSH	1700	1700	1700	1700	363
Volume to Capacity	0.00	0.27	0.22	0.16	0.61
Queue Length 95th (ft)	0	0	0	0	97
Control Delay (s)	0.0	0.0	0.0	0.0	29.7
Lane LOS					D
Approach Delay (s)	0.0		0.0		29.7
Approach LOS					D

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	430	0	570	505	595	555	990
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	51.0	82.0	31.0	
Total Split (%)	31.7%	31.7%	31.7%	42.5%	68.3%	25.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	430	0	570	505	595	0	0	555	990
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1545	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1545	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	467	0	620	549	647	0	0	603	1076
RTOR Reduction (vph)	0	0	0	0	0	205	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	233	234	415	549	647	0	0	603	1076
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				32.3	32.3	32.3	38.3	67.1			22.8	111.4
Effective Green, g (s)				32.3	32.3	32.3	38.3	67.1			22.8	111.4
Actuated g/C Ratio				0.29	0.29	0.29	0.34	0.60			0.20	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				487	487	447	608	2131			724	1583
v/s Ratio Prot							c0.31	0.18			0.17	
v/s Ratio Perm				0.14	0.14	c0.27						c0.68
v/c Ratio				0.48	0.48	0.93	0.90	0.30			0.83	0.68
Uniform Delay, d1				32.6	32.6	38.4	34.8	10.8			42.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.7	0.7	25.4	16.7	0.1			8.1	2.4
Delay (s)				33.3	33.4	63.8	51.5	10.9			50.6	2.4
Level of Service				C	C	E	D	B			D	A
Approach Delay (s)		0.0			50.7			29.5			19.7	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	111.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	385	425	190	570
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	63.0	63.0	49.0	38.0	87.0
Total Split (%)	42.0%	42.0%	32.7%	25.3%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 110.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	10	385	0	0	0	0	425	220	190	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3327		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3327		1770	3539	
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)	527	11	418	0	0	0	0	462	239	207	620	0
RTOR Reduction (vph)	0	0	151	0	0	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	538	267	0	0	0	0	656	0	207	620	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		41.9	41.9					30.6		19.5	56.1	
Effective Green, g (s)		41.9	41.9					30.6		19.5	56.1	
Actuated g/C Ratio		0.38	0.38					0.28		0.18	0.51	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		676	595					925		313	1804	
v/s Ratio Prot								c0.20		c0.12	0.18	
v/s Ratio Perm		0.30	0.17									
v/c Ratio		0.80	0.45					0.71		0.66	0.34	
Uniform Delay, d1		30.3	25.4					35.7		42.2	16.0	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		6.5	0.5					2.5		5.2	0.1	
Delay (s)		36.7	26.0					38.2		47.3	16.1	
Level of Service		D	C					D		D	B	
Approach Delay (s)		32.0			0.0			38.2			23.9	
Approach LOS		C			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	800	1125	340	295	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	37.0	37.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 104.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	800	1125	340	295	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.12	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	220	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	870	1223	370	321	103
RTOR Reduction (vph)	0	0	0	193	0	40
Lane Group Flow (vph)	38	870	1223	177	321	63
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	50.2	50.2	50.2	50.2	42.6	42.6
Effective Green, g (s)	50.2	50.2	50.2	50.2	42.6	42.6
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.41	0.41
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	105	1695	1695	758	719	643
v/s Ratio Prot		0.25	c0.35		c0.18	
v/s Ratio Perm	0.17			0.11		0.04
v/c Ratio	0.36	0.51	0.72	0.23	0.45	0.10
Uniform Delay, d1	17.2	18.9	21.7	16.0	22.6	19.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.3	1.5	0.2	2.0	0.3
Delay (s)	19.3	19.1	23.3	16.2	24.6	19.5
Level of Service	B	B	C	B	C	B
Approach Delay (s)		19.1	21.6		23.3	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2035 with Mitigation and Rail AM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	1490	0	180	635	360	895	60
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	57.0	57.0	57.0	36.0	83.0	47.0	47.0
Total Split (%)	40.7%	40.7%	40.7%	25.7%	59.3%	33.6%	33.6%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1490	0	180	635	360	0	0	895	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.91	0.91	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3221	1610	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				3221	1610	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	1505	0	196	641	364	0	0	904	65
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	0	0	0	44
Lane Group Flow (vph)	0	0	0	1008	497	75	641	364	0	0	904	21
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				53.8	53.8	53.8	29.4	74.2			39.8	39.8
Effective Green, g (s)				53.8	53.8	53.8	29.4	74.2			39.8	39.8
Actuated g/C Ratio				0.38	0.38	0.38	0.21	0.53			0.28	0.28
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				1237	618	608	720	987			1006	450
v/s Ratio Prot				c0.31	0.31		c0.19	0.20			c0.26	
v/s Ratio Perm						0.05						0.01
v/c Ratio				0.81	0.80	0.12	0.89	0.37			0.90	0.05
Uniform Delay, d1				38.6	38.4	27.9	53.7	19.2			48.2	36.3
Progression Factor				1.00	1.00	1.00	0.62	1.72			1.00	1.00
Incremental Delay, d2				6.0	7.5	0.4	9.5	0.2			10.6	0.0
Delay (s)				44.6	45.9	28.3	42.8	33.3			58.8	36.4
Level of Service				D	D	C	D	C			E	D
Approach Delay (s)		0.0			43.1			39.4			57.3	
Approach LOS		A			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	610	950	1900	425	1950
Turn Type	NA	Prot	NA	Free	Prot	NA
Protected Phases	4	4	2		1	6
Permitted Phases				Free		
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	30.0		4.0	30.0
Minimum Split (s)	10.0	10.0	36.0		10.0	36.0
Total Split (s)	40.0	40.0	53.0		47.0	100.0
Total Split (%)	28.6%	28.6%	37.9%		33.6%	71.4%
Yellow Time (s)	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		None	C-Max

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	5	610	0	0	0	0	950	1900	425	1950	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	0.88					0.95	0.88	1.00	0.91	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790	2787					3539	2787	1770	5085	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1790	2787					3539	2787	1770	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99	0.92	0.99	0.92
Adj. Flow (vph)	22	5	663	0	0	0	0	960	1919	462	1970	0
RTOR Reduction (vph)	0	0	47	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	27	616	0	0	0	0	960	1919	462	1970	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		33.2	33.2					50.4	140.0	39.4	94.8	
Effective Green, g (s)		33.2	33.2					50.4	140.0	39.4	94.8	
Actuated g/C Ratio		0.24	0.24					0.36	1.00	0.28	0.68	
Clearance Time (s)		6.0	6.0					6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		424	660					1274	2787	498	3443	
v/s Ratio Prot			c0.22					0.27		c0.26	0.39	
v/s Ratio Perm		0.02							c0.69			
v/c Ratio		0.06	0.93					0.75	0.69	0.93	0.57	
Uniform Delay, d1		41.4	52.3					39.3	0.0	48.9	11.9	
Progression Factor		1.00	1.00					1.00	1.00	1.14	0.44	
Incremental Delay, d2		0.1	20.2					4.2	1.4	14.9	0.4	
Delay (s)		41.4	72.5					43.5	1.4	70.4	5.6	
Level of Service		D	E					D	A	E	A	
Approach Delay (s)		71.3			0.0			15.5			17.9	
Approach LOS		E			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	35	0	2750	2515	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	38	0	2778	2540	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.85	0.79	0.79			
vC, conflicting volume	3235	847	2595			
vC1, stage 1 conf vol	2540					
vC2, stage 2 conf vol	694					
vCu, unblocked vol	946	0	2100			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	9	861	205			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	38	694	694	694	694	847	847	847	54
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	0	54
cSH	861	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.41	0.41	0.41	0.41	0.50	0.50	0.50	0.03
Queue Length 95th (ft)	3	0	0	0	0	0	0	0	0
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A								
Approach Delay (s)	9.4	0.0				0.0			
Approach LOS	A								

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		58.6%	ICU Level of Service	B
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	740	110	170	300	705	360	1760	410	730	1550	265
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	54.0		10.0	54.0	9.0	9.0	54.0		9.0	54.0	
Total Split (s)	17.0	54.0		17.0	54.0	32.0	31.0	57.0		32.0	58.0	
Total Split (%)	10.6%	33.8%		10.6%	33.8%	20.0%	19.4%	35.6%		20.0%	36.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	3.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	5.0	5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	Min		None	Min	

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 142.6
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	740	110	170	300	705	360	1760	410	730	1550	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	5.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.91	1.00	0.97	0.91	0.88	0.97	0.86	1.00	0.94	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	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)	315	804	120	185	326	766	391	1913	446	793	1685	288
RTOR Reduction (vph)	0	0	36	0	0	36	0	0	29	0	0	90
Lane Group Flow (vph)	315	804	84	185	326	730	391	1913	417	793	1685	198
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	11.0	30.9	57.9	10.7	30.6	57.4	21.0	51.1	67.8	26.8	56.9	73.9
Effective Green, g (s)	11.0	30.9	57.9	10.7	30.6	57.4	21.0	51.1	67.8	26.8	56.9	73.9
Actuated g/C Ratio	0.08	0.22	0.41	0.08	0.21	0.40	0.15	0.36	0.48	0.19	0.40	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	385	1102	643	257	1091	1122	505	2297	753	938	2558	820
v/s Ratio Prot	c0.06	c0.16		0.05	0.06	0.12	0.11	c0.30		c0.16	0.26	
v/s Ratio Perm			0.05			0.14			0.26			0.13
v/c Ratio	0.82	0.73	0.13	0.72	0.30	0.65	0.77	0.83	0.55	0.85	0.66	0.24
Uniform Delay, d1	64.8	51.9	26.5	64.4	46.9	34.4	58.5	41.8	26.6	55.9	34.9	18.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.7	2.5	0.1	9.3	0.2	1.4	7.3	2.7	0.9	7.1	0.6	0.2
Delay (s)	77.4	54.4	26.6	73.7	47.1	35.8	65.7	44.5	27.5	62.9	35.5	19.0
Level of Service	E	D	C	E	D	D	E	D	C	E	D	B
Approach Delay (s)		57.5			44.2			44.8			41.7	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	142.5	Sum of lost time (s)	23.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	110	190	30	65	360	80	2270	65	220	1365	355
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	23.0	51.0		11.0	39.0		14.0	115.0		23.0	124.0	
Total Split (%)	11.5%	25.5%		5.5%	19.5%		7.0%	57.5%		11.5%	62.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 200
Actuated Cycle Length: 188.5
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	110	190	30	65	360	80	2270	65	220	1365	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	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)	125	120	207	33	71	391	87	2467	71	239	1484	386
RTOR Reduction (vph)	0	0	59	0	0	59	0	0	27	0	0	116
Lane Group Flow (vph)	125	120	148	33	71	332	87	2467	44	239	1484	270
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	12.3	38.2	52.9	5.0	30.9	53.2	8.7	104.8	115.8	16.3	113.4	131.7
Effective Green, g (s)	12.3	38.2	52.9	5.0	30.9	53.2	8.7	104.8	115.8	16.3	113.4	131.7
Actuated g/C Ratio	0.07	0.20	0.28	0.03	0.16	0.28	0.05	0.56	0.61	0.09	0.60	0.70
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	224	377	444	91	305	447	158	3566	973	297	3859	1107
v/s Ratio Prot	c0.04	0.06		0.01	0.04		0.03	c0.38		c0.07	0.23	
v/s Ratio Perm			0.09			c0.21			0.03			0.17
v/c Ratio	0.56	0.32	0.33	0.36	0.23	0.74	0.55	0.69	0.04	0.80	0.38	0.24
Uniform Delay, d1	85.4	64.0	53.7	90.1	68.4	61.3	87.9	30.1	14.4	84.4	19.4	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.5	0.4	2.5	0.4	6.6	4.1	0.6	0.0	14.6	0.1	0.1
Delay (s)	88.4	64.4	54.2	92.5	68.8	67.9	92.0	30.7	14.4	99.0	19.5	10.4
Level of Service	F	E	D	F	E	E	F	C	B	F	B	B
Approach Delay (s)		66.3			69.7			32.3			26.8	
Approach LOS		E			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	188.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBT	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations									
Volume (vph)	35	0	685	1745	130	205	1200	125	
Turn Type	Free	NA	custom	NA	Perm	Prot	NA	Perm	
Protected Phases		8		2		1	6		3
Permitted Phases	Free		3 1		2			6	
Detector Phase		8	3 1	2	2	1	6	6	
Switch Phase									
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)		28.0		37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)		38.0		60.0	60.0	22.0	82.0	82.0	38.0
Total Split (%)		31.7%		50.0%	50.0%	18.3%	68.3%	68.3%	32%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lag	Lag	Lead			
Lead-Lag Optimize?									
Recall Mode		None		Min	Min	None	Min	Min	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 116
Natural Cycle: 75
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	35	95	0	685	0	1745	130	205	1200	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00		0.95	0.95		0.91	1.00	0.97	0.91	1.00
Frt			0.86		0.89	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00		0.99	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611		1549	1504		5085	1583	3433	5085	1583
Flt Permitted			1.00		0.99	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611		1549	1504		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	38	103	0	745	0	1897	141	223	1304	136
RTOR Reduction (vph)	0	0	0	0	94	15	0	0	76	0	0	52
Lane Group Flow (vph)	0	0	38	0	337	402	0	1897	65	223	1304	84
Turn Type			Free	Prot	NA	custom		NA	Perm	Prot	NA	Perm
Protected Phases				3	8			2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			116.0		32.0	50.9		53.1	53.1	12.9	72.0	72.0
Effective Green, g (s)			116.0		32.0	50.9		53.1	53.1	12.9	72.0	72.0
Actuated g/C Ratio			1.00		0.28	0.44		0.46	0.46	0.11	0.62	0.62
Clearance Time (s)					6.0			6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)					3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611		427	659		2327	724	381	3156	982
v/s Ratio Prot					c0.22			c0.37		0.06	0.26	
v/s Ratio Perm			0.02			c0.27			0.04			0.05
v/c Ratio			0.02		0.79	0.61		0.82	0.09	0.59	0.41	0.09
Uniform Delay, d1			0.0		38.9	24.9		27.2	17.8	49.0	11.2	8.8
Progression Factor			1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.0		9.4	1.6		2.3	0.1	2.3	0.1	0.0
Delay (s)			0.0		48.2	26.5		29.5	17.8	51.3	11.3	8.9
Level of Service			A		D	C		C	B	D	B	A
Approach Delay (s)		0.0			37.6			28.7			16.5	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	160	280	220	205	245	820	185	820	320	770	160
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	26.0	40.0		26.0	40.0		24.0	51.0	33.0	60.0	
Total Split (%)	17.3%	26.7%		17.3%	26.7%		16.0%	34.0%	22.0%	40.0%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 150
Actuated Cycle Length: 134.9
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	280	220	205	245	820	185	820	135	320	770	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	0.88	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	2787	3433	4977		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	2787	3433	4977		3433	5085	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)	174	304	239	223	266	891	201	891	147	348	837	174
RTOR Reduction (vph)	0	0	59	0	0	78	0	15	0	0	0	82
Lane Group Flow (vph)	174	304	180	223	266	813	201	1023	0	348	837	92
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	12.2	32.4	51.6	14.1	34.3	61.3	13.2	45.3		21.0	53.1	71.3
Effective Green, g (s)	12.2	32.4	51.6	14.1	34.3	61.3	13.2	45.3		21.0	53.1	71.3
Actuated g/C Ratio	0.09	0.24	0.38	0.10	0.25	0.45	0.10	0.34		0.16	0.39	0.53
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	310	447	605	359	474	1267	336	1672		534	2003	837
v/s Ratio Prot	0.05	0.16		c0.06	0.14		0.06	c0.21		c0.10	0.16	
v/s Ratio Perm			0.11			c0.29						0.06
v/c Ratio	0.56	0.68	0.30	0.62	0.56	0.64	0.60	0.61		0.65	0.42	0.11
Uniform Delay, d1	58.7	46.5	29.0	57.8	43.7	28.3	58.3	37.4		53.5	29.6	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.3	4.2	0.3	3.3	1.5	1.1	2.9	0.7		2.8	0.1	0.1
Delay (s)	61.1	50.7	29.3	61.1	45.2	29.4	61.1	38.1		56.3	29.8	15.9
Level of Service	E	D	C	E	D	C	E	D		E	C	B
Approach Delay (s)		46.1			37.6			41.8			34.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	134.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	725	175	35	180	965	320	20	105	35	540	200	460
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		18.0	44.0		28.0	54.0	
Total Split (%)	27.5%	27.5%	27.5%	27.5%	27.5%		11.3%	27.5%		17.5%	33.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 145.9
Natural Cycle: 145
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	725	175	35	180	965	320	20	105	35	540	200	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.94	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
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)	788	190	38	196	1049	348	22	114	38	587	217	500
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	23	0	0	137
Lane Group Flow (vph)	788	190	14	196	1049	348	22	114	15	587	217	363
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	33.9	52.3	52.3	17.8	36.2	63.7	4.7	32.5	56.3	21.5	49.3	89.2
Effective Green, g (s)	33.9	52.3	52.3	17.8	36.2	63.7	4.7	32.5	56.3	21.5	49.3	89.2
Actuated g/C Ratio	0.23	0.36	0.36	0.12	0.25	0.43	0.03	0.22	0.38	0.15	0.34	0.61
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1149	1258	562	415	1251	1206	56	781	605	729	1186	1690
v/s Ratio Prot	c0.16	0.05		0.06	c0.21	0.12	0.01	0.03		c0.12	0.06	c0.13
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.69	0.15	0.02	0.47	0.84	0.29	0.39	0.15	0.02	0.81	0.18	0.21
Uniform Delay, d1	51.7	32.3	30.8	60.3	52.7	27.0	69.8	46.1	28.3	60.8	34.6	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.1	0.0	0.9	5.1	0.1	4.5	0.1	0.0	6.5	0.1	0.1
Delay (s)	53.4	32.3	30.8	61.1	57.8	27.2	74.3	46.2	28.3	67.2	34.7	13.2
Level of Service	D	C	C	E	E	C	E	D	C	E	C	B
Approach Delay (s)		48.7			51.5			45.9			41.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	147.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	370	5	75	10	1760	40	960
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	5	370	5	75	10	1760	215	40	960	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.91	
Frt		0.86		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1687	1583	1770	3481		1770	5082	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1687	1583	1770	3481		1770	5082	
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	0	5	402	5	82	11	1913	234	43	1043	5
RTOR Reduction (vph)	0	5	0	0	0	69	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	205	202	13	11	2143	0	43	1048	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		1.1		28.0	28.0	28.0	3.2	122.3		8.6	127.7	
Effective Green, g (s)		1.1		28.0	28.0	28.0	3.2	122.3		8.6	127.7	
Actuated g/C Ratio		0.01		0.16	0.16	0.16	0.02	0.68		0.05	0.71	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		9		261	262	246	31	2365		84	3605	
v/s Ratio Prot		c0.00		c0.12	0.12		0.01	c0.62		c0.02	0.21	
v/s Ratio Perm						0.01						
v/c Ratio		0.00		0.79	0.77	0.05	0.35	0.91		0.51	0.29	
Uniform Delay, d1		88.9		73.1	72.9	64.7	87.4	24.1		83.7	9.6	
Progression Factor		1.00		1.00	1.00	1.00	1.35	0.30		1.00	1.00	
Incremental Delay, d2		0.1		14.3	13.1	0.1	3.7	3.6		5.2	0.2	
Delay (s)		89.1		87.4	86.0	64.8	121.8	10.8		88.8	9.8	
Level of Service		F		F	F	E	F	B		F	A	
Approach Delay (s)		89.1			83.1			11.3			12.9	
Approach LOS		F			F			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	515	25	2000	415	1380
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	515	25	2000	415	0	1380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.91
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		5085
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	560	27	2174	451	0	1500
RTOR Reduction (vph)	0	7	0	60	0	0
Lane Group Flow (vph)	560	20	2174	391	0	1500
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	35.3	35.3	132.7	132.7		132.7
Effective Green, g (s)	35.3	35.3	132.7	132.7		132.7
Actuated g/C Ratio	0.20	0.20	0.74	0.74		0.74
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	673	310	2609	1167		3748
v/s Ratio Prot	c0.16		c0.61			0.29
v/s Ratio Perm		0.01		0.25		
v/c Ratio	0.83	0.06	0.83	0.33		0.40
Uniform Delay, d1	69.5	58.9	16.1	8.3		8.8
Progression Factor	1.00	1.00	1.00	1.00		1.10
Incremental Delay, d2	8.7	0.1	3.3	0.8		0.3
Delay (s)	78.2	59.0	19.4	9.0		10.0
Level of Service	E	E	B	A		B
Approach Delay (s)	77.3		17.6			10.0
Approach LOS	E		B			B

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2225	1405	540	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2418	1527	587	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	2114				2627	803
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1821				2396	348
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	296				25	577

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	806	806	806	611	611	892
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	587
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.47	0.47	0.47	0.36	0.36	0.52
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	225	2225	1405
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 59.9
Natural Cycle: 40
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	225	2225	1405	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.91	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	5085	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	245	2418	1527	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	245	2418	1527	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			13.2	59.8	34.6	
Effective Green, g (s)			13.2	59.8	34.6	
Actuated g/C Ratio			0.22	1.00	0.58	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			390	5085	2942	
v/s Ratio Prot			0.14	c0.48	0.30	
v/s Ratio Perm						
v/c Ratio			0.63	0.48	0.52	
Uniform Delay, d1			21.1	0.0	7.6	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			3.2	0.1	0.2	
Delay (s)			24.2	0.1	7.7	
Level of Service			C	A	A	
Approach Delay (s)	0.0			2.3	7.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	600	175	1305	590	2495
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 155.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	600	0	175	0	0	0	0	1305	0	590	2495	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.86	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	6408	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	6408	
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)	652	0	190	0	0	0	0	1418	0	641	2712	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	652	0	190	0	0	0	0	1418	0	641	2712	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	32.7		154.9					70.9		33.3	110.2	
Effective Green, g (s)	32.7		154.9					70.9		33.3	110.2	
Actuated g/C Ratio	0.21		1.00					0.46		0.21	0.71	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	724		1583					1619		738	4558	
v/s Ratio Prot	c0.19							c0.40		c0.19	0.42	
v/s Ratio Perm			0.12									
v/c Ratio	0.90		0.12					0.88		0.87	0.59	
Uniform Delay, d1	59.5		0.0					38.0		58.7	11.2	
Progression Factor	1.00		1.00					1.00		0.99	0.99	
Incremental Delay, d2	14.3		0.2					5.6		10.6	0.2	
Delay (s)	73.8		0.2					43.7		69.0	11.3	
Level of Service	E		A					D		E	B	
Approach Delay (s)		57.2			0.0			43.7			22.3	
Approach LOS		E			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	154.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	2675	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 160
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	2675	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2908	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2908	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.82			
v/s Ratio Perm						
v/c Ratio			0.91			
Uniform Delay, d1			4.4			
Progression Factor			1.00			
Incremental Delay, d2			5.3			
Delay (s)			9.7			
Level of Service			A			
Approach Delay (s)	0.0		9.7			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	1305	2675	0	2670	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1418	2908	0	2902	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.79	
vC, conflicting volume			4326		2144	709
vC1, stage 1 conf vol					1418	
vC2, stage 2 conf vol					726	
vCu, unblocked vol			4326		1098	709
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			32		172	376

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	709	709	1454	1454	726	726	726	726
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	1454	1454	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.42	0.42	0.86	0.86	0.43	0.43	0.43	0.43
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
41: Kunia Rd & Honowai St

5/14/2014

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.
Channelized right turn lanes are not counted.

Timings
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	20	35	135	5	165	65	3350	30	40	1980	100
Turn Type	Perm	NA	Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8		5	2		1	6	
Permitted Phases	4		8		8 1			2			6
Detector Phase	4	4	8	8	8 1	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0		10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0		15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%		6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	35	20	135	5	165	65	3350	30	40	1980	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1736		1728	1863	1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.75	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1405	1736		1271	1863	1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.99	0.92
Adj. Flow (vph)	22	38	22	147	5	179	71	3526	33	43	2000	109
RTOR Reduction (vph)	0	9	0	0	0	14	0	0	9	0	0	27
Lane Group Flow (vph)	22	51	0	147	5	165	71	3526	24	43	2000	82
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm	NA	custom	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8 1			2			6
Actuated Green, G (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Effective Green, g (s)	37.0	37.0		37.0	37.0	54.2	12.5	172.8	172.8	11.2	171.5	171.5
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.23	0.05	0.72	0.72	0.05	0.71	0.71
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	267		195	287	357	92	3661	1110	82	3633	1070
v/s Ratio Prot		0.03			0.00		c0.04	c0.69		0.02	0.39	
v/s Ratio Perm	0.02			c0.12		0.10			0.02			0.05
v/c Ratio	0.10	0.19		0.75	0.02	0.46	0.77	0.96	0.02	0.52	0.55	0.08
Uniform Delay, d1	87.2	88.4		97.1	86.1	80.3	112.3	30.7	9.6	111.8	16.1	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.77	1.03	1.00	1.00	1.02	1.11
Incremental Delay, d2	0.2	0.3		15.2	0.0	1.0	10.0	2.8	0.0	5.9	0.6	0.1
Delay (s)	87.4	88.8		112.3	86.1	81.3	96.4	34.6	9.6	117.8	17.1	11.6
Level of Service	F	F		F	F	F	F	C	A	F	B	B
Approach Delay (s)		88.4			95.1			35.6			18.8	
Approach LOS		F			F			D			B	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	330	150	225	15	150	160	2970	45	45	1910	125
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8		5	2		1	6	
Permitted Phases			4		8			2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	38.0	38.0	38.0	26.0	26.0	25.0	163.0	163.0	13.0	151.0	151.0
Total Split (%)	15.8%	15.8%	15.8%	10.8%	10.8%	10.4%	67.9%	67.9%	5.4%	62.9%	62.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	150	225	190	15	150	160	2970	45	45	1910	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1736	1533		1780	1583	3433	5085	1551	1770	5085	1560
Flt Permitted	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1736	1533		1780	1583	3433	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	359	163	245	207	16	163	174	3228	49	49	1929	136
RTOR Reduction (vph)	0	0	87	0	0	92	0	0	17	0	0	53
Lane Group Flow (vph)	258	264	158	0	223	71	174	3228	32	49	1929	83
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	32.0	32.0	32.0		20.0	20.0	16.8	156.0	156.0	7.0	146.2	146.2
Effective Green, g (s)	32.0	32.0	32.0		20.0	20.0	16.8	156.0	156.0	7.0	146.2	146.2
Actuated g/C Ratio	0.13	0.13	0.13		0.08	0.08	0.07	0.65	0.65	0.03	0.61	0.61
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	224	231	204		148	131	240	3305	1008	51	3097	950
v/s Ratio Prot	c0.15	0.15			c0.13		c0.05	c0.63		0.03	0.38	
v/s Ratio Perm			0.10			0.05			0.02			0.05
v/c Ratio	1.15	1.14	0.78		1.51	0.54	0.72	0.98	0.03	0.96	0.62	0.09
Uniform Delay, d1	104.0	104.0	100.5		110.0	105.6	109.3	40.3	15.0	116.4	29.5	19.4
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.89	1.11	3.77	1.01	0.71	0.44
Incremental Delay, d2	107.2	103.1	16.7		259.8	4.6	5.2	6.7	0.0	101.2	0.8	0.2
Delay (s)	211.2	207.1	117.3		369.8	110.2	103.0	51.3	56.5	218.3	21.8	8.7
Level of Service	F	F	F		F	F	F	D	E	F	C	A
Approach Delay (s)		179.8			260.2			54.0			25.5	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	71.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	3345	2245	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	3345	2245	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	3636	2268	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	3636	2268	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				c0.72	0.45	
v/s Ratio Perm						
v/c Ratio				0.93	0.58	
Uniform Delay, d1				11.1	5.7	
Progression Factor				1.24	1.11	
Incremental Delay, d2				1.9	0.4	
Delay (s)				15.7	6.8	
Level of Service				B	A	
Approach Delay (s)	0.0			15.7	6.8	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	395	10	205	10	5	355	3045	15	50	1955	480
Turn Type	Split	NA	custom	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4 5		3			2			6
Detector Phase	4	4	4 5	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0		5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0		11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0		14.0	14.0	35.0	153.0	153.0	30.0	148.0	148.0
Total Split (%)	17.9%	17.9%		5.8%	5.8%	14.6%	63.8%	63.8%	12.5%	61.7%	61.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None		None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	10	205	10	10	5	355	3045	15	50	1955	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.95	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1689	1430		1817	1583	1770	5085	1391	1770	5085	1346
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)	429	11	223	11	11	5	386	3310	16	54	2125	522
RTOR Reduction (vph)	0	0	31	0	0	5	0	0	5	0	0	218
Lane Group Flow (vph)	219	221	192	0	22	0	386	3310	11	54	2125	304
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	custom	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4 5			3			2			6
Actuated Green, G (s)	35.0	35.0	75.3		5.9	5.9	34.3	162.4	162.4	11.7	139.8	139.8
Effective Green, g (s)	35.0	35.0	75.3		5.9	5.9	34.3	162.4	162.4	11.7	139.8	139.8
Actuated g/C Ratio	0.15	0.15	0.31		0.02	0.02	0.14	0.68	0.68	0.05	0.58	0.58
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0			2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	245	246	448		44	38	252	3440	941	86	2962	784
v/s Ratio Prot	0.13	c0.13			c0.01		c0.22	c0.65		0.03	0.42	
v/s Ratio Perm			0.13			0.00			0.01			0.23
v/c Ratio	0.89	0.90	0.43		0.50	0.00	1.53	0.96	0.01	0.63	0.72	0.39
Uniform Delay, d1	100.7	100.8	65.3		115.6	114.2	102.8	36.0	12.6	112.0	35.9	27.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.85	1.53	1.00	1.08	0.59	1.52
Incremental Delay, d2	30.9	31.5	0.7		3.2	0.0	248.5	4.8	0.0	9.0	1.4	1.3
Delay (s)	131.6	132.3	66.0		118.8	114.2	335.8	59.7	12.7	130.0	22.4	42.3
Level of Service	F	F	E		F	F	F	E	B	F	C	D
Approach Delay (s)		109.8			118.0			88.2			28.4	
Approach LOS		F			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	67.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	480	45	45	85	510	40	2190	5	350	1700	75
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3		4			2			6
Detector Phase	3	3	3	4	4	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	10.0	10.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	60.0	60.0	60.0	33.0	33.0	31.0	115.0	115.0	32.0	116.0	116.0
Total Split (%)	25.0%	25.0%	25.0%	13.8%	13.8%	12.9%	47.9%	47.9%	13.3%	48.3%	48.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	480	45	45	15	85	510	40	2190	5	350	1700	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.96	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1699	1583		1849	2787	1770	5085	1583	3433	5085	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)	522	49	49	16	92	554	43	2380	5	380	1848	82
RTOR Reduction (vph)	0	0	40	0	0	250	0	0	3	0	0	34
Lane Group Flow (vph)	282	289	9	0	108	304	43	2380	2	380	1848	48
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	45.6	45.6	45.6		27.0	27.0	9.9	116.4	116.4	26.0	132.5	132.5
Effective Green, g (s)	45.6	45.6	45.6		27.0	27.0	9.9	116.4	116.4	26.0	132.5	132.5
Actuated g/C Ratio	0.19	0.19	0.19		0.11	0.11	0.04	0.49	0.49	0.11	0.55	0.55
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	319	322	300		208	313	73	2466	767	371	2807	873
v/s Ratio Prot	0.17	c0.17			0.06		0.02	c0.47		c0.11	0.36	
v/s Ratio Perm			0.01			c0.11			0.00			0.03
v/c Ratio	0.88	0.90	0.03		0.52	0.97	0.59	0.97	0.00	1.02	0.66	0.05
Uniform Delay, d1	94.6	94.9	79.2		100.4	106.1	113.1	59.8	31.9	107.0	37.8	24.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.34	0.85	1.00	1.35	0.33	0.07
Incremental Delay, d2	23.9	25.8	0.0		2.2	42.7	8.7	9.4	0.0	45.9	0.9	0.1
Delay (s)	118.5	120.8	79.2		102.6	148.8	160.7	60.3	31.9	190.7	13.2	1.9
Level of Service	F	F	E		F	F	F	E	C	F	B	A
Approach Delay (s)		116.4			141.2			62.0			42.0	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	68.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	275	325	165	1625	65	220	1415	170
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	195	205	115	275	325	165	1625	65	220	1415	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3317	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	353	212	223	125	299	353	179	1766	71	239	1429	185
RTOR Reduction (vph)	0	0	58	0	0	33	0	0	23	0	0	64
Lane Group Flow (vph)	184	381	165	125	299	320	179	1766	48	239	1429	121
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	32.1	32.1	48.9	42.7	42.7	63.8	16.8	119.1	161.8	21.1	123.4	123.4
Effective Green, g (s)	32.1	32.1	48.9	42.7	42.7	63.8	16.8	119.1	161.8	21.1	123.4	123.4
Actuated g/C Ratio	0.13	0.13	0.20	0.18	0.18	0.27	0.07	0.50	0.67	0.09	0.51	0.51
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	215	443	322	314	331	810	240	2523	1067	301	2614	813
v/s Ratio Prot	0.11	c0.11		0.07	c0.16	0.07	0.05	c0.35		c0.07	c0.28	
v/s Ratio Perm			0.10			0.04			0.03			0.08
v/c Ratio	0.86	0.86	0.51	0.40	0.90	0.40	0.75	0.70	0.04	0.79	0.55	0.15
Uniform Delay, d1	101.7	101.8	84.9	87.3	96.6	72.3	109.5	46.7	13.1	107.3	39.4	30.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.60	2.19	4.46
Incremental Delay, d2	25.9	15.1	0.6	0.3	26.1	0.1	10.5	1.6	0.0	10.0	0.6	0.3
Delay (s)	127.6	116.8	85.5	87.6	122.7	72.4	120.0	48.3	13.1	74.8	86.9	137.0
Level of Service	F	F	F	F	F	E	F	D	B	E	F	F
Approach Delay (s)		110.5			94.2			53.4			90.4	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	80.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1825	45	20	1325	35	65	15	25	35	10	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	40.0	40.0	40.0	38.0	38.0	38.0
Total Split (s)	26.0	71.0	71.0	9.0	54.0	54.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	21.7%	59.2%	59.2%	7.5%	45.0%	45.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1825	45	20	1325	35	65	15	25	35	10	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1790	1583		1793	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.78	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1372	1583		1461	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)	168	1984	49	22	1440	38	71	16	27	38	11	158
RTOR Reduction (vph)	0	0	19	0	0	19	0	0	21	0	0	118
Lane Group Flow (vph)	168	1984	30	22	1440	19	0	87	6	0	49	40
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.5	72.3	72.3	3.0	60.8	60.8		28.7	28.7		30.7	30.7
Effective Green, g (s)	16.5	72.3	72.3	3.0	60.8	60.8		28.7	28.7		30.7	30.7
Actuated g/C Ratio	0.14	0.60	0.60	0.02	0.51	0.51		0.24	0.24		0.26	0.26
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	243	3063	953	44	2576	802		328	378		373	404
v/s Ratio Prot	c0.09	c0.39		0.01	0.28							
v/s Ratio Perm			0.02			0.01		c0.06	0.00		0.03	0.03
v/c Ratio	0.69	0.65	0.03	0.50	0.56	0.02		0.27	0.02		0.13	0.10
Uniform Delay, d1	49.3	15.5	9.7	57.8	20.4	14.8		37.1	34.9		34.4	34.1
Progression Factor	1.00	1.00	1.00	0.81	1.13	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.2	1.1	0.1	7.6	0.8	0.0		0.4	0.0		0.2	0.1
Delay (s)	57.5	16.6	9.7	54.6	23.8	14.8		37.5	34.9		34.5	34.2
Level of Service	E	B	A	D	C	B		D	C		C	C
Approach Delay (s)		19.6			24.0			36.9			34.3	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1630	75	35	1165	45	105	15	40	50	15	115
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	29.0	67.0	67.0	12.0	50.0	50.0	41.0	41.0	41.0	41.0	41.0	41.0
Total Split (%)	24.2%	55.8%	55.8%	10.0%	41.7%	41.7%	34.2%	34.2%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	1630	75	35	1165	45	105	15	40	50	15	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1785	1583		1794	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.70	1.00		0.72	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1309	1583		1335	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)	185	1772	82	38	1266	49	114	16	43	54	16	125
RTOR Reduction (vph)	0	0	35	0	0	27	0	0	33	0	0	95
Lane Group Flow (vph)	185	1772	47	38	1266	22	0	130	10	0	70	30
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	17.7	68.6	68.6	4.2	55.1	55.1		29.2	29.2		29.2	29.2
Effective Green, g (s)	17.7	68.6	68.6	4.2	55.1	55.1		29.2	29.2		29.2	29.2
Actuated g/C Ratio	0.15	0.57	0.57	0.04	0.46	0.46		0.24	0.24		0.24	0.24
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	261	2906	904	61	2334	726		318	385		324	385
v/s Ratio Prot	c0.10	c0.35		0.02	0.25							
v/s Ratio Perm			0.03			0.01		c0.10	0.01		0.05	0.02
v/c Ratio	0.71	0.61	0.05	0.62	0.54	0.03		0.41	0.03		0.22	0.08
Uniform Delay, d1	48.7	16.9	11.3	57.1	23.4	17.8		38.1	34.6		36.3	35.0
Progression Factor	1.32	0.63	0.86	1.17	0.55	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	6.8	0.8	0.1	17.3	0.9	0.1		0.9	0.0		0.3	0.1
Delay (s)	71.3	11.4	9.8	84.4	13.7	17.9		39.0	34.6		36.6	35.1
Level of Service	E	B	A	F	B	B		D	C		D	D
Approach Delay (s)		16.8			15.9			37.9			35.6	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1665	60	1125	130	85
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	40.0	40.0
Total Split (s)	64.0	16.0	80.0	40.0	40.0
Total Split (%)	53.3%	13.3%	66.7%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1665	40	60	1125	130	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5068		1770	5085	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5068		1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1810	43	65	1223	141	92
RTOR Reduction (vph)	2	0	0	0	0	70
Lane Group Flow (vph)	1851	0	65	1223	141	22
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	65.3		7.6	78.9	29.1	29.1
Effective Green, g (s)	65.3		7.6	78.9	29.1	29.1
Actuated g/C Ratio	0.54		0.06	0.66	0.24	0.24
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2757		112	3343	429	383
v/s Ratio Prot	c0.37		c0.04	0.24	c0.08	
v/s Ratio Perm						0.01
v/c Ratio	0.67		0.58	0.37	0.33	0.06
Uniform Delay, d1	19.6		54.6	9.3	37.4	34.9
Progression Factor	0.66		1.41	0.27	1.00	1.00
Incremental Delay, d2	1.1		7.1	0.3	0.5	0.1
Delay (s)	14.1		84.2	2.8	37.9	35.0
Level of Service	B		F	A	D	C
Approach Delay (s)	14.1			6.9	36.7	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1680	30	50	1055	10	50	5	95	20	10	85
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	12.0	66.0	66.0	14.0	68.0	68.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	10.0%	55.0%	55.0%	11.7%	56.7%	56.7%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1680	30	50	1055	10	50	5	95	20	10	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1781	1583		1803	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.83	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1381	1583		1546	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)	43	1826	33	54	1147	11	54	5	103	22	11	92
RTOR Reduction (vph)	0	0	14	0	0	5	0	0	79	0	0	70
Lane Group Flow (vph)	43	1826	19	54	1147	6	0	59	24	0	33	22
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.6	67.7	67.7	6.9	69.0	69.0		28.4	28.4		28.4	28.4
Effective Green, g (s)	5.6	67.7	67.7	6.9	69.0	69.0		28.4	28.4		28.4	28.4
Actuated g/C Ratio	0.05	0.56	0.56	0.06	0.58	0.58		0.24	0.24		0.24	0.24
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	82	2868	893	101	2923	910		326	374		365	374
v/s Ratio Prot	0.02	c0.36		c0.03	0.23							
v/s Ratio Perm			0.01			0.00		c0.04	0.02		0.02	0.01
v/c Ratio	0.52	0.64	0.02	0.53	0.39	0.01		0.18	0.07		0.09	0.06
Uniform Delay, d1	55.9	17.8	11.5	55.0	14.0	10.9		36.5	35.5		35.7	35.4
Progression Factor	1.16	0.67	1.00	1.29	1.22	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	4.6	0.8	0.0	5.2	0.4	0.0		0.3	0.1		0.1	0.1
Delay (s)	69.5	12.8	11.6	76.3	17.4	10.9		36.8	35.6		35.8	35.5
Level of Service	E	B	B	E	B	B		D	D		D	D
Approach Delay (s)		14.0			20.0			36.0			35.6	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1740	55	70	995	125	115
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	39.0	39.0
Total Split (s)	65.0	65.0	16.0	81.0	39.0	39.0
Total Split (%)	54.2%	54.2%	13.3%	67.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1740	55	70	995	125	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1891	60	76	1082	136	125
RTOR Reduction (vph)	0	12	0	0	0	95
Lane Group Flow (vph)	1891	48	76	1082	136	30
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	66.7	66.7	8.3	80.0	29.0	29.0
Effective Green, g (s)	66.7	66.7	8.3	80.0	29.0	29.0
Actuated g/C Ratio	0.56	0.56	0.07	0.67	0.24	0.24
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2826	879	122	3390	427	382
v/s Ratio Prot	c0.37		c0.04	0.21	c0.08	
v/s Ratio Perm		0.03				0.02
v/c Ratio	0.67	0.06	0.62	0.32	0.32	0.08
Uniform Delay, d1	18.8	12.2	54.3	8.5	37.4	35.2
Progression Factor	0.52	0.59	0.97	1.62	1.00	1.00
Incremental Delay, d2	1.0	0.1	9.2	0.2	0.4	0.1
Delay (s)	10.8	7.2	61.7	14.0	37.8	35.3
Level of Service	B	A	E	B	D	D
Approach Delay (s)	10.7			17.1	36.6	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations												
Volume (vph)	1800	50	95	935	25	120	20	120	10	5	15	
Turn Type	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	2		1	6			8			4		5
Permitted Phases		2			6	8		8	4		4	
Detector Phase	2	2	1	6	6	8	8	8	4	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0	10.0
Total Split (s)	62.0	62.0	18.0	70.0	70.0	40.0	40.0	40.0	40.0	40.0	40.0	10.0
Total Split (%)	51.7%	51.7%	15.0%	58.3%	58.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lag	Lag							Lead
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1800	50	95	935	25	120	20	120	10	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor		0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.97	1.00
Satd. Flow (prot)		5085	1583	1770	5085	1583		1786	1583		1801	1583
Flt Permitted		1.00	1.00	0.95	1.00	1.00		0.75	1.00		0.83	1.00
Satd. Flow (perm)		5085	1583	1770	5085	1583		1389	1583		1546	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1957	54	103	1016	27	130	22	130	11	5	16
RTOR Reduction (vph)	0	0	26	0	0	9	0	0	98	0	0	12
Lane Group Flow (vph)	0	1957	28	103	1016	18	0	152	32	0	16	4
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)		61.8	61.8	10.8	78.6	78.6		29.4	29.4		29.4	29.4
Effective Green, g (s)		61.8	61.8	10.8	78.6	78.6		29.4	29.4		29.4	29.4
Actuated g/C Ratio		0.51	0.51	0.09	0.65	0.65		0.24	0.24		0.24	0.24
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		2618	815	159	3330	1036		340	387		378	387
v/s Ratio Prot		c0.38		c0.06	0.20							
v/s Ratio Perm			0.02			0.01		c0.11	0.02		0.01	0.00
v/c Ratio		0.75	0.03	0.65	0.31	0.02		0.45	0.08		0.04	0.01
Uniform Delay, d1		22.9	14.4	52.8	8.9	7.2		38.4	34.9		34.6	34.3
Progression Factor		0.72	1.00	1.20	0.16	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.6	0.1	8.4	0.2	0.0		0.9	0.1		0.0	0.0
Delay (s)		18.0	14.4	71.9	1.7	7.3		39.3	35.0		34.6	34.3
Level of Service		B	B	E	A	A		D	C		C	C
Approach Delay (s)		17.9			8.1			37.3			34.5	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1710	30	250	980	45	65	40	275	70	35	20
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	11.0	59.0	59.0	21.0	69.0	69.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	9.2%	49.2%	49.2%	17.5%	57.5%	57.5%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	1710	30	250	980	45	65	40	275	70	35	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.73	1.00	1.00	0.73	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	1364	1863	1583	1358	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1859	33	272	1065	49	71	43	299	76	38	22
RTOR Reduction (vph)	0	0	17	0	0	20	0	0	123	0	0	17
Lane Group Flow (vph)	27	1859	16	272	1065	29	71	43	176	76	38	5
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	3.0	59.7	59.7	13.7	70.4	70.4	28.6	28.6	28.6	28.6	28.6	28.6
Effective Green, g (s)	3.0	59.7	59.7	13.7	70.4	70.4	28.6	28.6	28.6	28.6	28.6	28.6
Actuated g/C Ratio	0.02	0.50	0.50	0.11	0.59	0.59	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	44	2529	787	391	2983	928	325	444	377	323	444	377
v/s Ratio Prot	0.02	c0.37		c0.08	0.21			0.02			0.02	
v/s Ratio Perm			0.01			0.02	0.05		c0.11	0.06		0.00
v/c Ratio	0.61	0.74	0.02	0.70	0.36	0.03	0.22	0.10	0.47	0.24	0.09	0.01
Uniform Delay, d1	57.9	23.9	15.3	51.1	13.0	10.4	36.7	35.6	39.2	36.9	35.5	34.9
Progression Factor	0.76	1.15	1.00	0.68	0.87	3.72	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.2	1.3	0.0	4.9	0.3	0.1	0.3	0.1	0.9	0.4	0.1	0.0
Delay (s)	60.3	28.8	15.3	39.8	11.6	38.9	37.1	35.7	40.1	37.3	35.6	34.9
Level of Service	E	C	B	D	B	D	D	D	D	D	D	C
Approach Delay (s)		29.0			18.1			39.1			36.4	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Volume (vph)	1785	1220	50	5
Turn Type	NA	NA	NA	Perm
Protected Phases	4	8	2	
Permitted Phases				2
Detector Phase	4	8	2	2
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	40.0	40.0
Total Split (s)	78.0	78.0	42.0	42.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1785	50	0	1220	50	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.91			0.91	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	5065			5085	1770	1583
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	5065			5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1940	54	0	1326	54	5
RTOR Reduction (vph)	3	0	0	0	0	3
Lane Group Flow (vph)	1991	0	0	1326	54	2
Turn Type	NA			NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	66.7			66.7	41.3	41.3
Effective Green, g (s)	66.7			66.7	41.3	41.3
Actuated g/C Ratio	0.56			0.56	0.34	0.34
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2815			2826	609	544
v/s Ratio Prot	c0.39			0.26	c0.03	
v/s Ratio Perm						0.00
v/c Ratio	0.71			0.47	0.09	0.00
Uniform Delay, d1	19.5			16.0	26.6	25.8
Progression Factor	1.14			1.60	1.00	1.00
Incremental Delay, d2	0.6			0.1	0.3	0.0
Delay (s)	22.8			25.7	26.9	25.8
Level of Service	C			C	C	C
Approach Delay (s)	22.8			25.7	26.8	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	40	1730	80	1200	110	50	40	425	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	40.0
Total Split (s)	20.0	54.0	26.0	60.0		12.0	12.0	28.0	40.0
Total Split (%)	16.7%	45.0%	21.7%	50.0%		10.0%	10.0%	23.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1730	0	80	1200	110	0	50	40	425	5	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085		1770	5085	1583		1863	1583	3433	1612	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5085		1770	5085	1583		1863	1583	3433	1612	
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)	43	1880	0	87	1304	120	0	54	43	462	5	43
RTOR Reduction (vph)	0	0	0	0	0	18	0	0	41	0	32	0
Lane Group Flow (vph)	43	1880	0	87	1304	102	0	54	2	462	16	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	7.2	60.2		11.2	64.2	101.8		5.5	5.5	20.1	31.6	
Effective Green, g (s)	7.2	60.2		11.2	64.2	101.8		5.5	5.5	20.1	31.6	
Actuated g/C Ratio	0.06	0.50		0.09	0.54	0.85		0.05	0.05	0.17	0.26	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	106	2550		165	2720	1342		85	72	575	424	
v/s Ratio Prot	0.02	c0.37		c0.05	c0.26			c0.03		c0.13	0.01	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.41	0.74		0.53	0.48	0.08		0.64	0.03	0.80	0.04	
Uniform Delay, d1	54.3	23.6		51.9	17.4	1.5		56.3	54.7	48.1	32.9	
Progression Factor	1.23	0.86		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	1.5		3.0	0.6	0.0		14.5	0.2	8.0	0.0	
Delay (s)	68.7	21.9		54.9	18.1	1.5		70.8	54.8	56.0	32.9	
Level of Service	E	C		D	B	A		E	D	E	C	
Approach Delay (s)		23.0			18.9			63.7			53.9	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	15	25	45	10	40	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	27	49	11	43	87

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	43	60	130
Volume Left (vph)	0	49	43
Volume Right (vph)	27	0	87
Hadj (s)	-0.34	0.20	-0.30
Departure Headway (s)	3.9	4.4	3.8
Degree Utilization, x	0.05	0.07	0.14
Capacity (veh/h)	888	789	909
Control Delay (s)	7.1	7.8	7.4
Approach Delay (s)	7.1	7.8	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay		7.5	
Level of Service		A	
Intersection Capacity Utilization		23.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	2085	390	1080
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 92.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2085	0	390	1080	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.91		0.97	0.91		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	5085		3433	5085		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	5085		3433	5085		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2266	0	424	1174	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2266	0	424	1174	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	61.9		18.1	92.0		
Effective Green, g (s)	61.9		18.1	92.0		
Actuated g/C Ratio	0.67		0.20	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	3421		675	5085		
v/s Ratio Prot	c0.45		c0.12	0.23		
v/s Ratio Perm						
v/c Ratio	0.66		0.63	0.23		
Uniform Delay, d1	8.9		33.9	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.5		1.8	0.0		
Delay (s)	9.4		35.7	0.0		
Level of Service	A		D	A		
Approach Delay (s)	9.4			9.5	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	905	1905	1395	205
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 79.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	905	1905	1395	205	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	0.97	0.95	0.91	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	3433	3539	5085	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	3433	3539	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	984	2071	1516	223	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	984	2071	1516	223	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	33.0	79.3	35.3	79.3		
Effective Green, g (s)	33.0	79.3	35.3	79.3		
Actuated g/C Ratio	0.42	1.00	0.45	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	1428	3539	2263	1583		
v/s Ratio Prot	c0.29	c0.59	0.30			
v/s Ratio Perm				0.14		
v/c Ratio	0.69	0.59	0.67	0.14		
Uniform Delay, d1	19.0	0.0	17.4	0.0		
Progression Factor	0.99	1.00	1.00	1.00		
Incremental Delay, d2	1.4	0.2	0.8	0.2		
Delay (s)	20.1	0.2	18.2	0.2		
Level of Service	C	A	B	A		
Approach Delay (s)		6.6	15.9		0.0	
Approach LOS		A	B		A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	11.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	70	645	1210	20	25	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	701	1315	22	27	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		Raised	Raised			
Median storage veh)		1	1			
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1337				1829	668
vC1, stage 1 conf vol					1326	
vC2, stage 2 conf vol					503	
vCu, unblocked vol	1337				1829	668
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	85				83	93
cM capacity (veh/h)	512				157	400

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	76	351	351	877	460	27	27
Volume Left	76	0	0	0	0	27	0
Volume Right	0	0	0	0	22	0	27
cSH	512	1700	1700	1700	1700	157	400
Volume to Capacity	0.15	0.21	0.21	0.52	0.27	0.17	0.07
Queue Length 95th (ft)	13	0	0	0	0	15	5
Control Delay (s)	13.3	0.0	0.0	0.0	0.0	32.8	14.6
Lane LOS	B					D	B
Approach Delay (s)	1.3			0.0		23.7	
Approach LOS						C	

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		51.3%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	490	15	0	805	0	30	10	5	0	0	230
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	533	16	0	875	0	33	11	5	0	0	250
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	875			549			1391	1579	274	1315	1587	438
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	875			549			1391	1579	274	1315	1587	438
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			37	89	99	100	100	56
cM capacity (veh/h)	767			1017			52	97	723	97	96	567

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	82	355	194	0	583	292	49	0	250
Volume Left	82	0	0	0	0	0	33	0	0
Volume Right	0	0	16	0	0	0	5	0	250
cSH	767	1700	1700	1700	1700	1700	66	1700	567
Volume to Capacity	0.11	0.21	0.11	0.00	0.34	0.17	0.75	0.00	0.44
Queue Length 95th (ft)	9	0	0	0	0	0	84	0	56
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	149.8	0.0	16.3
Lane LOS	B						F	A	C
Approach Delay (s)	1.3			0.0			149.8	16.3	
Approach LOS							F	C	

Intersection Summary			
Average Delay		6.8	
Intersection Capacity Utilization		49.8%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	375	10	0	640	0	25	15	0	20	0	135
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	408	11	0	696	0	27	16	0	22	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	696			418			1158	1359	209	1158	1364	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	696			418			1158	1359	209	1158	1364	348
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			100			74	87	100	82	100	77
cM capacity (veh/h)	896			1137			104	127	797	122	126	648

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	272	147	0	464	232	43	22	147
Volume Left	125	0	0	0	0	0	27	22	0
Volume Right	0	0	11	0	0	0	0	0	147
cSH	896	1700	1700	1700	1700	1700	112	122	648
Volume to Capacity	0.14	0.16	0.09	0.00	0.27	0.14	0.39	0.18	0.23
Queue Length 95th (ft)	12	0	0	0	0	0	40	15	22
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	56.3	40.8	12.2
Lane LOS	A						F	E	B
Approach Delay (s)	2.2			0.0			56.3	15.9	
Approach LOS							F	C	

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization		42.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	295	5	0	515	5	20	10	0	0	0	110
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	321	5	0	560	5	22	11	0	0	0	120
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	565			326			918	1084	163	924	1084	283
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	565			326			918	1084	163	924	1084	283
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			88	94	100	100	100	83
cM capacity (veh/h)	1003			1230			174	194	853	199	194	714

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	214	112	0	373	192	33	0	120
Volume Left	98	0	0	0	0	0	22	0	0
Volume Right	0	0	5	0	0	5	0	0	120
cSH	1003	1700	1700	1700	1700	1700	181	1700	714
Volume to Capacity	0.10	0.13	0.07	0.00	0.22	0.11	0.18	0.00	0.17
Queue Length 95th (ft)	8	0	0	0	0	0	16	0	15
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	0.0	29.3	0.0	11.0
Lane LOS	A						D	A	B
Approach Delay (s)	2.1			0.0			29.3	11.0	
Approach LOS							D	B	

Intersection Summary			
Average Delay		2.8	
Intersection Capacity Utilization		34.5%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	230	15	0	400	25	40	50	0	0	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	250	16	0	435	27	43	54	0	0	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	462			266			688	840	133	720	834	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	462			266			688	840	133	720	834	231
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			84	81	100	100	96	89
cM capacity (veh/h)	1096			1295			275	284	891	258	286	771

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	60	167	100	0	290	172	98	0	11	87
Volume Left	60	0	0	0	0	0	43	0	0	0
Volume Right	0	0	16	0	0	27	0	0	0	87
cSH	1096	1700	1700	1700	1700	1700	280	1700	286	771
Volume to Capacity	0.05	0.10	0.06	0.00	0.17	0.10	0.35	0.00	0.04	0.11
Queue Length 95th (ft)	4	0	0	0	0	0	38	0	3	9
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	24.6	0.0	18.1	10.3
Lane LOS	A						C	A	C	B
Approach Delay (s)	1.6			0.0			24.6		11.1	
Approach LOS							C		B	

Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		36.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	85	110	40	25	240	60	40	0	30	210	5	140
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	120	43	27	261	65	43	0	33	228	5	152
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	326			163			666	707	82	625	696	163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326			163			666	707	82	625	696	163
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			98			83	100	97	31	98	82
cM capacity (veh/h)	1230			1413			260	325	962	331	330	853

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	92	80	83	27	174	152	76	234	152
Volume Left	92	0	0	27	0	0	43	228	0
Volume Right	0	0	43	0	0	65	33	0	152
cSH	1230	1700	1700	1413	1700	1700	378	331	853
Volume to Capacity	0.08	0.05	0.05	0.02	0.10	0.09	0.20	0.71	0.18
Queue Length 95th (ft)	6	0	0	1	0	0	19	127	16
Control Delay (s)	8.2	0.0	0.0	7.6	0.0	0.0	16.9	38.1	10.1
Lane LOS	A			A			C	E	B
Approach Delay (s)	3.0			0.6			16.9	27.1	
Approach LOS							C	D	

Intersection Summary			
Average Delay		11.9	
Intersection Capacity Utilization		41.7%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	295	5	10	220	30	10	0	30	65	5	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	321	5	11	239	33	11	0	33	71	5	98
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	272			326			674	726	163	579	712	136
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	272			326			674	726	163	579	712	136
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			96	100	96	81	98	89
cM capacity (veh/h)	1289			1230			288	332	853	368	338	888

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	54	214	112	11	159	112	43	76	98
Volume Left	54	0	0	11	0	0	11	71	0
Volume Right	0	0	5	0	0	33	33	0	98
cSH	1289	1700	1700	1230	1700	1700	572	366	888
Volume to Capacity	0.04	0.13	0.07	0.01	0.09	0.07	0.08	0.21	0.11
Queue Length 95th (ft)	3	0	0	1	0	0	6	19	9
Control Delay (s)	7.9	0.0	0.0	8.0	0.0	0.0	11.8	17.4	9.6
Lane LOS	A			A			B	C	A
Approach Delay (s)	1.1			0.3			11.8	13.0	
Approach LOS							B	B	

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		32.2%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	350	5	5	135	50	10	0	25	100	5	115
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	380	5	5	147	54	11	0	27	109	5	125
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	201			386			682	682	193	489	658	101
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	201			386			682	682	193	489	658	101
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			96	100	97	75	99	87
cM capacity (veh/h)	1368			1169			280	357	816	434	369	935

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	43	254	132	5	98	103	38	114	125
Volume Left	43	0	0	5	0	0	11	109	0
Volume Right	0	0	5	0	0	54	27	0	125
cSH	1368	1700	1700	1169	1700	1700	527	431	935
Volume to Capacity	0.03	0.15	0.08	0.00	0.06	0.06	0.07	0.27	0.13
Queue Length 95th (ft)	2	0	0	0	0	0	6	26	12
Control Delay (s)	7.7	0.0	0.0	8.1	0.0	0.0	12.4	16.4	9.4
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.8			0.2			12.4	12.7	
Approach LOS							B	B	

Intersection Summary			
Average Delay		4.3	
Intersection Capacity Utilization		35.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	465	175	105	235	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	505	190	114	255	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	304				696	190
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	304				696	190
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				37	99
cM capacity (veh/h)	1256				408	852

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	505	190	114	266
Volume Left	0	0	0	0	255
Volume Right	0	0	0	114	11
cSH	1700	1700	1700	1700	425
Volume to Capacity	0.00	0.30	0.11	0.07	0.63
Queue Length 95th (ft)	0	0	0	0	104
Control Delay (s)	0.0	0.0	0.0	0.0	26.8
Lane LOS					D
Approach Delay (s)	0.0		0.0		26.8
Approach LOS					D

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	460	0	200	375	730	335	740
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	41.0	61.0	20.0	
Total Split (%)	38.4%	38.4%	38.4%	41.4%	61.6%	20.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 99
Actuated Cycle Length: 71.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	460	0	200	375	730	0	0	335	740
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1552	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1552	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	500	0	217	408	793	0	0	364	804
RTOR Reduction (vph)	0	0	0	0	0	124	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	250	250	93	408	793	0	0	364	804
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Effective Green, g (s)				18.4	18.4	18.4	22.1	40.8			12.7	71.2
Actuated g/C Ratio				0.26	0.26	0.26	0.31	0.57			0.18	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				434	434	401	549	2027			631	1583
v/s Ratio Prot							c0.23	0.22			0.10	
v/s Ratio Perm				0.15	0.15	0.06						c0.51
v/c Ratio				0.58	0.58	0.23	0.74	0.39			0.58	0.51
Uniform Delay, d1				23.0	23.0	20.8	22.0	8.4			26.8	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				1.9	1.9	0.3	5.4	0.1			1.3	1.2
Delay (s)				24.9	24.9	21.1	27.4	8.5			28.1	1.2
Level of Service				C	C	C	C	A			C	A
Approach Delay (s)		0.0			23.7			14.9			9.6	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	90	550	355	240	605
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	58.0	58.0	33.0	29.0	62.0
Total Split (%)	48.3%	48.3%	27.5%	24.2%	51.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 116
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	635	90	550	0	0	0	0	355	335	240	605	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.93		1.00	1.00	
Flt Protected		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1785	1563					3237		1770	3539	
Flt Permitted		0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1785	1563					3237		1770	3539	
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)	690	98	598	0	0	0	0	386	364	261	658	0
RTOR Reduction (vph)	0	0	94	0	0	0	0	143	0	0	0	0
Lane Group Flow (vph)	0	788	504	0	0	0	0	607	0	261	658	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		52.2	52.2					25.2		20.6	51.8	
Effective Green, g (s)		52.2	52.2					25.2		20.6	51.8	
Actuated g/C Ratio		0.45	0.45					0.22		0.18	0.45	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		803	703					703		314	1580	
v/s Ratio Prot								c0.19		c0.15	0.19	
v/s Ratio Perm		0.44	0.32									
v/c Ratio		0.98	0.72					0.86		0.83	0.42	
Uniform Delay, d1		31.4	25.9					43.7		46.0	21.8	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		27.0	3.5					10.7		16.8	0.2	
Delay (s)		58.5	29.4					54.4		62.8	22.0	
Level of Service		E	C					D		E	C	
Approach Delay (s)		45.9			0.0			54.4			33.6	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	44.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1115	785	105	50	30
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	40.0	40.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 84.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1115	785	105	50	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.26	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	490	5085	5085	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	1212	853	114	54	33
RTOR Reduction (vph)	0	0	0	73	0	17
Lane Group Flow (vph)	22	1212	853	41	54	16
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	30.6	30.6	30.6	30.6	42.2	42.2
Effective Green, g (s)	30.6	30.6	30.6	30.6	42.2	42.2
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.50	0.50
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	1834	1834	571	880	787
v/s Ratio Prot		c0.24	0.17		c0.03	
v/s Ratio Perm	0.04			0.03		0.01
v/c Ratio	0.12	0.66	0.47	0.07	0.06	0.02
Uniform Delay, d1	18.1	22.7	20.8	17.8	11.0	10.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.9	0.2	0.1	0.1	0.0
Delay (s)	18.5	23.6	21.0	17.8	11.2	10.9
Level of Service	B	C	C	B	B	B
Approach Delay (s)		23.6	20.6		11.1	
Approach LOS		C	C		B	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Year 2035 with Mitigation and Rail PM

Timings
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	2115	5	315	590	415	315	145
Turn Type	Prot	NA	custom	Prot	NA	NA	Perm
Protected Phases	4	8		5	2	6	
Permitted Phases			4				6
Detector Phase	4	8	4	5	2	6	6
Switch Phase							
Minimum Initial (s)	30.0	4.0	30.0	4.0	4.0	4.0	4.0
Minimum Split (s)	36.0	10.0	36.0	9.0	28.0	28.0	28.0
Total Split (s)	60.0	60.0	60.0	30.0	70.0	40.0	40.0
Total Split (%)	46.2%	46.2%	46.2%	23.1%	53.8%	30.8%	30.8%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 4:WBL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
1: Kualakai Pkwy/Pueonani St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	2115	5	315	590	415	0	0	315	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Lane Util. Factor				0.91	0.91	1.00	0.97	1.00			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3221	1615	1583	3433	1863			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				3221	1615	1583	3433	1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.99	0.92	0.92	0.99	0.99	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2136	5	342	596	419	0	0	318	158
RTOR Reduction (vph)	0	0	0	0	0	163	0	0	0	0	0	133
Lane Group Flow (vph)	0	0	0	1431	710	179	596	419	0	0	318	25
Turn Type				Prot	NA	custom	Prot	NA			NA	Perm
Protected Phases				4	8		5	2			6	
Permitted Phases						4						6
Actuated Green, G (s)				68.1	68.1	68.1	24.6	49.9			20.3	20.3
Effective Green, g (s)				68.1	68.1	68.1	24.6	49.9			20.3	20.3
Actuated g/C Ratio				0.52	0.52	0.52	0.19	0.38			0.16	0.16
Clearance Time (s)				6.0	6.0	6.0	5.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				1687	846	829	649	715			552	247
v/s Ratio Prot				c0.44	0.44		c0.17	c0.22			0.09	
v/s Ratio Perm						0.11						0.02
v/c Ratio				0.85	0.84	0.22	0.92	0.59			0.58	0.10
Uniform Delay, d1				26.5	26.3	16.6	51.7	31.8			50.9	47.0
Progression Factor				1.00	1.00	1.00	0.79	1.23			1.00	1.00
Incremental Delay, d2				5.5	7.3	0.6	16.5	1.1			1.5	0.2
Delay (s)				32.0	33.6	17.2	57.2	40.4			52.3	47.2
Level of Service				C	C	B	E	D			D	D
Approach Delay (s)		0.0			30.5			50.3			50.6	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	10	630	885	1540	95	2330
Turn Type	NA	Prot	NA	Free	Prot	NA
Protected Phases	4	4	2		1	6
Permitted Phases				Free		
Detector Phase	4	4	2		1	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	30.0		4.0	30.0
Minimum Split (s)	10.0	10.0	36.0		10.0	36.0
Total Split (s)	48.0	48.0	62.0		20.0	82.0
Total Split (%)	36.9%	36.9%	47.7%		15.4%	63.1%
Yellow Time (s)	4.0	4.0	4.0		3.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		5.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		None	C-Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
2: Kualakai Pkwy & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	630	0	0	0	0	885	1540	95	2330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0	4.0	5.0	6.0	
Lane Util. Factor		1.00	0.88					0.95	0.88	1.00	0.91	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1780	2787					3539	2787	1770	5085	
Flt Permitted		0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1780	2787					3539	2787	1770	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.99	0.92	0.99	0.92
Adj. Flow (vph)	158	11	685	0	0	0	0	894	1556	103	2354	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	169	637	0	0	0	0	894	1556	103	2354	0
Turn Type	Perm	NA	Prot					NA	Free	Prot	NA	
Protected Phases		4	4					2		1	6	
Permitted Phases	4								Free			
Actuated Green, G (s)		36.1	36.1					64.6	130.0	12.3	81.9	
Effective Green, g (s)		36.1	36.1					64.6	130.0	12.3	81.9	
Actuated g/C Ratio		0.28	0.28					0.50	1.00	0.09	0.63	
Clearance Time (s)		6.0	6.0					6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		494	773					1758	2787	167	3203	
v/s Ratio Prot			c0.23					0.25		0.06	c0.46	
v/s Ratio Perm		0.09							0.56			
v/c Ratio		0.34	0.82					0.51	0.56	0.62	0.73	
Uniform Delay, d1		37.5	44.0					22.0	0.0	56.6	16.6	
Progression Factor		1.00	1.00					1.00	1.00	1.23	0.42	
Incremental Delay, d2		0.4	7.1					1.1	0.8	4.0	0.9	
Delay (s)		37.9	51.1					23.1	0.8	73.5	7.8	
Level of Service		D	D					C	A	E	A	
Approach Delay (s)		48.5			0.0			8.9			10.6	
Approach LOS		D			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
3: Kualakai Pkwy & RIRO

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	175	0	2040	2800	160
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.99	0.92
Hourly flow rate (vph)	0	190	0	2061	2828	174
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	Raised	
Median storage veh)				1	1	
Upstream signal (ft)				942	923	
pX, platoon unblocked	0.74	0.67	0.67			
vC, conflicting volume	3343	943	3002			
vC1, stage 1 conf vol	2828					
vC2, stage 2 conf vol	515					
vCu, unblocked vol	1514	0	2279			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	74	100			
cM capacity (veh/h)	54	731	148			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	190	515	515	515	515	943	943	943	174
Volume Left	0	0	0	0	0	0	0	0	0
Volume Right	190	0	0	0	0	0	0	0	174
cSH	731	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.26	0.30	0.30	0.30	0.30	0.55	0.55	0.55	0.10
Queue Length 95th (ft)	26	0	0	0	0	0	0	0	0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B								
Approach Delay (s)	11.6	0.0				0.0			
Approach LOS	B								

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		71.6%	ICU Level of Service	C
Analysis Period (min)		15	

Timings
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	565	215	375	755	550	480	1110	500	715	1965	410
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	54.0		10.0	54.0		9.0	54.0		9.0	54.0	
Total Split (s)	39.0	54.0		48.0	58.0		46.0	93.0		50.0	97.0	
Total Split (%)	15.9%	22.0%		19.6%	23.7%		18.8%	38.0%		20.4%	39.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 245
Actuated Cycle Length: 220.2
Natural Cycle: 170
Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Kualakai Pkwy & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
4: Kualakai Pkwy & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	565	215	375	755	550	480	1110	500	715	1965	410
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.91	1.00	0.97	0.91	0.88	0.97	0.86	1.00	0.94	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5085	1583	3433	5085	2787	3433	6408	1583	4990	6408	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)	272	614	234	408	821	598	522	1207	543	777	2136	446
RTOR Reduction (vph)	0	0	43	0	0	28	0	0	15	0	0	29
Lane Group Flow (vph)	272	614	191	408	821	570	522	1207	528	777	2136	417
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	18.1	35.1	78.9	32.8	49.8	96.4	37.8	88.7	127.5	40.6	91.5	115.6
Effective Green, g (s)	18.1	35.1	78.9	32.8	49.8	96.4	37.8	88.7	127.5	40.6	91.5	115.6
Actuated g/C Ratio	0.08	0.16	0.36	0.15	0.23	0.44	0.17	0.40	0.58	0.18	0.42	0.52
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	410	810	567	511	1150	1220	589	2581	916	920	2662	831
v/s Ratio Prot	0.05	0.12		c0.12	c0.16		0.15	0.19		c0.16	c0.33	
v/s Ratio Perm			0.12			0.20			0.33			0.26
v/c Ratio	0.66	0.76	0.34	0.80	0.71	0.47	0.89	0.47	0.58	0.84	0.80	0.50
Uniform Delay, d1	98.1	88.5	51.6	90.5	78.6	43.8	89.1	48.4	29.3	86.8	56.4	33.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	4.1	0.4	8.5	2.1	0.3	14.9	0.1	0.9	7.2	1.8	0.5
Delay (s)	102.1	92.6	51.9	99.0	80.8	44.0	104.0	48.5	30.2	93.9	58.3	34.2
Level of Service	F	F	D	F	F	D	F	D	C	F	E	C
Approach Delay (s)		86.4			72.8			56.9			63.3	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	66.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	220.2	Sum of lost time (s)	23.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	250	360	125	145	325	130	1670	110	540	1920	340
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	30.0		4.0	30.0	
Minimum Split (s)	10.0	44.0		10.0	28.0		9.0	36.0		10.0	36.0	
Total Split (s)	39.0	52.0		31.0	44.0		20.0	83.0		74.0	137.0	
Total Split (%)	16.3%	21.7%		12.9%	18.3%		8.3%	34.6%		30.8%	57.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 201.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

HCM Signalized Intersection Capacity Analysis
5: Kualakai Pkwy & UH West Oahu/Future D.R. Horton

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	250	360	125	145	325	130	1670	110	540	1920	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	3433	6408	1583	3433	6408	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)	136	272	391	136	158	353	141	1815	120	587	2087	370
RTOR Reduction (vph)	0	0	47	0	0	43	0	0	47	0	0	83
Lane Group Flow (vph)	136	272	344	136	158	310	141	1815	73	587	2087	287
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1			2 3			6 7
Actuated Green, G (s)	13.7	43.2	62.3	13.7	43.2	91.3	13.1	77.7	97.4	42.1	107.7	127.4
Effective Green, g (s)	13.7	43.2	62.3	13.7	43.2	91.3	13.1	77.7	97.4	42.1	107.7	127.4
Actuated g/C Ratio	0.07	0.22	0.31	0.07	0.22	0.45	0.07	0.39	0.49	0.21	0.54	0.63
Clearance Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	401	491	234	401	720	224	2480	768	720	3438	1004
v/s Ratio Prot	c0.04	0.15		0.04	0.08		0.04	c0.28		c0.17	0.33	
v/s Ratio Perm			c0.22			0.20			0.05			0.18
v/c Ratio	0.58	0.68	0.70	0.58	0.39	0.43	0.63	0.73	0.10	0.82	0.61	0.29
Uniform Delay, d1	90.7	72.4	61.0	90.7	67.5	37.1	91.4	52.6	27.9	75.6	32.0	16.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	4.5	4.5	3.6	0.6	0.4	5.4	1.1	0.1	7.1	0.3	0.2
Delay (s)	94.4	76.9	65.5	94.4	68.2	37.5	96.9	53.7	27.9	82.7	32.3	16.5
Level of Service	F	E	E	F	E	D	F	D	C	F	C	B
Approach Delay (s)		74.3			56.9			55.2			40.1	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	50.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	200.7	Sum of lost time (s)	24.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
6: Kualakai Pkwy & DHHL

5/14/2014

Lane Group	EBR	WBT	WBR	NBT	NBR	SBL	SBT	SBR	ø3
Lane Configurations									
Volume (vph)	95	0	430	1440	365	625	1600	105	
Turn Type	Free	NA	custom	NA	Perm	Prot	NA	Perm	
Protected Phases		8		2		1	6		3
Permitted Phases	Free		3 1		2			6	
Detector Phase		8	3 1	2	2	1	6	6	
Switch Phase									
Minimum Initial (s)		4.0		30.0	30.0	4.0	30.0	30.0	4.0
Minimum Split (s)		28.0		37.0	37.0	10.0	37.0	37.0	10.0
Total Split (s)		28.0		36.0	36.0	26.0	62.0	62.0	28.0
Total Split (%)		31.1%		40.0%	40.0%	28.9%	68.9%	68.9%	31%
Yellow Time (s)		4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lag	Lag	Lead			
Lead-Lag Optimize?									
Recall Mode		None		Min	Min	None	Min	Min	None

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Kualakai Pkwy & DHHL

HCM Signalized Intersection Capacity Analysis
6: Kualakai Pkwy & DHHL

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	95	300	0	430	0	1440	365	625	1600	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0
Lane Util. Factor			1.00		0.95	0.95		0.91	1.00	0.97	0.91	1.00
Frt			0.86		0.97	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00		0.96	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611		1648	1504		5085	1583	3433	5085	1583
Flt Permitted			1.00		0.96	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)			1611		1648	1504		5085	1583	3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	103	326	0	467	0	1565	397	679	1739	114
RTOR Reduction (vph)	0	0	0	0	82	17	0	0	262	0	0	43
Lane Group Flow (vph)	0	0	103	0	333	361	0	1565	135	679	1739	71
Turn Type			Free	Prot	NA	custom		NA	Perm	Prot	NA	Perm
Protected Phases				3	8			2		1	6	
Permitted Phases			Free			3 1			2			6
Actuated Green, G (s)			90.4		22.0	47.6		30.8	30.8	19.6	56.4	56.4
Effective Green, g (s)			90.4		22.0	47.6		30.8	30.8	19.6	56.4	56.4
Actuated g/C Ratio			1.00		0.24	0.53		0.34	0.34	0.22	0.62	0.62
Clearance Time (s)					6.0			6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)					3.0			3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			1611		401	791		1732	539	744	3172	987
v/s Ratio Prot					c0.20			c0.31		c0.20	0.34	
v/s Ratio Perm			0.06			0.24			0.09			0.04
v/c Ratio			0.06		0.83	0.46		0.90	0.25	0.91	0.55	0.07
Uniform Delay, d1			0.0		32.4	13.3		28.4	21.5	34.6	9.7	6.7
Progression Factor			1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2			0.1		13.2	0.4		7.0	0.2	15.5	0.2	0.0
Delay (s)			0.1		45.7	13.8		35.4	21.7	50.1	9.9	6.7
Level of Service			A		D	B		D	C	D	A	A
Approach Delay (s)		0.1			30.5			32.7			20.5	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	200	210	365	280	275	485	250	980	685	975	325
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA	Prot	NA	custom
Protected Phases	7	4		3	8		5	2	1	6	
Permitted Phases			4 5			8 1					6 7
Detector Phase	7	4	4 5	3	8	8 1	5	2	1	6	6 7
Switch Phase											
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	45.0	4.0	45.0	
Minimum Split (s)	9.0	40.0		9.0	40.0		9.0	51.0	9.0	51.0	
Total Split (s)	24.0	40.0		31.0	47.0		26.0	62.0	47.0	83.0	
Total Split (%)	13.3%	22.2%		17.2%	26.1%		14.4%	34.4%	26.1%	46.1%	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.0		5.0	6.0		5.0	6.0	5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	None	None		None	None		None	Min	None	Min	

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 171.3
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Kualakai Pkwy & East West/East West Rd

HCM Signalized Intersection Capacity Analysis
7: Kualakai Pkwy & East West/East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	210	365	280	275	485	250	980	425	685	975	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	0.88	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	3433	1863	2787	3433	4855		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	2787	3433	4855		3433	5085	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)	217	228	397	304	299	527	272	1065	462	745	1060	353
RTOR Reduction (vph)	0	0	74	0	0	25	0	42	0	0	0	58
Lane Group Flow (vph)	217	228	323	304	299	502	272	1485	0	745	1060	295
Turn Type	Prot	NA	custom	Prot	NA	custom	Prot	NA		Prot	NA	custom
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4 5			8 1						6 7
Actuated Green, G (s)	15.9	31.5	55.7	20.5	36.1	83.1	18.2	56.3		41.0	79.1	101.0
Effective Green, g (s)	15.9	31.5	55.7	20.5	36.1	83.1	18.2	56.3		41.0	79.1	101.0
Actuated g/C Ratio	0.09	0.18	0.33	0.12	0.21	0.49	0.11	0.33		0.24	0.46	0.59
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	318	342	514	410	392	1352	364	1595		821	2348	933
v/s Ratio Prot	0.06	0.12		c0.09	c0.16		0.08	c0.31		c0.22	0.21	
v/s Ratio Perm			0.20			0.18						0.19
v/c Ratio	0.68	0.67	0.63	0.74	0.76	0.37	0.75	0.93		0.91	0.45	0.32
Uniform Delay, d1	75.3	65.0	49.0	72.8	63.6	27.7	74.3	55.6		63.3	31.3	17.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.9	4.9	2.4	7.1	8.5	0.2	8.1	10.2		13.6	0.1	0.2
Delay (s)	81.2	69.9	51.5	79.9	72.1	27.9	82.4	65.8		76.9	31.5	17.9
Level of Service	F	E	D	E	E	C	F	E		E	C	B
Approach Delay (s)		64.1			53.6			68.3			45.0	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	56.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	171.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	910	780	65	360	490	380	70	380	230	525	385	710
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Detector Phase	7	4	4	3	8	8 1	5	2	2 3	1	6	6 7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	44.0	44.0	44.0	44.0	44.0		9.0	44.0		9.0	45.0	
Total Split (s)	44.0	44.0	44.0	44.0	44.0		18.0	44.0		28.0	54.0	
Total Split (%)	27.5%	27.5%	27.5%	27.5%	27.5%		11.3%	27.5%		17.5%	33.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None		None	None	

Intersection Summary
Cycle Length: 160
Actuated Cycle Length: 141
Natural Cycle: 145
Control Type: Actuated-Uncoordinated

Splits and Phases: 8: Kapolei Pkwy & Kualakai Pkwy

HCM Signalized Intersection Capacity Analysis
8: Kapolei Pkwy & Kualakai Pkwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	910	780	65	360	490	380	70	380	230	525	385	710
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	5.0	6.0	6.0
Lane Util. Factor	0.94	0.95	1.00	0.97	0.91	0.88	1.00	0.95	1.00	0.94	0.95	0.88
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	3539	1583	3433	5085	2787	1770	3539	1583	4990	3539	2787
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)	989	848	71	391	533	413	76	413	250	571	418	772
RTOR Reduction (vph)	0	0	51	0	0	0	0	0	49	0	0	83
Lane Group Flow (vph)	989	848	20	391	533	413	76	413	201	571	418	689
Confl. Peds. (#/hr)												4
Turn Type	Prot	NA	Perm	Prot	NA	pt+ov	Prot	NA	custom	Prot	NA	pt+ov
Protected Phases	7	4		3	8	8 1	5	2		1	6	6 7
Permitted Phases			4						2 3			
Actuated Green, G (s)	35.2	40.8	40.8	23.3	28.9	55.9	8.9	33.9	63.2	21.0	46.0	87.2
Effective Green, g (s)	35.2	40.8	40.8	23.3	28.9	55.9	8.9	33.9	63.2	21.0	46.0	87.2
Actuated g/C Ratio	0.25	0.29	0.29	0.16	0.20	0.39	0.06	0.24	0.45	0.15	0.32	0.61
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1236	1016	454	563	1034	1097	110	844	704	737	1146	1711
v/s Ratio Prot	c0.20	c0.24		0.11	0.10	0.15	0.04	c0.12		c0.11	0.12	0.25
v/s Ratio Perm			0.01						0.13			
v/c Ratio	0.80	0.83	0.04	0.69	0.52	0.38	0.69	0.49	0.28	0.77	0.36	0.40
Uniform Delay, d1	50.1	47.4	36.5	56.0	50.3	30.6	65.2	46.6	25.0	58.2	36.8	14.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	6.0	0.0	3.7	0.4	0.2	17.1	0.4	0.2	5.1	0.2	0.2
Delay (s)	53.9	53.5	36.6	59.7	50.8	30.9	82.3	47.0	25.3	63.3	37.0	14.2
Level of Service	D	D	D	E	D	C	F	D	C	E	D	B
Approach Delay (s)		53.1			47.2			43.3			35.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	142.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
21: Kunia Rd & North Kupuna Lp

5/14/2014

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	0	665	0	55	5	1165	150	1600
Turn Type	NA	Split	NA	Perm	Prot	NA	Prot	NA
Protected Phases	8	4	4		5	2	1	6
Permitted Phases				4				
Detector Phase	8	4	4	4	5	2	1	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	34.0	34.0	34.0	9.0	36.0	9.0	10.0
Total Split (s)	10.0	48.0	48.0	48.0	15.0	97.0	25.0	107.0
Total Split (%)	5.6%	26.7%	26.7%	26.7%	8.3%	53.9%	13.9%	59.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	6.0	5.0	6.0
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 7 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 21: Kunia Rd & North Kupuna Lp

HCM Signalized Intersection Capacity Analysis
21: Kunia Rd & North Kupuna Lp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	665	0	55	5	1165	615	150	1600	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95		1.00	0.91	
Frt		0.86		1.00	1.00	0.85	1.00	0.95		1.00	1.00	
Flt Protected		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611		1681	1681	1583	1770	3356		1770	5085	
Flt Permitted		1.00		0.95	0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1611		1681	1681	1583	1770	3356		1770	5085	
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	0	11	723	0	60	5	1266	668	163	1739	0
RTOR Reduction (vph)	0	11	0	0	0	46	0	35	0	0	0	0
Lane Group Flow (vph)	0	0	0	361	362	14	5	1899	0	163	1739	0
Turn Type	Split	NA		Split	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	8	8		4	4		5	2		1	6	
Permitted Phases						4						
Actuated Green, G (s)		2.2		41.6	41.6	41.6	1.5	97.1		19.1	114.7	
Effective Green, g (s)		2.2		41.6	41.6	41.6	1.5	97.1		19.1	114.7	
Actuated g/C Ratio		0.01		0.23	0.23	0.23	0.01	0.54		0.11	0.64	
Clearance Time (s)		4.0		5.0	5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		19		388	388	365	14	1810		187	3240	
v/s Ratio Prot		c0.00		0.21	c0.22		0.00	c0.57		c0.09	0.34	
v/s Ratio Perm						0.01						
v/c Ratio		0.01		0.93	0.93	0.04	0.36	1.05		0.87	0.54	
Uniform Delay, d1		87.8		67.8	67.8	53.7	88.8	41.5		79.2	18.0	
Progression Factor		1.00		1.00	1.00	1.00	1.34	0.70		1.00	1.00	
Incremental Delay, d2		0.1		28.7	29.2	0.0	11.1	32.5		33.0	0.6	
Delay (s)		88.0		96.5	97.0	53.7	130.0	61.5		112.2	18.6	
Level of Service		F		F	F	D	F	E		F	B	
Approach Delay (s)		88.0			93.5			61.7			26.7	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	52.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings
22: Kunia Rd & South Kupuna Lp

5/14/2014

Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Configurations					
Volume (vph)	455	25	1720	950	2355
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		2	
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	22.0	22.0	10.0
Total Split (s)	62.0	62.0	118.0	118.0	118.0
Total Split (%)	34.4%	34.4%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max

Intersection Summary
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 22: Kunia Rd & South Kupuna Lp

HCM Signalized Intersection Capacity Analysis
22: Kunia Rd & South Kupuna Lp

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	25	1720	950	0	2355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	0.95	1.00		0.91
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3433	1583	3539	1583		5085
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3433	1583	3539	1583		5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	495	27	1870	1033	0	2560
RTOR Reduction (vph)	0	15	0	148	0	0
Lane Group Flow (vph)	495	12	1870	885	0	2560
Turn Type	NA	Perm	NA	Perm		NA
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	31.7	31.7	136.3	136.3		136.3
Effective Green, g (s)	31.7	31.7	136.3	136.3		136.3
Actuated g/C Ratio	0.18	0.18	0.76	0.76		0.76
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	604	278	2679	1198		3850
v/s Ratio Prot	c0.14		0.53			0.50
v/s Ratio Perm		0.01		c0.56		
v/c Ratio	0.82	0.04	0.70	0.74		0.66
Uniform Delay, d1	71.4	61.6	11.3	12.0		10.7
Progression Factor	1.00	1.00	1.00	1.00		0.81
Incremental Delay, d2	8.5	0.1	1.5	4.1		0.7
Delay (s)	79.9	61.6	12.8	16.1		9.4
Level of Service	E	E	B	B		A
Approach Delay (s)	79.0		14.0			9.4
Approach LOS	E		B			A

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	180.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: H-1 WB On-Ramp SBR & Kunia Rd

5/14/2014

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	0	2500	2075	760	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2717	2255	826	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		229	418			
pX, platoon unblocked	0.74				0.74	0.74
vC, conflicting volume	3082				3574	1165
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2580				3247	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	123				5	801

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	906	906	906	902	902	1277
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	826
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.53	0.53	0.53	0.53	0.53	0.75
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

Timings
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Lane Group	NBL	NBT	SBT
Lane Configurations			
Volume (vph)	190	2500	2075
Turn Type	Prot	NA	NA
Protected Phases	5	2	6
Permitted Phases			
Detector Phase	5	2	6
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0
Total Split (s)	25.0	90.0	65.0
Total Split (%)	27.8%	100.0%	72.2%
Yellow Time (s)	4.0	2.0	4.0
All-Red Time (s)	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	2.0	6.0
Lead/Lag	Lead		Lag
Lead-Lag Optimize?			
Recall Mode	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 84
Natural Cycle: 45
Control Type: Actuated-Uncoordinated

Splits and Phases: 24: Kunia Rd & H-1 WB On-Ramp NBL

HCM Signalized Intersection Capacity Analysis
24: Kunia Rd & H-1 WB On-Ramp NBL

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	190	2500	2075	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	2.0	6.0	
Lane Util. Factor			1.00	0.91	0.91	
Frt			1.00	1.00	1.00	
Flt Protected			0.95	1.00	1.00	
Satd. Flow (prot)			1770	5085	5085	
Flt Permitted			0.95	1.00	1.00	
Satd. Flow (perm)			1770	5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	207	2717	2255	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	207	2717	2255	0
Turn Type			Prot	NA	NA	
Protected Phases			5	2	6	
Permitted Phases						
Actuated Green, G (s)			14.7	84.0	57.3	
Effective Green, g (s)			14.7	84.0	57.3	
Actuated g/C Ratio			0.17	1.00	0.68	
Clearance Time (s)			6.0	2.0	6.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)			309	5085	3468	
v/s Ratio Prot			0.12	c0.53	c0.44	
v/s Ratio Perm						
v/c Ratio			0.67	0.53	0.65	
Uniform Delay, d1			32.4	0.0	7.6	
Progression Factor			1.00	1.00	1.00	
Incremental Delay, d2			5.4	0.1	0.4	
Delay (s)			37.8	0.1	8.1	
Level of Service			D	A	A	
Approach Delay (s)	0.0			2.8	8.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	485	355	1480	665	4115
Turn Type	Prot	Free	NA	Prot	NA
Protected Phases	7		2	1	6
Permitted Phases		Free			
Detector Phase	7		2	1	6
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0		26.0	10.0	10.0
Total Split (s)	40.0		87.0	43.0	130.0
Total Split (%)	23.5%		51.2%	25.3%	76.5%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None		None	None	None

Intersection Summary
Cycle Length: 170
Actuated Cycle Length: 165.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

HCM Signalized Intersection Capacity Analysis
26: Kunia Rd & H-1 EB Off Ramp/H-1EB On Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	0	355	0	0	0	0	1480	0	665	4115	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0					6.0		6.0	6.0	
Lane Util. Factor	0.97		1.00					0.95		0.97	0.86	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583					3539		3433	6408	
Flt Permitted	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (perm)	3433		1583					3539		3433	6408	
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)	527	0	386	0	0	0	0	1609	0	723	4473	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	527	0	386	0	0	0	0	1609	0	723	4473	0
Turn Type	Prot		Free					NA		Prot	NA	
Protected Phases	7							2		1	6	
Permitted Phases			Free									
Actuated Green, G (s)	29.7		165.8					81.4		36.7	124.1	
Effective Green, g (s)	29.7		165.8					81.4		36.7	124.1	
Actuated g/C Ratio	0.18		1.00					0.49		0.22	0.75	
Clearance Time (s)	6.0							6.0		6.0	6.0	
Vehicle Extension (s)	3.0							3.0		3.0	3.0	
Lane Grp Cap (vph)	614		1583					1737		759	4796	
v/s Ratio Prot	c0.15							0.45		0.21	c0.70	
v/s Ratio Perm			0.24									
v/c Ratio	0.86		0.24					0.93		0.95	0.93	
Uniform Delay, d1	66.0		0.0					39.4		63.7	17.4	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	11.4		0.4					8.9		21.7	4.1	
Delay (s)	77.5		0.4					48.3		85.4	21.4	
Level of Service	E		A					D		F	C	
Approach Delay (s)		44.9			0.0			48.3			30.3	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	165.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Lane Group	NBT	ø8
Lane Configurations		
Volume (vph)	1950	
Turn Type	NA	
Protected Phases	2	8
Permitted Phases		
Detector Phase	2	
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	10.0	25.0
Total Split (s)	141.0	25.0
Total Split (%)	84.9%	15%
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	6.0	
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	Max	None

Intersection Summary
Cycle Length: 166
Actuated Cycle Length: 146
Natural Cycle: 80
Control Type: Actuated-Uncoordinated

Splits and Phases: 27: H-1 EB On-Ramp from Kunia Rd

HCM Signalized Intersection Capacity Analysis
27: H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1950	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0			
Lane Util. Factor			0.95			
Frt			1.00			
Flt Protected			1.00			
Satd. Flow (prot)			3539			
Flt Permitted			1.00			
Satd. Flow (perm)			3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2120	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2120	0	0	0
Turn Type		custom	NA			
Protected Phases			2			
Permitted Phases		8				
Actuated Green, G (s)			135.6			
Effective Green, g (s)			135.6			
Actuated g/C Ratio			0.90			
Clearance Time (s)			6.0			
Vehicle Extension (s)			3.0			
Lane Grp Cap (vph)			3180			
v/s Ratio Prot			c0.60			
v/s Ratio Perm						
v/c Ratio			0.67			
Uniform Delay, d1			1.9			
Progression Factor			1.00			
Incremental Delay, d2			1.1			
Delay (s)			3.1			
Level of Service			A			
Approach Delay (s)	0.0		3.1			0.0
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	3.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	150.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
28: Kunia Rd & H-1 EB On-Ramp from Kunia Rd

5/14/2014

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Volume (veh/h)	1480	1950	0	4470	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1609	2120	0	4859	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)				498		
pX, platoon unblocked					0.27	
vC, conflicting volume			3728		2823	804
vC1, stage 1 conf vol					1609	
vC2, stage 2 conf vol					1215	
vCu, unblocked vol			3728		0	804
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			57		275	326

Direction, Lane #	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	804	804	1060	1060	1215	1215	1215	1215
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	1060	1060	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.47	0.47	0.62	0.62	0.71	0.71	0.71	0.71
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS								
Approach Delay (s)	0.0				0.0			
Approach LOS								

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.
Channelized right turn lanes are not counted.

Lane Group	EBL	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	125	150	40	115	50	2335	35	115	3185	125
Turn Type	Perm	NA	Perm	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			5	2		1	6	
Permitted Phases	4		8	8			2			6
Detector Phase	4	4	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	51.0	51.0	51.0	51.0	10.0	39.0	39.0	10.0	28.0	28.0
Total Split (s)	51.0	51.0	51.0	51.0	15.0	159.0	159.0	30.0	174.0	174.0
Total Split (%)	21.3%	21.3%	21.3%	21.3%	6.3%	66.3%	66.3%	12.5%	72.5%	72.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary

Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 180
Control Type: Actuated-Coordinated

Splits and Phases: 45: Ft Weaver Rd & Laulaunui St

HCM Signalized Intersection Capacity Analysis
45: Ft Weaver Rd & Laulaunui St

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	150	35	40	0	115	50	2335	35	115	3185	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0		6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00		1.00	1.00	1.00	0.97	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.98		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1797		1743		1583	1770	5085	1543	1770	5085	1498
Flt Permitted	0.76	1.00		0.30		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1410	1797		547		1583	1770	5085	1543	1770	5085	1498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	150%	100%	100%	100%
Adj. Flow (vph)	136	163	38	43	0	125	54	2538	57	125	3217	136
RTOR Reduction (vph)	0	3	0	0	0	101	0	0	18	0	0	20
Lane Group Flow (vph)	136	198	0	43	0	24	54	2538	39	125	3217	116
Confl. Peds. (#/hr)			16	16					6			6
Turn Type	Perm	NA		Perm		Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	37.0	37.0		37.0		37.0	9.6	163.1	163.1	20.9	174.4	174.4
Effective Green, g (s)	37.0	37.0		37.0		37.0	9.6	163.1	163.1	20.9	174.4	174.4
Actuated g/C Ratio	0.15	0.15		0.15		0.15	0.04	0.68	0.68	0.09	0.73	0.73
Clearance Time (s)	6.0	6.0		6.0		6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	217	277		84		244	70	3455	1048	154	3695	1088
v/s Ratio Prot		c0.11					0.03	0.50		c0.07	c0.63	
v/s Ratio Perm	0.10			0.08		0.02			0.03			0.08
v/c Ratio	0.63	0.71		0.51		0.10	0.77	0.73	0.04	0.81	0.87	0.11
Uniform Delay, d1	95.0	96.5		93.2		87.2	114.1	24.6	12.6	107.6	24.4	9.7
Progression Factor	1.00	1.00		1.00		1.00	0.80	0.97	3.63	1.00	1.01	1.02
Incremental Delay, d2	5.6	8.4		5.2		0.2	26.9	0.9	0.0	26.7	3.1	0.2
Delay (s)	100.6	104.9		98.4		87.4	118.7	24.6	46.0	134.8	27.7	10.2
Level of Service	F	F		F		F	F	C	D	F	C	B
Approach Delay (s)		103.1			90.2			27.0			30.9	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Timings
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	295	105	220	10	115	255	2130	50	160	2920	355
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8		5	2		1	6	
Permitted Phases			4		8			2			6
Detector Phase	4	4	4	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	38.0	38.0	38.0	10.0	10.0	10.0	33.0	33.0	10.0	33.0	33.0
Total Split (s)	39.0	39.0	39.0	16.0	16.0	28.0	143.0	143.0	42.0	157.0	157.0
Total Split (%)	16.3%	16.3%	16.3%	6.7%	6.7%	11.7%	59.6%	59.6%	17.5%	65.4%	65.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag						Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

HCM Signalized Intersection Capacity Analysis
46: Ft Weaver Rd & Old Ft Weaver Rd/Aawa Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	295	105	220	35	10	115	255	2130	50	160	2920	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.97		1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1728	1533		1793	1583	3433	5085	1551	1770	5085	1560
Flt Permitted	0.95	0.98	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1728	1533		1793	1583	3433	5085	1551	1770	5085	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	321	114	239	38	11	125	277	2315	54	174	2949	386
RTOR Reduction (vph)	0	0	135	0	0	120	0	0	21	0	0	121
Lane Group Flow (vph)	215	220	104	0	49	5	277	2315	33	174	2949	265
Confl. Peds. (#/hr)			9	9					3			1
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	32.3	32.3	32.3		9.5	9.5	21.6	144.7	144.7	28.5	151.6	151.6
Effective Green, g (s)	32.3	32.3	32.3		9.5	9.5	21.6	144.7	144.7	28.5	151.6	151.6
Actuated g/C Ratio	0.13	0.13	0.13		0.04	0.04	0.09	0.60	0.60	0.12	0.63	0.63
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	226	232	206		70	62	308	3065	935	210	3212	985
v/s Ratio Prot	c0.13	0.13			c0.03		0.08	0.46		c0.10	c0.58	
v/s Ratio Perm			0.07			0.00			0.02			0.17
v/c Ratio	0.95	0.95	0.50		0.70	0.08	0.90	0.76	0.03	0.83	0.92	0.27
Uniform Delay, d1	103.1	103.0	96.4		113.8	111.0	108.1	34.7	19.3	103.4	38.8	19.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.84	1.02	1.00	0.93	0.77	2.01
Incremental Delay, d2	46.1	44.3	1.9		26.3	0.6	22.9	1.4	0.1	14.0	3.2	0.4
Delay (s)	149.2	147.3	98.4		140.2	111.6	114.3	36.8	19.4	110.2	33.2	39.8
Level of Service	F	F	F		F	F	F	D	B	F	C	D
Approach Delay (s)		130.6			119.6			44.6			37.7	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Lane Group	NBT	SBT	ø4
Lane Configurations			
Volume (vph)	2380	3335	
Turn Type	NA	NA	
Protected Phases	2	6	4
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	45.0
Total Split (s)	75.0	75.0	45.0
Total Split (%)	62.5%	62.5%	38%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.0	6.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 49 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

HCM Signalized Intersection Capacity Analysis
47: Ft Weaver Rd & CrossWalk at Hale O Ulu School

5/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	0	2380	3335	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	
Lane Util. Factor				0.91	0.91	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5085	5085	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.99	0.92
Adj. Flow (vph)	0	0	0	2587	3369	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2587	3369	0
Turn Type				NA	NA	
Protected Phases				2	6	
Permitted Phases						
Actuated Green, G (s)				92.4	92.4	
Effective Green, g (s)				92.4	92.4	
Actuated g/C Ratio				0.77	0.77	
Clearance Time (s)				6.0	6.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				3915	3915	
v/s Ratio Prot				0.51	c0.66	
v/s Ratio Perm						
v/c Ratio				0.66	0.86	
Uniform Delay, d1				6.5	9.4	
Progression Factor				0.95	1.93	
Incremental Delay, d2				0.7	1.3	
Delay (s)				6.8	19.5	
Level of Service				A	B	
Approach Delay (s)	0.0			6.8	19.5	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
48: Ft Weaver Rd & Renton Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	300	30	165	15	20	185	1945	35	70	2725	395
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3		5	2		1	6	
Permitted Phases			4		3			2			6
Detector Phase	4	4	4	3	3	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	5.0	5.0	5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	41.0	41.0	41.0	11.0	11.0	11.0	29.0	29.0	11.0	27.0	27.0
Total Split (s)	43.0	43.0	43.0	14.0	14.0	35.0	153.0	153.0	30.0	148.0	148.0
Total Split (%)	17.9%	17.9%	17.9%	5.8%	5.8%	14.6%	63.8%	63.8%	12.5%	61.7%	61.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 96 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 175
Control Type: Actuated-Coordinated

Splits and Phases: 48: Ft Weaver Rd & Renton Rd

HCM Signalized Intersection Capacity Analysis
48: Ft Weaver Rd & Renton Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	30	165	25	15	20	185	1945	35	70	2725	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.90		1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1700	1430		1806	1583	1770	5085	1391	1770	5085	1346
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)	326	33	179	27	16	22	201	2114	38	76	2962	429
RTOR Reduction (vph)	0	0	91	0	0	21	0	0	13	0	0	170
Lane Group Flow (vph)	179	180	88	0	43	1	201	2114	25	76	2962	259
Confl. Peds. (#/hr)			42						19			21
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			4			3			2			6
Actuated Green, G (s)	33.0	33.0	33.0		7.7	7.7	29.4	159.6	159.6	14.7	144.9	144.9
Effective Green, g (s)	33.0	33.0	33.0		7.7	7.7	29.4	159.6	159.6	14.7	144.9	144.9
Actuated g/C Ratio	0.14	0.14	0.14		0.03	0.03	0.12	0.66	0.66	0.06	0.60	0.60
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		2.0	2.0	2.0	5.0	5.0	2.0	5.0	5.0
Lane Grp Cap (vph)	231	233	196		57	50	216	3381	925	108	3070	812
v/s Ratio Prot	c0.11	0.11			c0.02		c0.11	0.42		0.04	c0.58	
v/s Ratio Perm			0.06			0.00			0.02			0.19
v/c Ratio	0.77	0.77	0.45		0.75	0.01	0.93	0.63	0.03	0.70	0.96	0.32
Uniform Delay, d1	99.9	99.9	95.1		115.2	112.5	104.3	23.1	13.7	110.5	45.1	23.3
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.90	1.38	69.85	1.13	0.43	2.38
Incremental Delay, d2	14.9	14.6	1.6		38.8	0.0	36.7	0.7	0.0	9.8	6.8	0.6
Delay (s)	114.8	114.5	96.7		154.0	112.5	131.0	32.5	958.2	134.5	26.2	56.2
Level of Service	F	F	F		F	F	F	C	F	F	C	E
Approach Delay (s)		108.7			139.9			55.9			32.3	
Approach LOS		F			F			E			C	

Intersection Summary			
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Timings
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	235	75	50	85	405	35	1545	5	420	2215	450
Turn Type	Split	NA	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4		5	2		1	6	
Permitted Phases			3		4			2			6
Detector Phase	3	3	3	4	4	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	60.0	60.0	60.0	10.0	10.0	10.0	46.0	46.0	10.0	46.0	46.0
Total Split (s)	61.0	61.0	61.0	33.0	33.0	27.0	108.0	108.0	38.0	119.0	119.0
Total Split (%)	25.4%	25.4%	25.4%	13.8%	13.8%	11.3%	45.0%	45.0%	15.8%	49.6%	49.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 136 (57%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 170
Control Type: Actuated-Coordinated

Splits and Phases: 49: Ft Weaver Rd & Kolowaka Dr

HCM Signalized Intersection Capacity Analysis
49: Ft Weaver Rd & Kolowaka Dr

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	75	50	10	85	405	35	1545	5	420	2215	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.95	0.95	1.00		1.00	0.88	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.97	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1725	1583		1853	2787	1770	5085	1583	3433	5085	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)	255	82	54	11	92	440	38	1679	5	457	2408	489
RTOR Reduction (vph)	0	0	47	0	0	381	0	0	2	0	0	124
Lane Group Flow (vph)	166	171	7	0	103	59	38	1679	3	457	2408	365
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			6
Actuated Green, G (s)	29.3	29.3	29.3		19.0	19.0	9.3	134.7	134.7	32.0	157.4	157.4
Effective Green, g (s)	29.3	29.3	29.3		19.0	19.0	9.3	134.7	134.7	32.0	157.4	157.4
Actuated g/C Ratio	0.12	0.12	0.12		0.08	0.08	0.04	0.56	0.56	0.13	0.66	0.66
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	210	193		146	220	68	2853	888	457	3334	1038
v/s Ratio Prot	0.10	c0.10			c0.06		0.02	0.33		c0.13	c0.47	
v/s Ratio Perm			0.00			0.02			0.00			0.23
v/c Ratio	0.81	0.81	0.03		0.71	0.27	0.56	0.59	0.00	1.00	0.72	0.35
Uniform Delay, d1	102.6	102.7	92.9		107.8	104.0	113.3	34.5	23.1	104.0	27.0	18.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.15	0.53	1.00	1.37	0.22	0.03
Incremental Delay, d2	20.5	20.9	0.1		14.4	0.7	7.8	0.7	0.0	28.1	0.6	0.4
Delay (s)	123.1	123.6	92.9		122.2	104.6	138.4	19.1	23.1	170.8	6.4	1.0
Level of Service	F	F	F		F	F	F	B	C	F	A	A
Approach Delay (s)		119.2			107.9			21.7			28.0	
Approach LOS		F			F			C			C	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1770	255
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Detector Phase	3	3	3 5	4	4	4	5	2	2 4	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		9.0	9.0	9.0	3.0	20.0		3.0	20.0	20.0
Minimum Split (s)	33.0	33.0		15.0	15.0	15.0	9.0	46.0		9.0	46.0	46.0
Total Split (s)	44.0	44.0		57.0	57.0	57.0	27.0	96.0		43.0	112.0	112.0
Total Split (%)	18.3%	18.3%		23.8%	23.8%	23.8%	11.3%	40.0%		17.9%	46.7%	46.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	5.0		4.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	C-Max

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 65 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 135
Control Type: Actuated-Coordinated

Splits and Phases: 50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

HCM Signalized Intersection Capacity Analysis
50: Ft Weaver Rd & Geiger Rd/Iroquois Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	305	205	35	345	245	210	1230	40	390	1770	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	0.88	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1610	3360	1583	1770	1863	2787	3433	5085	1583	3433	5085	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	0.99	0.92
Adj. Flow (vph)	266	332	223	38	375	266	228	1337	43	424	1788	277
RTOR Reduction (vph)	0	0	57	0	0	46	0	0	16	0	0	84
Lane Group Flow (vph)	194	404	166	38	375	220	228	1337	27	424	1788	193
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	Perm
Protected Phases	3	3		4	4	4	5	2		1	6	
Permitted Phases			3 5			4 1			2 4			6
Actuated Green, G (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Effective Green, g (s)	33.4	33.4	52.5	49.8	49.8	82.9	19.1	98.7	148.5	33.1	112.7	112.7
Actuated g/C Ratio	0.14	0.14	0.22	0.21	0.21	0.35	0.08	0.41	0.62	0.14	0.47	0.47
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	7.0		6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	5.0		2.0	5.0	5.0
Lane Grp Cap (vph)	224	467	346	367	386	1032	273	2091	979	473	2387	743
v/s Ratio Prot	c0.12	0.12		0.02	c0.20	0.04	0.07	0.26		c0.12	c0.35	
v/s Ratio Perm			0.10			0.03			0.02			0.12
v/c Ratio	0.87	0.87	0.48	0.10	0.97	0.21	0.84	0.64	0.03	0.90	0.75	0.26
Uniform Delay, d1	101.1	101.1	81.8	77.0	94.4	55.5	108.9	56.4	17.7	101.8	52.1	38.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.69	1.65	2.65
Incremental Delay, d2	26.9	14.9	0.4	0.0	38.0	0.0	18.5	1.5	0.0	14.3	1.6	0.6
Delay (s)	128.0	115.9	82.2	77.1	132.4	55.5	127.4	57.9	17.7	84.1	87.6	102.6
Level of Service	F	F	F	E	F	E	F	E	B	F	F	F
Approach Delay (s)		109.6			99.2			66.7			88.7	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	86.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
61: Driveway 1 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1565	120	70	1935	40	120	15	45	40	15	140
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	28.0	28.0	8.0	26.0	26.0	28.0	28.0	28.0	38.0	38.0	38.0
Total Split (s)	23.0	67.0	67.0	15.0	59.0	59.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	19.2%	55.8%	55.8%	12.5%	49.2%	49.2%	31.7%	31.7%	31.7%	31.7%	31.7%	31.7%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	2.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 61: Driveway 1 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
61: Driveway 1 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	1565	120	70	1935	40	120	15	45	40	15	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1783	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.76	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1318	1583		1410	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)	207	1701	130	76	2103	43	130	16	49	43	16	152
RTOR Reduction (vph)	0	0	50	0	0	21	0	0	38	0	0	114
Lane Group Flow (vph)	207	1701	80	76	2103	22	0	146	11	0	59	38
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	17.4	67.9	67.9	8.3	60.8	60.8		27.8	27.8		29.8	29.8
Effective Green, g (s)	17.4	67.9	67.9	8.3	60.8	60.8		27.8	27.8		29.8	29.8
Actuated g/C Ratio	0.14	0.57	0.57	0.07	0.51	0.51		0.23	0.23		0.25	0.25
Clearance Time (s)	4.0	6.0	6.0	4.0	4.0	4.0		6.0	6.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	256	2877	895	122	2576	802		305	366		350	393
v/s Ratio Prot	c0.12	0.33		0.04	c0.41							
v/s Ratio Perm			0.05			0.01		c0.11	0.01		0.04	0.02
v/c Ratio	0.81	0.59	0.09	0.62	0.82	0.03		0.48	0.03		0.17	0.10
Uniform Delay, d1	49.7	17.0	11.9	54.3	24.9	14.8		39.8	35.7		35.4	34.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	16.9	0.9	0.2	9.5	3.0	0.1		1.2	0.0		0.2	0.1
Delay (s)	66.6	17.9	12.1	63.8	27.9	14.9		41.0	35.7		35.6	34.8
Level of Service	E	B	B	E	C	B		D	D		D	C
Approach Delay (s)		22.5			28.9			39.7			35.1	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
62: Driveway 2 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1325	55	65	1845	50	95	15	20	40	15	140
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	24.0	75.0	75.0	17.0	68.0	68.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	18.2%	56.8%	56.8%	12.9%	51.5%	51.5%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 132
Actuated Cycle Length: 132
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated

Splits and Phases: 62: Driveway 2 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
62: Driveway 2 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	1325	55	65	1845	50	95	15	20	40	15	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1785	1583		1797	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.71	1.00		0.74	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1328	1583		1383	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)	190	1440	60	71	2005	54	103	16	22	43	16	152
RTOR Reduction (vph)	0	0	25	0	0	26	0	0	17	0	0	118
Lane Group Flow (vph)	190	1440	35	71	2005	28	0	119	5	0	59	34
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	16.9	76.5	76.5	8.3	67.9	67.9		29.2	29.2		29.2	29.2
Effective Green, g (s)	16.9	76.5	76.5	8.3	67.9	67.9		29.2	29.2		29.2	29.2
Actuated g/C Ratio	0.13	0.58	0.58	0.06	0.51	0.51		0.22	0.22		0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	226	2946	917	111	2615	814		293	350		305	350
v/s Ratio Prot	c0.11	0.28		0.04	c0.39							
v/s Ratio Perm			0.02			0.02		c0.09	0.00		0.04	0.02
v/c Ratio	0.84	0.49	0.04	0.64	0.77	0.03		0.41	0.01		0.19	0.10
Uniform Delay, d1	56.2	16.3	11.9	60.4	25.7	15.8		44.0	40.2		41.8	40.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	23.5	0.6	0.1	11.5	2.2	0.1		0.9	0.0		0.3	0.1
Delay (s)	79.8	16.9	12.0	71.9	27.9	15.9		44.9	40.2		42.1	41.0
Level of Service	E	B	B	E	C	B		D	D		D	D
Approach Delay (s)		23.8			29.1			44.2			41.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
63: Driveway 3 & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Volume (vph)	1275	115	1840	110	65
Turn Type	NA	Prot	NA	NA	Perm
Protected Phases	2	1	6	8	
Permitted Phases					8
Detector Phase	2	1	6	8	8
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	10.0	28.0	40.0	40.0
Total Split (s)	66.0	22.0	88.0	40.0	40.0
Total Split (%)	51.6%	17.2%	68.8%	31.3%	31.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?					
Recall Mode	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 128
Actuated Cycle Length: 128
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 63: Driveway 3 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
63: Driveway 3 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1275	95	115	1840	110	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	6.0	6.0	6.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	5033		1770	5085	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	5033		1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1386	103	125	2000	120	71
RTOR Reduction (vph)	6	0	0	0	0	55
Lane Group Flow (vph)	1483	0	125	2000	120	16
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases						8
Actuated Green, G (s)	67.6		13.5	87.1	28.9	28.9
Effective Green, g (s)	67.6		13.5	87.1	28.9	28.9
Actuated g/C Ratio	0.53		0.11	0.68	0.23	0.23
Clearance Time (s)	6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2658		186	3460	399	357
v/s Ratio Prot	0.29		0.07	c0.39	c0.07	
v/s Ratio Perm						0.01
v/c Ratio	0.56		0.67	0.58	0.30	0.04
Uniform Delay, d1	20.2		55.1	10.8	41.2	38.8
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9		9.2	0.7	0.4	0.1
Delay (s)	21.1		64.3	11.5	41.6	38.8
Level of Service	C		E	B	D	D
Approach Delay (s)	21.1			14.6	40.6	
Approach LOS	C			B	D	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	128.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
64: Driveway 4 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1235	65	120	1825	10	95	5	85	10	5	45
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	15.0	73.0	73.0	19.0	77.0	77.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	11.4%	55.3%	55.3%	14.4%	58.3%	58.3%	30.3%	30.3%	30.3%	30.3%	30.3%	30.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 132
Actuated Cycle Length: 132
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 64: Driveway 4 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
64: Driveway 4 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	1235	65	120	1825	10	95	5	85	10	5	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1778	1583		1801	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.84	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1349	1583		1563	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)	49	1342	71	130	1984	11	103	5	92	11	5	49
RTOR Reduction (vph)	0	0	29	0	0	4	0	0	72	0	0	38
Lane Group Flow (vph)	49	1342	42	130	1984	7	0	108	20	0	16	11
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	7.3	73.1	73.1	12.9	78.7	78.7		29.0	29.0		29.0	29.0
Effective Green, g (s)	7.3	73.1	73.1	12.9	78.7	78.7		29.0	29.0		29.0	29.0
Actuated g/C Ratio	0.06	0.55	0.55	0.10	0.60	0.60		0.22	0.22		0.22	0.22
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	97	2816	876	172	3031	943		296	347		343	347
v/s Ratio Prot	0.03	0.26		c0.07	c0.39							
v/s Ratio Perm			0.03			0.00		c0.08	0.01		0.01	0.01
v/c Ratio	0.51	0.48	0.05	0.76	0.65	0.01		0.36	0.06		0.05	0.03
Uniform Delay, d1	60.6	17.9	13.5	58.0	17.6	10.8		43.7	40.7		40.6	40.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	4.1	0.6	0.1	17.1	1.1	0.0		0.8	0.1		0.1	0.0
Delay (s)	64.7	18.4	13.6	75.1	18.8	10.8		44.5	40.8		40.7	40.5
Level of Service	E	B	B	E	B	B		D	D		D	D
Approach Delay (s)		19.7			22.2			42.8			40.5	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
65: Driveway 5 & Farrington Hwy

5/14/2014

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1210	115	140	1795	155	100
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	10.0	28.0	39.0	39.0
Total Split (s)	69.0	69.0	22.0	91.0	39.0	39.0
Total Split (%)	53.1%	53.1%	16.9%	70.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	None	C-Max	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 65: Driveway 5 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
65: Driveway 5 & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1210	115	140	1795	155	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1315	125	152	1951	168	109
RTOR Reduction (vph)	0	33	0	0	0	84
Lane Group Flow (vph)	1315	92	152	1951	168	25
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases		2				8
Actuated Green, G (s)	69.5	69.5	15.0	89.5	29.5	29.5
Effective Green, g (s)	69.5	69.5	15.0	89.5	29.5	29.5
Actuated g/C Ratio	0.53	0.53	0.12	0.69	0.23	0.23
Clearance Time (s)	6.0	6.0	5.0	6.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2718	846	204	3500	401	359
v/s Ratio Prot	0.26		c0.09	c0.38	c0.09	
v/s Ratio Perm		0.06				0.02
v/c Ratio	0.48	0.11	0.75	0.56	0.42	0.07
Uniform Delay, d1	19.0	15.0	55.6	10.2	42.9	39.5
Progression Factor	1.00	1.00	1.26	0.52	1.00	1.00
Incremental Delay, d2	0.6	0.3	11.3	0.5	0.7	0.1
Delay (s)	19.6	15.2	81.4	5.8	43.6	39.5
Level of Service	B	B	F	A	D	D
Approach Delay (s)	19.2			11.3	42.0	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
66: Driveway 6 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1170	95	185	1695	15	120	25	115	25	5	120
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	28.0	58.0	58.0	32.0	62.0	62.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	21.5%	44.6%	44.6%	24.6%	47.7%	47.7%	30.8%	30.8%	30.8%	30.8%	30.8%	30.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 66: Driveway 6 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
66: Driveway 6 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	1170	95	185	1695	15	120	25	115	25	5	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583		1789	1583		1787	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.73	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583		1379	1583		1366	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)	54	1272	103	201	1842	16	130	27	125	27	5	130
RTOR Reduction (vph)	0	0	39	0	0	7	0	0	97	0	0	100
Lane Group Flow (vph)	54	1272	64	201	1842	9	0	157	28	0	32	30
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	8.2	62.6	62.6	19.8	74.2	74.2		29.6	29.6		29.6	29.6
Effective Green, g (s)	8.2	62.6	62.6	19.8	74.2	74.2		29.6	29.6		29.6	29.6
Actuated g/C Ratio	0.06	0.48	0.48	0.15	0.57	0.57		0.23	0.23		0.23	0.23
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	111	2448	762	269	2902	903		313	360		311	360
v/s Ratio Prot	0.03	0.25		c0.11	c0.36							
v/s Ratio Perm			0.04			0.01		c0.11	0.02		0.02	0.02
v/c Ratio	0.49	0.52	0.08	0.75	0.63	0.01		0.50	0.08		0.10	0.08
Uniform Delay, d1	58.9	23.3	18.2	52.7	18.8	12.0		43.8	39.5		39.7	39.5
Progression Factor	1.27	0.37	0.11	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.0	0.7	0.2	10.8	1.1	0.0		1.3	0.1		0.1	0.1
Delay (s)	77.6	9.4	2.3	63.5	19.8	12.1		45.0	39.6		39.8	39.6
Level of Service	E	A	A	E	B	B		D	D		D	D
Approach Delay (s)		11.4			24.0			42.6			39.7	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
68: Driveway 8 & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	1070	55	535	1770	100	75	100	275	95	95	50
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	28.0	28.0	10.0	28.0	28.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (s)	26.0	55.0	55.0	36.0	65.0	65.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	19.8%	42.0%	42.0%	27.5%	49.6%	49.6%	30.5%	30.5%	30.5%	30.5%	30.5%	30.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None

Intersection Summary
Cycle Length: 131
Actuated Cycle Length: 131
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 68: Driveway 8 & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
68: Driveway 8 & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	1070	55	535	1770	100	75	100	275	95	95	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.69	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	1278	1863	1583	1254	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	1163	60	582	1924	109	82	109	299	103	103	54
RTOR Reduction (vph)	0	0	34	0	0	50	0	0	233	0	0	42
Lane Group Flow (vph)	201	1163	26	582	1924	59	82	109	66	103	103	12
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	18.3	57.4	57.4	26.6	65.7	65.7	29.0	29.0	29.0	29.0	29.0	29.0
Effective Green, g (s)	18.3	57.4	57.4	26.6	65.7	65.7	29.0	29.0	29.0	29.0	29.0	29.0
Actuated g/C Ratio	0.14	0.44	0.44	0.20	0.50	0.50	0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	247	2228	693	697	2550	793	282	412	350	277	412	350
v/s Ratio Prot	0.11	0.23		c0.17	c0.38			0.06			0.06	
v/s Ratio Perm			0.02			0.04	0.06		0.04	c0.08		0.01
v/c Ratio	0.81	0.52	0.04	0.84	0.75	0.07	0.29	0.26	0.19	0.37	0.25	0.03
Uniform Delay, d1	54.7	26.8	21.0	50.1	26.2	16.9	42.4	42.2	41.4	43.3	42.0	40.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.2	0.9	0.1	8.5	2.1	0.2	0.6	0.3	0.3	0.8	0.3	0.0
Delay (s)	72.9	27.7	21.1	58.6	28.3	17.1	43.0	42.5	41.7	44.1	42.4	40.1
Level of Service	E	C	C	E	C	B	D	D	D	D	D	D
Approach Delay (s)		33.8			34.6			42.1			42.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Volume (vph)	1405	2275	95	15
Turn Type	NA	NA	NA	Perm
Protected Phases	4	8	2	
Permitted Phases				2
Detector Phase	4	8	2	2
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	40.0	40.0
Total Split (s)	89.0	89.0	40.0	40.0
Total Split (%)	69.0%	69.0%	31.0%	31.0%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min

Intersection Summary
Cycle Length: 129
Actuated Cycle Length: 129
Offset: 0 (0%), Referenced to phase 2:NBL and 6:, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 69: Old Ft Weaver Rd (WEST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
69: Old Ft Weaver Rd (WEST) & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1405	35	0	2275	95	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.91			0.91	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	5067			5085	1770	1583
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	5067			5085	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1527	38	0	2473	103	16
RTOR Reduction (vph)	2	0	0	0	0	12
Lane Group Flow (vph)	1563	0	0	2473	103	4
Turn Type	NA			NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	82.1			82.1	34.9	34.9
Effective Green, g (s)	82.1			82.1	34.9	34.9
Actuated g/C Ratio	0.64			0.64	0.27	0.27
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	3224			3236	478	428
v/s Ratio Prot	0.31			c0.49	c0.06	
v/s Ratio Perm						0.00
v/c Ratio	0.48			0.76	0.22	0.01
Uniform Delay, d1	12.3			16.6	36.4	34.4
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			1.1	1.0	0.0
Delay (s)	12.4			17.7	37.5	34.5
Level of Service	B			B	D	C
Approach Delay (s)	12.4			17.7	37.1	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	129.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	145	1305	205	1995	525	105	60	800	5
Turn Type	Prot	NA	Prot	NA	custom	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases					8 6		2		
Detector Phase	7	4	3	8	8 6	2	2	1	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	28.0	9.0	28.0		10.0	10.0	10.0	40.0
Total Split (s)	31.0	98.0	49.0	116.0		24.0	24.0	69.0	93.0
Total Split (%)	12.9%	40.8%	20.4%	48.3%		10.0%	10.0%	28.8%	38.8%
Yellow Time (s)	3.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag		Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	C-Min	None	C-Min		None	None	None	None

Intersection Summary
Cycle Length: 240
Actuated Cycle Length: 240
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow
Natural Cycle: 130
Control Type: Actuated-Coordinated

Splits and Phases: 70: Old Ft Weaver Rd (EAST) & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
70: Old Ft Weaver Rd (EAST) & Farrington Hwy

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	1305	0	205	1995	525	0	105	60	800	5	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0		6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		1.00	1.00	0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5085		1770	5085	1583		1863	1583	3433	1588	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5085		1770	5085	1583		1863	1583	3433	1588	
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)	158	1418	0	223	2168	571	0	114	65	870	5	304
RTOR Reduction (vph)	0	0	0	0	0	23	0	0	60	0	140	0
Lane Group Flow (vph)	158	1418	0	223	2168	548	0	114	5	870	169	0
Turn Type	Prot	NA		Prot	NA	custom		NA	Perm	Prot	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases						8 6			2			
Actuated Green, G (s)	24.3	102.0		35.2	112.9	204.7		17.3	17.3	62.5	85.8	
Effective Green, g (s)	24.3	102.0		35.2	112.9	204.7		17.3	17.3	62.5	85.8	
Actuated g/C Ratio	0.10	0.42		0.15	0.47	0.85		0.07	0.07	0.26	0.36	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	179	2161		259	2392	1350		134	114	894	567	
v/s Ratio Prot	0.09	0.28		c0.13	c0.43			c0.06		c0.25	0.11	
v/s Ratio Perm						0.35			0.00			
v/c Ratio	0.88	0.66		0.86	0.91	0.41		0.85	0.04	0.97	0.30	
Uniform Delay, d1	106.4	55.0		100.0	58.7	4.0		110.1	103.6	87.9	55.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	36.2	1.6		24.1	6.3	0.2		37.4	0.1	23.6	0.3	
Delay (s)	142.7	56.6		124.1	65.0	4.2		147.5	103.8	111.5	55.7	
Level of Service	F	E		F	E	A		F	F	F	E	
Approach Delay (s)		65.2			57.7			131.6			96.9	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	69.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	40	170	5	75	135
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	43	185	5	82	147

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	54	190	228
Volume Left (vph)	0	185	82
Volume Right (vph)	43	0	147
Hadj (s)	-0.45	0.23	-0.28
Departure Headway (s)	4.2	4.7	4.2
Degree Utilization, x	0.06	0.25	0.27
Capacity (veh/h)	790	725	814
Control Delay (s)	7.5	9.3	8.7
Approach Delay (s)	7.5	9.3	8.7
Approach LOS	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
72: EB Farrington Hwy to SB Ft Weaver Rd/SB Ft Weaver Rd to WB Farrington Hwy & Farrington Hwy

5/14/2014

Intersection Sign configuration not allowed in HCM analysis.

Timings
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Lane Group	EBT	WBL	WBT
Lane Configurations			
Volume (vph)	2155	665	1800
Turn Type	NA	Prot	NA
Protected Phases	4	3	8
Permitted Phases			
Detector Phase	4	3	8
Switch Phase			
Minimum Initial (s)	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	120.0
Total Split (s)	82.0	58.0	140.0
Total Split (%)	58.6%	41.4%	100.0%
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	2.0
Lead/Lag	Lag	Lead	
Lead-Lag Optimize?			
Recall Mode	None	None	None

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 111.3
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

HCM Signalized Intersection Capacity Analysis
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy

5/14/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2155	0	665	1800	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0	2.0		
Lane Util. Factor	0.91		0.97	0.91		
Frt	1.00		1.00	1.00		
Flt Protected	1.00		0.95	1.00		
Satd. Flow (prot)	5085		3433	5085		
Flt Permitted	1.00		0.95	1.00		
Satd. Flow (perm)	5085		3433	5085		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2342	0	723	1957	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2342	0	723	1957	0	0
Turn Type	NA		Prot	NA		
Protected Phases	4		3	8		
Permitted Phases						
Actuated Green, G (s)	69.4		29.8	111.2		
Effective Green, g (s)	69.4		29.8	111.2		
Actuated g/C Ratio	0.62		0.27	1.00		
Clearance Time (s)	6.0		6.0	2.0		
Vehicle Extension (s)	3.0		3.0	3.0		
Lane Grp Cap (vph)	3173		919	5085		
v/s Ratio Prot	c0.46		c0.21	0.38		
v/s Ratio Perm						
v/c Ratio	0.74		0.79	0.38		
Uniform Delay, d1	14.6		37.8	0.0		
Progression Factor	1.00		1.00	1.00		
Incremental Delay, d2	0.9		4.5	0.0		
Delay (s)	15.5		42.3	0.0		
Level of Service	B		D	A		
Approach Delay (s)	15.5			11.4	0.0	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	111.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Lane Group	EBL	EBT	WBT	WBR
Lane Configurations				
Volume (vph)	1050	1645	2520	565
Turn Type	Prot	NA	NA	Free
Protected Phases	5	2	6	
Permitted Phases				Free
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	
Minimum Split (s)	10.0	90.0	10.0	
Total Split (s)	38.0	120.0	82.0	
Total Split (%)	31.7%	100.0%	68.3%	
Yellow Time (s)	3.0	2.0	4.0	
All-Red Time (s)	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	5.0	2.0	6.0	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?				
Recall Mode	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

HCM Signalized Intersection Capacity Analysis
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1050	1645	2520	565	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	2.0	6.0	4.0		
Lane Util. Factor	0.97	0.95	0.91	1.00		
Frt	1.00	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	1.00		
Satd. Flow (prot)	3433	3539	5085	1583		
Flt Permitted	0.95	1.00	1.00	1.00		
Satd. Flow (perm)	3433	3539	5085	1583		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1141	1788	2739	614	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1141	1788	2739	614	0	0
Turn Type	Prot	NA	NA	Free		
Protected Phases	5	2	6			
Permitted Phases				Free		
Actuated Green, G (s)	33.0	120.0	76.0	120.0		
Effective Green, g (s)	33.0	120.0	76.0	120.0		
Actuated g/C Ratio	0.28	1.00	0.63	1.00		
Clearance Time (s)	5.0	2.0	6.0			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	944	3539	3220	1583		
v/s Ratio Prot	c0.33	0.51	c0.54			
v/s Ratio Perm				0.39		
v/c Ratio	1.21	0.51	0.85	0.39		
Uniform Delay, d1	43.5	0.0	17.5	0.0		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	103.9	0.1	2.3	0.7		
Delay (s)	147.3	0.1	19.8	0.7		
Level of Service	F	A	B	A		
Approach Delay (s)		57.5	16.3		0.0	
Approach LOS		E	B		A	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
81: East West Rd & Kroc Center

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	25	1230	905	15	20	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	1337	984	16	22	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		Raised	Raised			
Median storage veh)		1	1			
Upstream signal (ft)		918				
pX, platoon unblocked						
vC, conflicting volume	1000				1715	500
vC1, stage 1 conf vol					992	
vC2, stage 2 conf vol					723	
vCu, unblocked vol	1000				1715	500
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				89	82
cM capacity (veh/h)	688				201	516

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	27	668	668	656	344	22	92
Volume Left	27	0	0	0	0	22	0
Volume Right	0	0	0	0	16	0	92
cSH	688	1700	1700	1700	1700	201	516
Volume to Capacity	0.04	0.39	0.39	0.39	0.20	0.11	0.18
Queue Length 95th (ft)	3	0	0	0	0	9	16
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	25.1	13.5
Lane LOS	B					D	B
Approach Delay (s)	0.2			0.0		15.7	
Approach LOS						C	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
82: Road A & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	135	915	45	5	715	10	25	0	5	0	0	85
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	995	49	5	777	11	27	0	5	0	0	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	788			1043			1804	2111	522	1590	2130	394
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	788			1043			1804	2111	522	1590	2130	394
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			25	100	99	100	100	85
cM capacity (veh/h)	827			662			36	41	500	61	40	605

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	147	663	380	5	518	270	33	0	92
Volume Left	147	0	0	5	0	0	27	0	0
Volume Right	0	0	49	0	0	11	5	0	92
cSH	827	1700	1700	662	1700	1700	43	1700	605
Volume to Capacity	0.18	0.39	0.22	0.01	0.30	0.16	0.76	0.00	0.15
Queue Length 95th (ft)	16	0	0	1	0	0	73	0	13
Control Delay (s)	10.3	0.0	0.0	10.5	0.0	0.0	213.7	0.0	12.0
Lane LOS	B			B			F	A	B
Approach Delay (s)	1.3			0.1			213.7	12.0	
Approach LOS							F	B	

Intersection Summary			
Average Delay		4.6	
Intersection Capacity Utilization		43.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
83: Road B & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	745	40	5	640	10	20	5	0	0	0	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	158	810	43	5	696	11	22	5	0	0	0	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	707			853			1576	1864	427	1435	1880	353
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	707			853			1576	1864	427	1435	1880	353
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			99			62	91	100	100	100	89
cM capacity (veh/h)	888			782			57	59	576	75	57	643

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	158	540	313	5	464	243	27	0	71
Volume Left	158	0	0	5	0	0	22	0	0
Volume Right	0	0	43	0	0	11	0	0	71
cSH	888	1700	1700	782	1700	1700	57	1700	643
Volume to Capacity	0.18	0.32	0.18	0.01	0.27	0.14	0.48	0.00	0.11
Queue Length 95th (ft)	16	0	0	1	0	0	46	0	9
Control Delay (s)	9.9	0.0	0.0	9.6	0.0	0.0	116.1	0.0	11.3
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.5			0.1			116.1	11.3	
Approach LOS							F	B	

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization		39.4%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
84: Road D & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	600	25	5	540	10	15	0	0	0	0	105
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	652	27	5	587	11	16	0	0	0	0	114
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	598			679			1334	1524	340	1179	1533	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	598			679			1334	1524	340	1179	1533	299
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			99			81	100	100	100	100	84
cM capacity (veh/h)	975			909			84	101	656	131	100	697

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	125	435	245	5	391	207	16	0	114
Volume Left	125	0	0	5	0	0	16	0	0
Volume Right	0	0	27	0	0	11	0	0	114
cSH	975	1700	1700	909	1700	1700	84	1700	697
Volume to Capacity	0.13	0.26	0.14	0.01	0.23	0.12	0.19	0.00	0.16
Queue Length 95th (ft)	11	0	0	0	0	0	17	0	15
Control Delay (s)	9.2	0.0	0.0	9.0	0.0	0.0	57.9	0.0	11.2
Lane LOS	A			A			F	A	B
Approach Delay (s)	1.4			0.1			57.9	11.2	
Approach LOS							F	B	

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		35.1%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
85: Road G & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	465	45	0	420	15	95	15	0	0	25	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	505	49	0	457	16	103	16	0	0	27	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	473			554			1016	1209	277	932	1226	236
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	473			554			1016	1209	277	932	1226	236
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			30	90	100	100	83	95
cM capacity (veh/h)	1085			1012			148	164	720	190	161	765

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	103	337	217	0	304	168	120	0	27	38
Volume Left	103	0	0	0	0	0	103	0	0	0
Volume Right	0	0	49	0	0	16	0	0	0	38
cSH	1085	1700	1700	1700	1700	1700	150	1700	161	765
Volume to Capacity	0.10	0.20	0.13	0.00	0.18	0.10	0.80	0.00	0.17	0.05
Queue Length 95th (ft)	8	0	0	0	0	0	127	0	15	4
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	0.0	87.3	0.0	31.9	10.0
Lane LOS	A						F	A	D	A
Approach Delay (s)	1.4			0.0			87.3		19.1	
Approach LOS							F		C	

Intersection Summary			
Average Delay		9.6	
Intersection Capacity Utilization		40.3%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
86: Driveway 6 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	190	180	100	60	165	125	90	0	60	200	5	185
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	207	196	109	65	179	136	98	0	65	217	5	201
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	315			304			1087	1109	152	954	1095	158
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	315			304			1087	1109	152	954	1095	158
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			95			8	100	92	0	97	77
cM capacity (veh/h)	1242			1253			107	165	867	165	168	860

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	207	130	174	65	120	196	163	223	201
Volume Left	207	0	0	65	0	0	98	217	0
Volume Right	0	0	109	0	0	136	65	0	201
cSH	1242	1700	1700	1253	1700	1700	165	165	860
Volume to Capacity	0.17	0.08	0.10	0.05	0.07	0.12	0.99	1.35	0.23
Queue Length 95th (ft)	15	0	0	4	0	0	193	335	23
Control Delay (s)	8.5	0.0	0.0	8.0	0.0	0.0	123.4	243.5	10.5
Lane LOS	A			A			F	F	B
Approach Delay (s)	3.4			1.4			123.4	132.9	
Approach LOS							F	F	

Intersection Summary			
Average Delay		53.3	
Intersection Capacity Utilization		45.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
87: Driveway 7 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	105	330	10	15	260	70	5	0	15	75	10	80
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	359	11	16	283	76	5	0	16	82	11	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	359			370			859	984	185	777	951	179
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	359			370			859	984	185	777	951	179
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			99			97	100	98	68	95	90
cM capacity (veh/h)	1197			1186			198	220	826	258	230	833

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	114	239	130	16	188	170	22	92	87
Volume Left	114	0	0	16	0	0	5	82	0
Volume Right	0	0	11	0	0	76	16	0	87
cSH	1197	1700	1700	1186	1700	1700	461	254	833
Volume to Capacity	0.10	0.14	0.08	0.01	0.11	0.10	0.05	0.36	0.10
Queue Length 95th (ft)	8	0	0	1	0	0	4	40	9
Control Delay (s)	8.3	0.0	0.0	8.1	0.0	0.0	13.2	27.0	9.8
Lane LOS	A			A			B	D	A
Approach Delay (s)	2.0			0.4			13.2	18.7	
Approach LOS							B	C	

Intersection Summary			
Average Delay		4.5	
Intersection Capacity Utilization		36.6%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
88: Driveway 8 & East West Rd

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	320	10	15	265	90	5	0	15	100	10	95
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	348	11	16	288	98	5	0	16	109	11	103
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	386			359			834	967	179	755	924	193
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	386			359			834	967	179	755	924	193
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			97	100	98	60	96	87
cM capacity (veh/h)	1169			1197			204	228	833	270	242	816

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	98	232	127	16	192	194	22	120	103
Volume Left	98	0	0	16	0	0	5	109	0
Volume Right	0	0	11	0	0	98	16	0	103
cSH	1169	1700	1700	1197	1700	1700	470	267	816
Volume to Capacity	0.08	0.14	0.07	0.01	0.11	0.11	0.05	0.45	0.13
Queue Length 95th (ft)	7	0	0	1	0	0	4	54	11
Control Delay (s)	8.4	0.0	0.0	8.1	0.0	0.0	13.0	28.9	10.0
Lane LOS	A			A			B	D	B
Approach Delay (s)	1.8			0.3			13.0	20.2	
Approach LOS							B	C	

Intersection Summary			
Average Delay		5.2	
Intersection Capacity Utilization		37.9%	ICU Level of Service
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
89: East West Rd & Old Ft Weaver Rd

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	425	345	245	190	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	462	375	266	207	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			374			
pX, platoon unblocked						
vC, conflicting volume	641				837	375
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	641				837	375
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				39	98
cM capacity (veh/h)	943				337	671

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	462	375	266	223
Volume Left	0	0	0	0	207
Volume Right	0	0	0	266	16
cSH	1700	1700	1700	1700	363
Volume to Capacity	0.00	0.27	0.22	0.16	0.61
Queue Length 95th (ft)	0	0	0	0	97
Control Delay (s)	0.0	0.0	0.0	0.0	29.7
Lane LOS					D
Approach Delay (s)	0.0		0.0		29.7
Approach LOS					D

Intersection Summary			
Average Delay		5.0	
Intersection Capacity Utilization		39.6%	ICU Level of Service A
Analysis Period (min)		15	

Timings
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	430	0	570	505	595	555	990
Turn Type	Perm	NA	Perm	Prot	NA	NA	Free
Protected Phases		8		5	2	6	
Permitted Phases	8		8				Free
Detector Phase	8	8	8	5	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	38.0	38.0	38.0	10.0	21.0	20.0	
Total Split (s)	38.0	38.0	38.0	51.0	82.0	31.0	
Total Split (%)	31.7%	31.7%	31.7%	42.5%	68.3%	25.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag				Lead		Lag	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 111.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

HCM Signalized Intersection Capacity Analysis
200: Paiwa St & H-1 WB On-Ramp/H-1 WB Off-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	430	0	570	505	595	0	0	555	990
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	4.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.95	1.00
Frpb, ped/bikes				1.00	1.00	0.98	1.00	1.00			1.00	1.00
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1681	1545	1770	3539			3539	1583
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1681	1545	1770	3539			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	467	0	620	549	647	0	0	603	1076
RTOR Reduction (vph)	0	0	0	0	0	205	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	233	234	415	549	647	0	0	603	1076
Confl. Peds. (#/hr)						12						
Turn Type				Perm	NA	Perm	Prot	NA			NA	Free
Protected Phases					8		5	2			6	
Permitted Phases				8		8						Free
Actuated Green, G (s)				32.3	32.3	32.3	38.3	67.1			22.8	111.4
Effective Green, g (s)				32.3	32.3	32.3	38.3	67.1			22.8	111.4
Actuated g/C Ratio				0.29	0.29	0.29	0.34	0.60			0.20	1.00
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)				487	487	447	608	2131			724	1583
v/s Ratio Prot							c0.31	0.18			0.17	
v/s Ratio Perm				0.14	0.14	c0.27						c0.68
v/c Ratio				0.48	0.48	0.93	0.90	0.30			0.83	0.68
Uniform Delay, d1				32.6	32.6	38.4	34.8	10.8			42.5	0.0
Progression Factor				1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2				0.7	0.7	25.4	16.7	0.1			8.1	2.4
Delay (s)				33.3	33.4	63.8	51.5	10.9			50.6	2.4
Level of Service				C	C	E	D	B			D	A
Approach Delay (s)		0.0			50.7			29.5			19.7	
Approach LOS		A			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	111.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Volume (vph)	10	385	425	190	570
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	25.0	10.0	20.0
Total Split (s)	38.0	38.0	66.0	47.0	113.0
Total Split (%)	25.2%	25.2%	43.7%	31.1%	74.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	None

Intersection Summary
Cycle Length: 151
Actuated Cycle Length: 92.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

HCM Signalized Intersection Capacity Analysis
201: Paiwa St & H-1 EB Off-Ramp/H-1 EB On-Ramp

5/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	485	10	385	0	0	0	0	425	220	190	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0					6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00					0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.95		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1776	1563					3330		1770	3539	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1776	1563					3330		1770	3539	
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)	527	11	418	0	0	0	0	462	239	207	620	0
RTOR Reduction (vph)	0	0	227	0	0	0	0	53	0	0	0	0
Lane Group Flow (vph)	0	538	191	0	0	0	0	648	0	207	620	0
Confl. Peds. (#/hr)			1						9			
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		32.4	32.4					25.1		16.5	47.6	
Effective Green, g (s)		32.4	32.4					25.1		16.5	47.6	
Actuated g/C Ratio		0.35	0.35					0.27		0.18	0.52	
Clearance Time (s)		6.0	6.0					6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		625	550					908		317	1831	
v/s Ratio Prot								c0.19		c0.12	0.18	
v/s Ratio Perm		0.30	0.12									
v/c Ratio		0.86	0.35					0.71		0.65	0.34	
Uniform Delay, d1		27.7	22.0					30.2		35.1	13.0	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		11.7	0.4					2.7		4.8	0.1	
Delay (s)		39.4	22.4					32.9		39.9	13.1	
Level of Service		D	C					C		D	B	
Approach Delay (s)		31.9			0.0			32.9			19.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
204: Farrington Hwy

5/14/2014

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	800	1125	340	295	95
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	28.0	28.0	28.0	28.0	40.0	40.0
Total Split (s)	82.0	82.0	82.0	82.0	48.0	48.0
Total Split (%)	63.1%	63.1%	63.1%	63.1%	36.9%	36.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 92.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 204: Farrington Hwy

HCM Signalized Intersection Capacity Analysis
204: Farrington Hwy

5/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	35	800	1125	340	295	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.15	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	277	5085	5085	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	870	1223	370	321	103
RTOR Reduction (vph)	0	0	0	218	0	36
Lane Group Flow (vph)	38	870	1223	152	321	67
Turn Type	Perm	NA	NA	Perm	NA	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Actuated Green, G (s)	38.1	38.1	38.1	38.1	42.4	42.4
Effective Green, g (s)	38.1	38.1	38.1	38.1	42.4	42.4
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.46	0.46
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	114	2094	2094	652	811	725
v/s Ratio Prot		0.17	c0.24		c0.18	
v/s Ratio Perm	0.14			0.10		0.04
v/c Ratio	0.33	0.42	0.58	0.23	0.40	0.09
Uniform Delay, d1	18.5	19.3	21.1	17.7	16.6	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.1	0.4	0.2	1.4	0.3
Delay (s)	20.3	19.4	21.5	17.9	18.0	14.4
Level of Service	C	B	C	B	B	B
Approach Delay (s)		19.5	20.6		17.1	
Approach LOS		B	C		B	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	92.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX D

FULL SIZED INTERSECTION VOLUME & LEVEL OF SERVICE FIGURES

EXISTING CONDITIONS

DATE OF COUNTS:
February 15 & 16, 2012
April 3, 2012
May 10, 2012

AM PEAK HOUR:
6:45 AM – 7:45 AM

PM PEAK HOUR:
3:45 PM – 4:45 PM

LEGEND

- #(#) – AM(PM) PEAK HOUR OF TRAFFIC VOLUMES
- X(X) – AM(PM) LOS
- * – OVERCAPACITY, V/C>=1
- (Y) – UNSIGNALIZED INTERSECTION Y
- (Y) X/X – SIGNALIZED INTERSECTION Y, AM/PM LOS
- A – H-1 FREEWAY RAMP X
- → – AM SHOULDER LANE
- → – AM EASTBOUND CONTRA-FLOW LANE

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII EXISTING VOLUME AND LEVEL OF SERVICE	FIGURE 3.1

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

BASE YEAR 2023 VOLUME and LOS - NO RAIL

FIGURE 4.3

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS,SURVEYORS • HONOLULU,HAWAII

BASE YEAR 2023 WITH MITIGATION MEASURES VOLUME and LOS - NO RAIL

FIGURE
4.4

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

BASE YEAR 2035 VOLUME and LOS - NO RAIL

FIGURE 4.5

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS,SURVEYORS • HONOLULU,HAWAII

BASE YEAR 2035 with MITIGATION MEASURES VOLUME and LOS - NO RAIL

FIGURE
4.6

YEAR 2023 PROJECT VOLUMES ONLY (NO RAIL)

LEGEND
#(#) – AM(PM) PEAK HOUR OF TRAFFIC VOLUMES
(Y) – INTERSECTION Y

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII YEAR 2023 PROJECT VOLUMES ONLY - NO RAIL	FIGURE 5.2

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

YEAR 2023 with PROJECT VOLUME and LOS - NO RAIL

FIGURE 5.3

EAST-WEST ROAD

YEAR 2023 WITH PROJECT AND MITIGATION MEASURES (NO RAIL)

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 5.4
	YEAR 2023 with PROJECT and MITIGATION MEASURES VOLUME and LOS - NO RAIL	

EAST-WEST ROAD

YEAR 2035 PROJECT VOLUMES ONLY (NO RAIL)

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 5.6
	YEAR 2035 PROJECT VOLUMES ONLY - NO RAIL	

YEAR 2035 WITH PROJECT (NO RAIL)

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII YEAR 2035 with PROJECT VOLUME and LOS - NO RAIL	FIGURE 5.7

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

YEAR 2035 with PROJECT and MITIGATION MEASURES VOLUME and LOS - NO RAIL

FIGURE 5.8

YEAR 2023 PROJECT VOLUMES ONLY (WITH RAIL)

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII YEAR 2023 PROJECT VOLUMES ONLY - WITH RAIL	FIGURE 5.9

YEAR 2023 WITH PROJECT (WITH RAIL)

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII	FIGURE 5.10
	YEAR 2023 with PROJECT VOLUME and LOS - WITH RAIL	

EAST-WEST ROAD

YEAR 2023 WITH PROJECT AND MITIGATION MEASURES (WITH RAIL)

LEGEND

- #(#) – AM(PM) PEAK HOUR OF TRAFFIC VOLUMES
- X(X) – AM(PM) LOS
- * – OVERCAPACITY, V/C>=1
- (Y) – UNSIGNALIZED INTERSECTION Y
- (#) X/X – SIGNALIZED INTERSECTION Y, AM/PM LOS

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII	FIGURE 5.11
	YEAR 2023 with PROJECT and MITIGATION MEASURES VOLUME and LOS - WITH RAIL	

YEAR 2035 PROJECT VOLUMES ONLY (WITH RAIL)

HOOPILI TIAR	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS,SURVEYORS • HONOLULU,HAWAII YEAR 2035 PROJECT VOLUMES ONLY - WITH RAIL	FIGURE 5.12

YEAR 2035 WITH PROJECT (WITH RAIL)

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

YEAR 2035 with PROJECT VOLUME and LOS - WITH RAIL

FIGURE 5.13

EAST-WEST ROAD

YEAR 2035 WITH PROJECT AND MITIGATION MEASURES (WITH RAIL)

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

YEAR 2035 with PROJECT and MITIGATION MEASURES VOLUME and LOS - WITH RAIL

FIGURE 5.14

APPENDIX E

TRIP REDUCTION DEFINITIONS AND METHODS

DEFINITIONS:

Pass-by Trips – Applied to Commercial Land uses only

As defined by the ITE Trip Generation Manual 9th Edition, 2012:
"Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator." Conversely, "Primary" trips are trips made for the purpose of visiting the generator. The stop at the generator is the primary reason for the trip."
In simple terms, a pass-by trip would be someone traveling home from work along Kunia Road (for example) and stopping at the market (i.e. Proposed Project) on their way home. Pass-by trips are not new trips but rather trips currently in the network making an intermediate stop before reaching their final destination.

Diverted Linked Trips – Applied to Commercial Land uses only

As defined by the ITE Trip Generation Manual 9th Edition, 2012:
"Diverted Linked Trips are trips that are attracted from the traffic volume on roadways within the vicinity of the generator but require a diversion from that roadway to another roadway to gain access to the side. These trips could travel on highways or freeways adjacent to a generators, but without access to the generator. Diverted linked trips add traffic to streets adjacent to a site, but may not add traffic to the area's major travel routes. Both pass-by and diverted linked trips may be part of a multi-stop chain of trips."

Internal Capture Rate – Applied between Commercial and Residential Land uses only

As defined by the ITE Trip Generation Manual 9th Edition, 2012:
"An internal capture rate can generally be defined as a percentage reduction that can be applied to the trip generation estimates for individual land uses to account for trips internal to the site. It is important to note that these reductions are applied externally to the site (i.e., at entrances, adjacent intersections and adjacent roadways). The trip reduction for internally captured trips is separate from the reduction for pass-by trips. These are two distinct phenomena and both could be applicable for a proposed development. "

METHODOLOGY:

The following methods were used to determine:

Pass-by Trips

Pass-by trips were determined for areas of the Project (the Project was divided roughly into six (6) areas based on its layout) i.e. pass-by trip for the commercial site located at the corner of Kualakai Parkway and Farrington Highway was determined by using its projected square footage (approximately 500k sf) and compared to similar commercial sites listed in the ITE handbook +/- 10% and the percent pass-by trips were averaged to obtain the calculated pass-by rates. Rates were only applied to commercial PM trips. See table below.

Area	Commercial square footage	Calculated Pass-by Rate	Used Pass-by rates
1	844,706	16%	16%
2	494,617	26%	20%
3	62,840	51%	20%
4	111,995	21%	20%
5	443,399	30%	20%
6	57,636	51%	20%

Diverted Linked Trips

The same method used to determine pass-by trips was used to determine diverted linked trips rates and applied to PM commercial trips only. See table below for the rates used.

Area	Commercial square footage	Calculated Diverted Linked	Used Diverted Linked Trip
1	844,706	32%	20%
2	494,617	20%	20%
3	62,840	20%	20%
4	111,995	26%	20%
5	443,399	25%	20%
6	57,636	21%	20%

Internal Capture Rates

Internal capture rates between residential and commercial sites were determined using the same general areas as the ones used for the pass-by and diverted linked trips. The method used was taken directly from the Trip Generation Handbook p.91-94.
Area 2 which is located away from the residential areas was not used to generate internal capture rates.

Internal Capture Rates for Schools – Applied only for Phase 2 of the Project

Internal capture rates for schools were determined using existing school districts in the vicinity of the Project. It was found that for:

- Elementary schools the ratio is approximately one (1) student for every four (4) households or 25 percent
- Middle school the ratio is approximately one (1) student for every five (5) household or approximately 17 percent
- High school the ratio is approximately one (1) student for every five (5) household or approximately 16 percent

The proposed school enrollment and dwelling units were compared to the existing school district to determine the internal capture rates. The table below summarizes the findings:

	Project Proposed:			**Existing Ratio**	**Projected number of students based on dwelling units**	**% internal capture**	**Internal capture rate used**
Area	**Dwelling units**	**School**	**Enrollment**				
Phase 1C	1,727	Elementary	550	25%	432	79%	70%
Phase 1B and part of Phase 2	4,264	Elementary	550	25%	1,066	194%	70%
Phase 1A and Part of Phase 2	5,045	Elementary	550	25%	1,261	229%	70%
Phase 1B, 1A and 2	7,586	Middle	600	17%	1,290	215%	50%
Phase 1C	1,727	High School	1,000	16%	276	28%	20%

APPENDIX F

2007 AND 2035 LAND USE COMPARISON AND TAZ MAP

Figure F1 - TAZ Map

Table F1: Growth in Population, Employement and Household between 2007 and 2035

TAZ	Population	Total Employment	Total Household	Projects
444	48	147	23	
445	-24	128	1	
446	-91	136	1	
447	547	209	254	
450	-260	90	0	
451	-30	516	55	
452	-110	75	0	
453	-2	130	25	
454	-183	103	3	
456	317	156	137	
457	-228	136	0	
458	-170	122	1	
459	-125	134	1	
460	-192	100	0	
461	-110	518	9	
541	3982	2899	1375	Royal Kunia I & II
542	110	256	128	Royal Kunia I
543	99	84	101	Royal Kunia I +
544	-289	304	7	
545	2752	1973	863	Hoopili
546	4653	779	1459	East Kapolei II
547	500	510	169	
548	-133	-429	0	
549	8790	1255	2760	Hoopili
550	-203	68	0	
551	590	135	244	
552	-296	50	3	
553	-13	527	17	
554	-218	58	18	
555	1511	309	548	
556	-163	128	2	
557	-229	136	1	
558	-160	157	1	
564	2144	-57	859	
566	1553	647	509	
567	1147	444	374	
568	360	374	131	
569	1304	586	413	
570	-45	28	-8	
571	3698	2127	1227	Kamakana Alii
591	350	555	104	
597	235	1331	80	
598	95	1421	30	
599	825	855	260	
600	9459	7553	2966	Hoopili
601	1065	85	416	
602	98	51	94	
603	3334	953	1046	Hoopili
604	1073	3813	339	UHWO
605	93	2084	33	Part of Hoopili
606	18	38	47	
618	-1	74	0	
763	4972	852	1562	UHWO
764	1563	1380	490	Hoopili

Source: Data obtained from the OMPO Model dated 2011 ??

APPENDIX G

RAMP ANALYSIS

APPENDIX G

RAMP ANALYSIS

- Existing Conditions

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4495	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	250	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	432	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4495	250	432	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1249	69	120	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5064	282	487	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.620 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3249 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5064	6855	No
$v_{FO} = v_F - v_R$	4782	6855	No
v_R	282	2000	No
v_3 or v_{av34}	1815 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3249		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3249	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.453

Space mean speed in ramp influence area, S_R = 51.0 mph

Space mean speed in outer lanes, S_0 = 61.0 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4653	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	194	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	518	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4653	194	518	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1293	54	144	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5242	219	584	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.619 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3328 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5242	6855	No
$v_{FO} = v_F - v_R$	5023	6855	No
v_R	219	2000	No
v_3 or v_{av34}	1914 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3328 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3328	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.448

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4320	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	607	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	788	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4320		607		788		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1200		169		219		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4867		684		888		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.607 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3222 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4867	6855	No
$v_{FO} = v_F - v_R$	4183	6855	No
v_R	684	2000	No
v_3 or v_{av34}	1645 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3222 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3222	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.490

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 61.7 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4587	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	584	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	556	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4587	584	556	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1274	162	154	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5168	658	626	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.601 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3366 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5168	6855	No
$v_{FO} = v_F - v_R$	4510	6855	No
v_R	658	2000	No
v_3 or v_{av34}	1802 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3366		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3366	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.487

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 61.0 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4495	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	432	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	250	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4495	432	250	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1249	120	69	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5064	487	282	pcph

Estimation of V12 Merge Areas

L_{EQ} = 838.11 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2995 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5551	6855	No
v_3 or v_{av34}	2069 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 2995		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5551	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.413

Space mean speed in ramp influence area, S_R = 51.7 mph

Space mean speed in outer lanes, S_0 = 52.9 mph

Space mean speed for all vehicles, S = 52.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4653	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	518	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	194	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4653	518	194	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1293	144	54	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5242	584	219	pcph

Estimation of V12 Merge Areas

L_{EQ} = 896.96 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3101 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5826	6855	No
v_3 or v_{av34}	2141 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3101 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5826	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.441

Space mean speed in ramp influence area, S_R = 51.2 mph

Space mean speed in outer lanes, S_0 = 52.6 mph

Space mean speed for all vehicles, S = 51.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4320	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	788	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	607	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4320	788	607	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1200	219	169	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4867	888	684	pcph

Estimation of V12 Merge Areas

L_{EQ} = 881.77 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2879 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5755	6855	No
v_3 or v_{av34}	1988 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 2879 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5755	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.455

Space mean speed in ramp influence area, S_R = 51.0 mph

Space mean speed in outer lanes, S_0 = 53.1 mph

Space mean speed for all vehicles, S = 51.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4587	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	556	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	584	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4587	556	584	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1274	154	162	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5168	626	658	pcph

Estimation of V12 Merge Areas

L_{EQ} = 890.12 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3057 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5794	6855	No
v_3 or v_{av34}	2111 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3057		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5794	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.441

Space mean speed in ramp influence area, S_R = 51.2 mph

Space mean speed in outer lanes, S_0 = 52.7 mph

Space mean speed for all vehicles, S = 51.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6733	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1029	vph
Length of first accel/decel lane	300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	671	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6733	1029	671	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1870	286	186	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7586	1159	756	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3961 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7586	9140	No
$v_{FO} = v_F - v_R$	6427	9140	No
v_R	1159	2000	No
v_3 or v_{av34}	1812 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3961 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3961	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.532

Space mean speed in ramp influence area, S_R = 49.7 mph

Space mean speed in outer lanes, S_0 = 61.0 mph

Space mean speed for all vehicles, S = 54.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6178	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	737	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	548	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6178	737	548	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1716	205	152	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6961	830	617	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3503 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6961	9140	No
$v_{FO} = v_F - v_R$	6131	9140	No
v_R	830	2000	No
v_3 or v_{av34}	1729 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3503 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3503	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 29.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.503

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 61.3 mph

Space mean speed for all vehicles, S = 55.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6733	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	671	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1282	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6733	671	1282	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1870	186	356	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7586	756	1444	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.123 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 935 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8342	9140	No
v_3 or v_{av34}	3325 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 3034		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8342	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.459	
Space mean speed in ramp influence area,	S_R = 50.9	mph
Space mean speed in outer lanes,	S_0 = 52.1	mph
Space mean speed for all vehicles,	S = 51.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6733	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	671	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1029	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6733	671	1029	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1870	186	286	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7586	756	1159	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.123 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 935 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8342	9140	No
v_3 or v_{av34}	3325 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 3034 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8342	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.459	
Space mean speed in ramp influence area,	S_R = 50.9	mph
Space mean speed in outer lanes,	S_0 = 52.1	mph
Space mean speed for all vehicles,	S = 51.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6178	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	548	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	651	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6178	548	651	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1716	152	181	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6961	617	733	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.141 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 979 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7578	9140	No
v_3 or v_{av34}	2991 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2784		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7578	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.403	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_0 = 52.8	mph
Space mean speed for all vehicles,	S = 52.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6178	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	548	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	737	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6178	548	737	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1716	152	205	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6961	617	830	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.141 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 979 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7578	9140	No
v_3 or v_{av34}	2991 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2784		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7578	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.403	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_0 = 52.8	mph
Space mean speed for all vehicles,	S = 52.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5347	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1282	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	58	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5347		1282		58		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1485		356		16		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6024		1444		65		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3441 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6024	9140	No
$v_{FO} = v_F - v_R$	4580	9140	No
v_R	1444	2000	No
v_3 or v_{av34}	1291 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3441 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3441	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.558

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 63.0 mph

Space mean speed for all vehicles, S = 54.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5347	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1282	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	671	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5347	1282	671	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1485	356	186	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6024	1444	756	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3441 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6024	9140	No
$v_{FO} = v_F - v_R$	4580	9140	No
v_R	1444	2000	No
v_3 or v_{av34}	1291 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3441 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3441	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.558

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 63.0 mph

Space mean speed for all vehicles, S = 54.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6075	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	651	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	344	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6075		651		344		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1688		181		96		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6845		733		388		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3398 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6845	9140	No
$v_{FO} = v_F - v_R$	6112	9140	No
v_R	733	2000	No
v_3 or v_{av34}	1723 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 3398 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3398	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.494

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 61.4 mph

Space mean speed for all vehicles, S = 55.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6075	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	651	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	548	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6075		651		548		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1688		181		152		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6845		733		617		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3398 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6845	9140	No
$v_{FO} = v_F - v_R$	6112	9140	No
v_R	733	2000	No
v_3 or v_{av34}	1723 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3398 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3398	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 29.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.494

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 61.4 mph

Space mean speed for all vehicles, S = 55.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4877	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	58	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	412	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4877		58		412		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1355		16		114		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5495		65		464		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 488.64 (Equation 13-12 or 13-13)

P_{FD} = 0.620 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3430 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5495	6855	No
$v_{FO} = v_F - v_R$	5430	6855	No
v_R	65	2000	No
v_3 or v_{av34}	2065 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3430		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3430	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.434

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 60.7 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4877	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	58	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1282	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4877		58		1282		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1355		16		356		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5495		65		1444		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.620 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3430 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5495	6855	No
$v_{FO} = v_F - v_R$	5430	6855	No
v_R	65	2000	No
v_3 or v_{av34}	2065 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3430 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3430	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.434

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 60.7 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4716	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	344	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1015	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4716		344		1015		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1310		96		282		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5313		388		1144		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 1368.05 (Equation 13-12 or 13-13)

P_{FD} = 0.770 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4181 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5313	6855	No
$v_{FO} = v_F - v_R$	4925	6855	No
v_R	388	2000	No
v_3 or v_{av34}	1132 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 4181		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4181	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.463

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 52.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4716	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	344	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	651	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4716		344		651		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1310		96		181		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5313		388		733		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.609 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3389 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5313	6855	No
$v_{FO} = v_F - v_R$	4925	6855	No
v_R	388	2000	No
v_3 or v_{av34}	1924 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3389 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3389	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.463

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 61.2 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4877	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	412	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	58	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4877		412		58		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1355		114		16		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5495		464		65		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.601 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3489 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5495	6855	No
$v_{FO} = v_F - v_R$	5031	6855	No
v_R	464	2000	No
v_3 or v_{av34}	2006 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3489 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3489	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.470

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 53.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 6/12/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4716	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1015	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	344	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4716		1015		344		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1310		282		96		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5313		1144		388		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.575 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3539 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5313	6855	No
$v_{FO} = v_F - v_R$	4169	6855	No
v_R	1144	2000	No
v_3 or v_{av34}	1774 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3539 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3539	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.531

Space mean speed in ramp influence area, S_R = 49.7 mph

Space mean speed in outer lanes, S_0 = 61.2 mph

Space mean speed for all vehicles, S = 53.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3216	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	331	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	190	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3216	331	190	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	893	92	53	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3623	373	214	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.652 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2493 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3623	6855	No
$v_{FO} = v_F - v_R$	3250	6855	No
v_R	373	2000	No
v_3 or v_{av34}	1130 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2493 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2493	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.462

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 63.7 mph

Space mean speed for all vehicles, S = 54.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4170	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	625	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	300	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4170	625	300	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1158	174	83	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4698	704	338	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.610 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3141 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4698	6855	No
$v_{FO} = v_F - v_R$	3994	6855	No
v_R	704	2000	No
v_3 or v_{av34}	1557 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3141 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3141	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.491

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 62.0 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3062	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	790	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	485	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3062	790	485	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	851	219	135	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3450	890	546	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.633 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2510 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3450	6855	No
$v_{FO} = v_F - v_R$	2560	6855	No
v_R	890	2000	No
v_3 or v_{av34}	940 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2510		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2510	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3982	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1305	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	813	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3982	1305	813	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1106	363	226	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4486	1470	916	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.580 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3220 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4486	6855	No
$v_{FO} = v_F - v_R$	3016	6855	No
v_R	1470	2000	No
v_3 or v_{av34}	1266 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3220		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3220	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.560

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 63.1 mph

Space mean speed for all vehicles, S = 52.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4378	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	448	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	891	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4378		448		891		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1216		124		248		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4933		505		1004		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2436 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4933	9140	No
$v_{FO} = v_F - v_R$	4428	9140	No
v_R	505	2000	No
v_3 or v_{av34}	1248 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2436 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2436	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 20.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.473

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 63.2 mph

Space mean speed for all vehicles, S = 56.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6157	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	948	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	846	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6157	948	846	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1710	263	235	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6937	1068	953	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3627 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6937	9140	No
$v_{FO} = v_F - v_R$	5869	9140	No
v_R	1068	2000	No
v_3 or v_{av34}	1655 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3627 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3627	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.524

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 61.6 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3216	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	190	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	331	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3216	190	331	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	893	53	92	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3623	214	373	pcph

Estimation of V12 Merge Areas

L_{EQ} = 471.32 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2143 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3837	6855	No
v_3 or v_{av34}	1480 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 2143 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3837	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.327
Space mean speed in ramp influence area,	S_R = 53.1 mph
Space mean speed in outer lanes,	S_0 = 55.0 mph
Space mean speed for all vehicles,	S = 53.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4170	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	300	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	625	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4170	300	625	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1158	83	174	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4698	338	704	pcph

Estimation of V12 Merge Areas

L_{EQ} = 727.90 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2779 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5036	6855	No
v_3 or v_{av34}	1919 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2779		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5036	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 26.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.374

Space mean speed in ramp influence area, S_R = 52.3 mph

Space mean speed in outer lanes, S_0 = 53.4 mph

Space mean speed for all vehicles, S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3062	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	790	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3062	485	790	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	851	135	219	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3450	546	890	pcph

Estimation of V12 Merge Areas

L_{EQ} = 505.34 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2041 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3996	6855	No
v_3 or v_{av34}	1409 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2041 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3996	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.338	
Space mean speed in ramp influence area,	S_R = 52.9	mph
Space mean speed in outer lanes,	S_0 = 55.2	mph
Space mean speed for all vehicles,	S = 53.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3982	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	813	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1305	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3982	813	1305	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1106	226	363	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4486	916	1470	pcph

Estimation of V12 Merge Areas

L_{EQ} = 806.23 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2653 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5402	6855	No
v_3 or v_{av34}	1833 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2653		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5402	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.424

Space mean speed in ramp influence area, S_R = 51.5 mph

Space mean speed in outer lanes, S_0 = 53.7 mph

Space mean speed for all vehicles, S = 52.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3935	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	484	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	891	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3935		484		891		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1093		134		248		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4433		545		1004		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.624 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2972 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4433	6855	No
$v_{FO} = v_F - v_R$	3888	6855	No
v_R	545	2000	No
v_3 or v_{av34}	1461 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2972 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2972	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 25.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.477

Space mean speed in ramp influence area, S_R = 50.6 mph

Space mean speed in outer lanes, S_0 = 62.4 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6259	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	959	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	846	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6259	959	846	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1739	266	235	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7052	1080	953	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3684 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7052	9140	No
$v_{FO} = v_F - v_R$	5972	9140	No
v_R	1080	2000	No
v_3 or v_{av34}	1684 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3684 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3684	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.525

Space mean speed in ramp influence area, S_R = 49.8 mph

Space mean speed in outer lanes, S_0 = 61.5 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3935	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	891	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	448	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3935	891	448	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1093	248	124	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4433	1004	505	pcph

Estimation of V12 Merge Areas

L_{EQ} = 3096.26 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2622 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5437	6855	No
v_3 or v_{av34}	1811 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2622		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5437	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.432	
Space mean speed in ramp influence area,	S_R = 51.4	mph
Space mean speed in outer lanes,	S_0 = 53.8	mph
Space mean speed for all vehicles,	S = 52.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3935	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	891	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	484	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3935	891	484	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1093	248	134	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4433	1004	545	pcph

Estimation of V12 Merge Areas

L_{EQ} = 813.72 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2622 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5437	6855	No
v_3 or v_{av34}	1811 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2622		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5437	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.432	
Space mean speed in ramp influence area,	S_R = 51.4	mph
Space mean speed in outer lanes,	S_0 = 53.8	mph
Space mean speed for all vehicles,	S = 52.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6259	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	846	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	948	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6259	846	948	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1739	235	263	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7052	953	1068	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.099 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 696 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8005	9140	No
v_3 or v_{av34}	3178 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2820 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8005	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.456

Space mean speed in ramp influence area, S_R = 51.0 mph

Space mean speed in outer lanes, S_0 = 52.7 mph

Space mean speed for all vehicles, S = 51.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6259	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	846	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	959	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6259	846	959	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1739	235	266	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7052	953	1080	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.099 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 696 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8005	9140	No
v_3 or v_{av34}	3178 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2820 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8005	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.456
Space mean speed in ramp influence area,	S_R = 51.0 mph
Space mean speed in outer lanes,	S_0 = 52.7 mph
Space mean speed for all vehicles,	S = 51.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	58.5	mph
Volume on freeway	2668	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	676	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1075	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2668	676	1075	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	741	188	299	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3006	762	1211	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3006 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3768	4570	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3006		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3768	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.455	
Space mean speed in ramp influence area,	S_R = 51.0	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 51.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/2/2012
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5159	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1056	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1003	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5159	1056	1003	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1433	293	279	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5812	1190	1130	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3438 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7002	6855	Yes
v_3 or v_{av34}	2374 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3438 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	7002	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 37.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.685

Space mean speed in ramp influence area, S_R = 47.2 mph

Space mean speed in outer lanes, S_0 = 51.5 mph

Space mean speed for all vehicles, S = 48.6 mph

APPENDIX G

RAMP ANALYSIS

- Base Year 2023

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4430	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	830	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4430		360		830		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1231		100		231		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4991		406		935		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.617 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3233 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4991	6855	No
$v_{FO} = v_F - v_R$	4585	6855	No
v_R	406	2000	No
v_3 or v_{av34}	1758 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3233 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3233	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.465

Space mean speed in ramp influence area, S_R = 50.8 mph

Space mean speed in outer lanes, S_0 = 61.2 mph

Space mean speed for all vehicles, S = 54.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	340	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	705	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4660	340	705	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1294	94	196	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5250	383	794	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.611 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3357 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5250	6855	No
$v_{FO} = v_F - v_R$	4867	6855	No
v_R	383	2000	No
v_3 or v_{av34}	1893 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3357 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3357	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 28.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.462

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 60.7 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4720	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	645	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	710	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4720	645	710	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1311	179	197	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5318	727	800	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.594 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3452 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5318	6855	No
$v_{FO} = v_F - v_R$	4591	6855	No
v_R	727	2000	No
v_3 or v_{av34}	1866 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3452		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3452	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.493

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 60.8 mph

Space mean speed for all vehicles, S = 53.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5280	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	615	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5280	560	615	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1467	156	171	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5949	631	693	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.582 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3727 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5949	6855	No
$v_{FO} = v_F - v_R$	5318	6855	No
v_R	631	2000	No
v_3 or v_{av34}	2222 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3727 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3727	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 59.4 mph

Space mean speed for all vehicles, S = 53.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4430	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	830	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	360	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4430	830	360	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1231	231	100	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4991	935	406	pcph

Estimation of V12 Merge Areas

L_{EQ} = 918.36 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12FM} = v_F (P_{FM})$ = 2952 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5926	6855	No
v_3 or v_{av34}	2039 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 2952		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5926	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.476

Space mean speed in ramp influence area, S_R = 50.6 mph

Space mean speed in outer lanes, S_0 = 53.0 mph

Space mean speed for all vehicles, S = 51.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4660	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	705	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	340	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4660	705	340	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1294	196	94	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5250	794	383	pcph

Estimation of V12 Merge Areas

L_{EQ} = 943.62 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3105 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6044	6855	No
v_3 or v_{av34}	2145 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3105		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6044	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.478

Space mean speed in ramp influence area, S_R = 50.6 mph

Space mean speed in outer lanes, S_0 = 52.6 mph

Space mean speed for all vehicles, S = 51.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4720	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	645	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4720	710	645	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1311	197	179	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5318	800	727	pcph

Estimation of V12 Merge Areas

L_{EQ} = 959.45 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3146 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6118	6855	No
v_3 or v_{av34}	2172 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3146		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6118	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.488

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 52.5 mph

Space mean speed for all vehicles, S = 51.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/11/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5280	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	615	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	560	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5280	615	560	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1467	171	156	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5949	693	631	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1071.59 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3519 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6642	6855	No
v_3 or v_{av34}	2430 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3519		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6642	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.549	
Space mean speed in ramp influence area,	S_R = 49.4	mph
Space mean speed in outer lanes,	S_0 = 51.2	mph
Space mean speed for all vehicles,	S = 50.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7265	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1110	vph
Length of first accel/decel lane	300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	670	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	7265		1110		670		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2018		308		186		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	8185		1251		755		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4274 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8185	9140	No
$v_{FO} = v_F - v_R$	6934	9140	No
v_R	1251	2000	No
v_3 or v_{av34}	1955 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4274 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4274	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 38.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.541

Space mean speed in ramp influence area, S_R = 49.6 mph

Space mean speed in outer lanes, S_0 = 60.5 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6575	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	750	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	485	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6575	750	485	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1826	208	135	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7408	845	546	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3706 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7408	9140	No
$v_{FO} = v_F - v_R$	6563	9140	No
v_R	845	2000	No
v_3 or v_{av34}	1851 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3706 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3706	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.504

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 60.9 mph

Space mean speed for all vehicles, S = 55.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7265	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	670	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1450	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7265	670	1450	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2018	186	403	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8185	755	1634	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.123 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1010 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8940	9140	No
v_3 or v_{av34}	3587 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3274 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8940	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.505	
Space mean speed in ramp influence area,	S_R = 50.2	mph
Space mean speed in outer lanes,	S_0 = 51.0	mph
Space mean speed for all vehicles,	S = 50.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7265	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	670	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1110	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7265	670	1110	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2018	186	308	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8185	755	1251	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.123 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1010 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8940	9140	No
v_3 or v_{av34}	3587 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3274 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8940	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.505

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 51.0 mph

Space mean speed for all vehicles, S = 50.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6575	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	705	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6575	485	705	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1826	135	196	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7408	546	794	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1108 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7954	9140	No
v_3 or v_{av34}	3150 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2963 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7954	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.416	
Space mean speed in ramp influence area,	S_R = 51.6	mph
Space mean speed in outer lanes,	S_0 = 52.3	mph
Space mean speed for all vehicles,	S = 52.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6575	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	750	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6575	485	750	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1826	135	208	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7408	546	845	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1108 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7954	9140	No
v_3 or v_{av34}	3150 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2963 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7954	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.416	
Space mean speed in ramp influence area,	S_R = 51.6	mph
Space mean speed in outer lanes,	S_0 = 52.3	mph
Space mean speed for all vehicles,	S = 52.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5875	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1450	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	75	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5875	1450	75	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1632	403	21	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6619	1634	85	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3807 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6619	9140	No
$v_{FO} = v_F - v_R$	4985	9140	No
v_R	1634	2000	No
v_3 or v_{av34}	1406 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3807		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3807	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.575

Space mean speed in ramp influence area, S_R = 49.0 mph

Space mean speed in outer lanes, S_0 = 62.6 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5875	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1450	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	670	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5875		1450		670		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1632		403		186		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6619		1634		755		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3807 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6619	9140	No
$v_{FO} = v_F - v_R$	4985	9140	No
v_R	1634	2000	No
v_3 or v_{av34}	1406 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3807 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3807	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.575

Space mean speed in ramp influence area, S_R = 49.0 mph

Space mean speed in outer lanes, S_0 = 62.6 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6410	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	705	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	565	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6410	705	565	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1781	196	157	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7222	794	637	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3597 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7222	9140	No
$v_{FO} = v_F - v_R$	6428	9140	No
v_R	794	2000	No
v_3 or v_{av34}	1812 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3597 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3597	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.499

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 61.0 mph

Space mean speed for all vehicles, S = 55.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6410	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	705	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	485	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6410	705	485	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1781	196	135	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7222	794	546	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3597 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7222	9140	No
$v_{FO} = v_F - v_R$	6428	9140	No
v_R	794	2000	No
v_3 or v_{av34}	1812 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3597 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3597	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.499

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 61.0 mph

Space mean speed for all vehicles, S = 55.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5175	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	75	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	785	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5175		75		785		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1438		21		218		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5831		85		884		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 949.11 (Equation 13-12 or 13-13)

P_{FD} = 0.699 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4100 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5831	6855	No
$v_{FO} = v_F - v_R$	5746	6855	No
v_R	85	2000	No
v_3 or v_{av34}	1731 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4100 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4100	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.436

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 53.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5175	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	75	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1450	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5175		75		1450		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1438		21		403		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5831		85		1634		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.610 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3592 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5831	6855	No
$v_{FO} = v_F - v_R$	5746	6855	No
v_R	85	2000	No
v_3 or v_{av34}	2239 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3592 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3592	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.436

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 60.0 mph

Space mean speed for all vehicles, S = 54.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4720	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1155	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4720		565		1155		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1311		157		321		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5318		637		1301		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 1748.22 (Equation 13-12 or 13-13)

P_{FD} = 0.806 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4412 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5318	6855	No
$v_{FO} = v_F - v_R$	4681	6855	No
v_R	637	2000	No
v_3 or v_{av34}	906 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4412 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4412	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 51.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4720	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	705	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4720		565		705		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1311		157		196		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5318		637		794		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.598 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3435 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5318	6855	No
$v_{FO} = v_F - v_R$	4681	6855	No
v_R	637	2000	No
v_3 or v_{av34}	1883 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3435 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3435	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 61.4 mph

Space mean speed for all vehicles, S = 53.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5175	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	785	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	75	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5175	785	75	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1438	218	21	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5831	884	85	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.574 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3721 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5831	6855	No
$v_{FO} = v_F - v_R$	4947	6855	No
v_R	884	2000	No
v_3 or v_{av34}	2110 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3721 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3721	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 59.8 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4720	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1155	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	565	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4720	1155	565	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1311	321	157	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5318	1301	637	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.567 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3579 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5318	6855	No
$v_{FO} = v_F - v_R$	4017	6855	No
v_R	1301	2000	No
v_3 or v_{av34}	1739 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3579 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3579	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.545

Space mean speed in ramp influence area, S_R = 49.5 mph

Space mean speed in outer lanes, S_0 = 61.3 mph

Space mean speed for all vehicles, S = 52.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3590	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	530	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	350	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3590	530	350	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	997	147	97	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4045	597	394	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.631 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2774 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4045	6855	No
$v_{FO} = v_F - v_R$	3448	6855	No
v_R	597	2000	No
v_3 or v_{av34}	1271 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2774 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2774	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.482

Space mean speed in ramp influence area, S_R = 50.6 mph

Space mean speed in outer lanes, S_0 = 63.1 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4230	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	875	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	420	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4230	875	420	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1175	243	117	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4766	986	473	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.595 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3237 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4766	6855	No
$v_{FO} = v_F - v_R$	3780	6855	No
v_R	986	2000	No
v_3 or v_{av34}	1529 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3237 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3237	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.517

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4000	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	798	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	585	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4000	798	585	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1111	222	163	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4507	899	659	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.606 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3085 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4507	6855	No
$v_{FO} = v_F - v_R$	3608	6855	No
v_R	899	2000	No
v_3 or v_{av34}	1422 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3085 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3085	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.509

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 62.5 mph

Space mean speed for all vehicles, S = 53.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4505	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1236	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	765	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4505	1236	765	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1251	343	213	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5076	1393	862	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.569 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3489 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5076	6855	No
$v_{FO} = v_F - v_R$	3683	6855	No
v_R	1393	2000	No
v_3 or v_{av34}	1587 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3489 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3489	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.553

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 61.9 mph

Space mean speed for all vehicles, S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5435	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	455	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	920	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5435	455	920	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1510	126	256	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6123	513	1037	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2959 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6123	9140	No
$v_{FO} = v_F - v_R$	5610	9140	No
v_R	513	2000	No
v_3 or v_{av34}	1582 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2959 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2959	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.474

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 61.9 mph

Space mean speed for all vehicles, S = 55.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6690	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1030	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6690	865	1030	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1858	240	286	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7537	975	1160	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3836 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7537	9140	No
$v_{FO} = v_F - v_R$	6562	9140	No
v_R	975	2000	No
v_3 or v_{av34}	1850 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3836 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3836	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 32.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 60.9 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3590	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	350	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	530	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3590	350	530	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	997	97	147	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4045	394	597	pcph

Estimation of V12 Merge Areas

L_{EQ} = 600.15 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2393 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4439	6855	No
v_3 or v_{av34}	1652 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 2393		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4439	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.349

Space mean speed in ramp influence area, S_R = 52.7 mph

Space mean speed in outer lanes, S_0 = 54.4 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	875	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4230	420	875	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1175	117	243	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4766	473	986	pcph

Estimation of V12 Merge Areas

L_{EQ} = 771.35 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2819 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5239	6855	No
v_3 or v_{av34}	1947 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2819 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5239	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.391	
Space mean speed in ramp influence area,	S_R = 52.1	mph
Space mean speed in outer lanes,	S_0 = 53.3	mph
Space mean speed for all vehicles,	S = 52.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4000	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	585	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	798	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4000	585	798	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1111	163	222	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4507	659	899	pcph

Estimation of V12 Merge Areas

L_{EQ} = 755.72 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2666 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5166	6855	No
v_3 or v_{av34}	1841 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2666		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5166	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.394

Space mean speed in ramp influence area, S_R = 52.0 mph

Space mean speed in outer lanes, S_0 = 53.7 mph

Space mean speed for all vehicles, S = 52.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4505	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	765	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1236	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4505	765	1236	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1251	213	343	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5076	862	1393	pcph

Estimation of V12 Merge Areas

L_{EQ} = 920.93 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3002 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5938	6855	No
v_3 or v_{av34}	2074 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3002		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5938	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.472	
Space mean speed in ramp influence area,	S_R = 50.7	mph
Space mean speed in outer lanes,	S_0 = 52.8	mph
Space mean speed for all vehicles,	S = 51.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4825	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	920	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4825	565	920	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1340	157	256	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5436	637	1037	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.595 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3491 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5436	6855	No
$v_{FO} = v_F - v_R$	4799	6855	No
v_R	637	2000	No
v_3 or v_{av34}	1945 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3491 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3491	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 29.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 60.5 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6680	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	915	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1030	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6680		915		1030		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1856		254		286		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7526		1031		1160		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3863 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7526	9140	No
$v_{FO} = v_F - v_R$	6495	9140	No
v_R	1031	2000	No
v_3 or v_{av34}	1831 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3863 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3863	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.521

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 60.9 mph

Space mean speed for all vehicles, S = 54.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	920	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	455	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4825	920	455	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1340	256	126	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5436	1037	513	pcph

Estimation of V12 Merge Areas

L_{EQ} = 3145.31 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3215 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6473	6855	No
v_3 or v_{av34}	2221 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3215		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6473	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{R12} - 0.00627\, L_A$ = 35.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.560

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 52.3 mph

Space mean speed for all vehicles, S = 50.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	920	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	565	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4825	920	565	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1340	256	157	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5436	1037	637	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1035.42 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3215 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6473	6855	No
v_3 or v_{av34}	2221 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3215		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6473	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.560

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 52.3 mph

Space mean speed for all vehicles, S = 50.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6680	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1030	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	865	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6680	1030	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1856	286	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7526	1160	975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.073 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 548 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8686	9140	No
v_3 or v_{av34}	3489 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 3010		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8686	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.538	
Space mean speed in ramp influence area,	S_R = 49.6	mph
Space mean speed in outer lanes,	S_0 = 52.2	mph
Space mean speed for all vehicles,	S = 50.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6680	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1030	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	915	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6680	1030	915	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1856	286	254	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7526	1160	1031	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.073 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 548 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8686	9140	No
v_3 or v_{av34}	3489 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 3010 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8686	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.538	
Space mean speed in ramp influence area,	S_R = 49.6	mph
Space mean speed in outer lanes,	S_0 = 52.2	mph
Space mean speed for all vehicles,	S = 50.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	58.5	mph
Volume on freeway	2885	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	885	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1665	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2885	885	1665	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	801	246	463	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3250	997	1876	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3250 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4247	4570	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3250		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4247	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.559

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 49.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/14/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5060	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1140	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1450	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5060	1140	1450	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1406	317	403	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5701	1284	1634	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3372 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6985	6855	Yes
v_3 or v_{av34}	2329 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3372 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6985	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 38.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.696

Space mean speed in ramp influence area, S_R = 47.0 mph

Space mean speed in outer lanes, S_0 = 51.8 mph

Space mean speed for all vehicles, S = 48.5 mph

APPENDIX G

RAMP ANALYSIS

- Base Year 2035

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4360	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	510	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1345	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4360		510		1345		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1211		142		374		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4912		575		1515		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.611 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3224 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4912	6855	No
$v_{FO} = v_F - v_R$	4337	6855	No
v_R	575	2000	No
v_3 or v_{av34}	1688 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3224 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3224	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.480

Space mean speed in ramp influence area, S_R = 50.6 mph

Space mean speed in outer lanes, S_0 = 61.5 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4665	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	605	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	985	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4665		605		985		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1296		168		274		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5256		682		1110		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.597 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3414 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5256	6855	No
$v_{FO} = v_F - v_R$	4574	6855	No
v_R	682	2000	No
v_3 or v_{av34}	1842 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3414 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3414	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 29.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.489

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 60.9 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5190	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	685	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	625	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5190	685	625	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1442	190	174	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5847	772	704	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.578 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3707 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5847	6855	No
$v_{FO} = v_F - v_R$	5075	6855	No
v_R	772	2000	No
v_3 or v_{av34}	2140 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3707 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3707	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.497

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 59.7 mph

Space mean speed for all vehicles, S = 53.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6145	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	535	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6145	535	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1707	149	189	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6923	603	766	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.559 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4137 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6923	6855	Yes
$v_{FO} = v_F - v_R$	6320	6855	No
v_R	603	2000	No
v_3 or v_{av34}	2786 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4223 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4223	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.482

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 57.5 mph

Space mean speed for all vehicles, S = 53.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4360	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1345	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	510	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4360	1345	510	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1211	374	142	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4912	1515	575	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1025.58 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2905 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6427	6855	No
v_3 or v_{av34}	2007 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2905		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6427	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.610

Space mean speed in ramp influence area, S_R = 48.4 mph

Space mean speed in outer lanes, S_0 = 53.1 mph

Space mean speed for all vehicles, S = 49.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4665	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	985	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	605	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4665	985	605	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1296	274	168	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5256	1110	682	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1012.52 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3109 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6366	6855	No
v_3 or v_{av34}	2147 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3109		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6366	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.551

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 52.6 mph

Space mean speed for all vehicles, S = 50.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5190	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	625	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	685	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5190	625	685	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1442	174	190	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5847	704	772	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1052.11 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3459 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6551	6855	No
v_3 or v_{av34}	2388 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3459		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6551	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.537	
Space mean speed in ramp influence area,	S_R = 49.6	mph
Space mean speed in outer lanes,	S_0 = 51.4	mph
Space mean speed for all vehicles,	S = 50.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6145	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	535	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6145	680	535	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1707	189	149	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6923	766	603	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1295.65 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4095 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7689	6855	Yes
v_3 or v_{av34}	2828 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 4223 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7689	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 40.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.858	
Space mean speed in ramp influence area,	S_R = 44.3	mph
Space mean speed in outer lanes,	S_0 = 49.6	mph
Space mean speed for all vehicles,	S = 46.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7885	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1190	vph
Length of first accel/decel lane	300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	655	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7885	1190	655	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2190	331	182	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8884	1341	738	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4630 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8884	9140	No
$v_{FO} = v_F - v_R$	7543	9140	No
v_R	1341	2000	No
v_3 or v_{av34}	2127 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4630 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4630	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 41.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.549

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 59.8 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7035	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	760	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	415	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7035	760	415	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1954	211	115	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7926	856	468	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3939 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7926	9140	No
$v_{FO} = v_F - v_R$	7070	9140	No
v_R	856	2000	No
v_3 or v_{av34}	1993 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3939 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3939	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.505

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7885	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	655	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1655	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7885	655	1655	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2190	182	460	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8884	738	1865	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.126 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1115 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9622	9140	Yes
v_3 or v_{av34}	3884 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3553 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9622	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.571	
Space mean speed in ramp influence area,	S_R = 49.1	mph
Space mean speed in outer lanes,	S_0 = 49.8	mph
Space mean speed for all vehicles,	S = 49.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7885	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	655	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1190	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7885	655	1190	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2190	182	331	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8884	738	1341	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.126 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1115 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9622	9140	Yes
v_3 or v_{av34}	3884 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3553 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9622	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.571	
Space mean speed in ramp influence area,	S_R = 49.1	mph
Space mean speed in outer lanes,	S_0 = 49.8	mph
Space mean speed for all vehicles,	S = 49.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7035	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	765	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7035	415	765	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1954	115	213	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7926	468	862	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1263 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8394	9140	No
v_3 or v_{av34}	3331 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 3170 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8394	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.434

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 51.5 mph

Space mean speed for all vehicles, S = 51.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7035	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	760	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7035	415	760	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1954	115	211	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7926	468	856	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1263 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8394	9140	No
v_3 or v_{av34}	3331 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 3170		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8394	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.434

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 51.5 mph

Space mean speed for all vehicles, S = 51.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6495	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1655	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	95	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6495	1655	95	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1804	460	26	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7318	1865	107	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4243 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7318	9140	No
$v_{FO} = v_F - v_R$	5453	9140	No
v_R	1865	2000	No
v_3 or v_{av34}	1537 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4243 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4243	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.596

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 53.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6495	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1655	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	655	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6495	1655	655	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1804	460	182	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7318	1865	738	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4243 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7318	9140	No
$v_{FO} = v_F - v_R$	5453	9140	No
v_R	1865	2000	No
v_3 or v_{av34}	1537 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4243 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4243	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.596

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 53.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6795	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	765	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	955	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6795	765	955	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1888	213	265	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7656	862	1076	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3824 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7656	9140	No
$v_{FO} = v_F - v_R$	6794	9140	No
v_R	862	2000	No
v_3 or v_{av34}	1916 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3824 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3824	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.506

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6795	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	765	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	415	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6795	765	415	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1888	213	115	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7656	862	468	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3824 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7656	9140	No
$v_{FO} = v_F - v_R$	6794	9140	No
v_R	862	2000	No
v_3 or v_{av34}	1916 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3824 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3824	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.506

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5510	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	95	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1580	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5510		95		1580		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1531		26		439		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6208		107		1780		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 1953.51 (Equation 13-12 or 13-13)

P_{FD} = 0.899 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 5592 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6208	6855	No
$v_{FO} = v_F - v_R$	6101	6855	No
v_R	107	2000	No
v_3 or v_{av34}	616 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 5592		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5592	4400	Yes

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 41.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.438

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 51.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5510	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	95	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1655	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5510		95		1655		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1531		26		460		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6208		107		1865		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.600 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6208	6855	No
$v_{FO} = v_F - v_R$	6101	6855	No
v_R	107	2000	No
v_3 or v_{av34}	2441 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3767 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3767	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.438

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 59.3 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4715	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	955	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1325	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4715		955		1325		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1310		265		368		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5312		1076		1493		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2563.58 (Equation 13-12 or 13-13)

P_{FD} = 0.851 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4681 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5312	6855	No
$v_{FO} = v_F - v_R$	4236	6855	No
v_R	1076	2000	No
v_3 or v_{av34}	631 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4681 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4681	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.525

Space mean speed in ramp influence area, S_R = 49.8 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 50.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 10/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4715	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	955	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	765	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4715		955		765		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1310		265		213		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5312		1076		862		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.578 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3523 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5312	6855	No
$v_{FO} = v_F - v_R$	4236	6855	No
v_R	1076	2000	No
v_3 or v_{av34}	1789 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3523 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3523	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.525

Space mean speed in ramp influence area, S_R = 49.8 mph

Space mean speed in outer lanes, S_0 = 61.8 mph

Space mean speed for all vehicles, S = 52.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5510	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1580	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	95	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5510		1580		95		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1531		439		26		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6208		1780		107		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.523 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4095 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6208	6855	No
$v_{FO} = v_F - v_R$	4428	6855	No
v_R	1780	2000	No
v_3 or v_{av34}	2113 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4095 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4095	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.588

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 59.8 mph

Space mean speed for all vehicles, S = 52.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4715	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1325	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	955	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4715		1325		955		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1310		368		265		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5312		1493		1076		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.559 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3626 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5312	6855	No
$v_{FO} = v_F - v_R$	3819	6855	No
v_R	1493	2000	No
v_3 or v_{av34}	1686 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3626 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3626	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.562

Space mean speed in ramp influence area, S_R = 49.2 mph

Space mean speed in outer lanes, S_0 = 61.5 mph

Space mean speed for all vehicles, S = 52.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4130	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	950	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	515	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4130	950	515	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1147	264	143	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4653	1070	580	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.594 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3200 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4653	6855	No
$v_{FO} = v_F - v_R$	3583	6855	No
v_R	1070	2000	No
v_3 or v_{av34}	1453 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3200		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3200	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.524

Space mean speed in ramp influence area, S_R = 49.8 mph

Space mean speed in outer lanes, S_0 = 62.4 mph

Space mean speed for all vehicles, S = 53.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4295	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1500	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	575	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4295	1500	575	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1193	417	160	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4839	1690	648	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.561 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3457 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4839	6855	No
$v_{FO} = v_F - v_R$	3149	6855	No
v_R	1690	2000	No
v_3 or v_{av34}	1382 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3457 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3457	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.580

Space mean speed in ramp influence area, S_R = 48.9 mph

Space mean speed in outer lanes, S_0 = 62.7 mph

Space mean speed for all vehicles, S = 52.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5475	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	804	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	710	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5475	804	710	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1521	223	197	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6169	906	800	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.564 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3875 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6169	6855	No
$v_{FO} = v_F - v_R$	5263	6855	No
v_R	906	2000	No
v_3 or v_{av34}	2294 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3875 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3875	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.510

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 59.1 mph

Space mean speed for all vehicles, S = 53.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5160	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1164	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	795	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5160	1164	795	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1433	323	221	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5814	1311	896	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.554 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3807 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5814	6855	No
$v_{FO} = v_F - v_R$	4503	6855	No
v_R	1311	2000	No
v_3 or v_{av34}	2007 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3807 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3807	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 32.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.546

Space mean speed in ramp influence area, S_R = 49.5 mph

Space mean speed in outer lanes, S_0 = 60.2 mph

Space mean speed for all vehicles, S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6985	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	460	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	950	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6985	460	950	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1940	128	264	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7870	518	1070	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3723 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7870	9140	No
$v_{FO} = v_F - v_R$	7352	9140	No
v_R	518	2000	No
v_3 or v_{av34}	2073 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3723		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3723	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 60.0 mph

Space mean speed for all vehicles, S = 55.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7330	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1265	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7330	775	1265	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2036	215	351	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8258	873	1425	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4093 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8258	9140	No
$v_{FO} = v_F - v_R$	7385	9140	No
v_R	873	2000	No
v_3 or v_{av34}	2082 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4093 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4093	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.507

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 60.0 mph

Space mean speed for all vehicles, S = 54.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/8/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4130	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	515	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	950	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4130	515	950	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1147	143	264	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4653	580	1070	pcph

Estimation of V12 Merge Areas

L_{EQ} = 770.06 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2752 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5233	6855	No
v_3 or v_{av34}	1901 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 2752 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5233	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.395

Space mean speed in ramp influence area, S_R = 52.0 mph

Space mean speed in outer lanes, S_0 = 53.5 mph

Space mean speed for all vehicles, S = 52.5 mph

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Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4295	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1500	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4295	575	1500	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1193	160	417	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4839	648	1690	pcph

Estimation of V12 Merge Areas

L_{EQ} = 824.42 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2862 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5487	6855	No
v_3 or v_{av34}	1977 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2862		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5487	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.416
Space mean speed in ramp influence area,	S_R = 51.6 mph
Space mean speed in outer lanes,	S_0 = 53.2 mph
Space mean speed for all vehicles,	S = 52.2 mph

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Merge Analysis

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Agency/Co.: ATA
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Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5475	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	804	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5475	710	804	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1521	197	223	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6169	800	906	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1141.57 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3649 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6969	6855	Yes
v_3 or v_{av34}	2520 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3649 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6969	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.620	
Space mean speed in ramp influence area,	S_R = 48.3	mph
Space mean speed in outer lanes,	S_0 = 50.7	mph
Space mean speed for all vehicles,	S = 49.1	mph

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Merge Analysis

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Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5160	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	795	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1164	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5160	795	1164	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1433	221	323	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5814	896	1311	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1086.14 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3439 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6710	6855	No
v_3 or v_{av34}	2375 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3439		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6710	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.584

Space mean speed in ramp influence area, S_R = 48.9 mph

Space mean speed in outer lanes, S_0 = 51.5 mph

Space mean speed for all vehicles, S = 49.8 mph

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Phone: Fax:
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Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/10/2013
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6125	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	950	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6125	660	950	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1701	183	264	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6901	744	1070	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.553 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4150 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6901	6855	Yes
$v_{FO} = v_F - v_R$	6157	6855	No
v_R	744	2000	No
v_3 or v_{av34}	2751 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4201 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4201	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.495

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 57.5 mph

Space mean speed for all vehicles, S = 52.9 mph

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Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/10/2013
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7170	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1265	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7170	865	1265	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1992	240	351	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8078	975	1425	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4072 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8078	9140	No
$v_{FO} = v_F - v_R$	7103	9140	No
v_R	975	2000	No
v_3 or v_{av34}	2003 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4072 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4072	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 54.6 mph

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Merge Analysis

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Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6125	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	950	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	460	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6125	950	460	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1701	264	128	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6901	1070	518	pcph

Estimation of V12 Merge Areas

L_{EQ} = 3175.97 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4082 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7971	6855	Yes
v_3 or v_{av34}	2819 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4201 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7971	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 43.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.045	
Space mean speed in ramp influence area,	S_R = 41.3	mph
Space mean speed in outer lanes,	S_0 = 49.6	mph
Space mean speed for all vehicles,	S = 43.7	mph

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Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6125	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	950	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	660	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6125	950	660	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1701	264	183	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6901	1070	744	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1355.99 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4082 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7971	6855	Yes
v_3 or v_{av34}	2819 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 4201 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7971	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 43.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.045	
Space mean speed in ramp influence area,	S_R = 41.3	mph
Space mean speed in outer lanes,	S_0 = 49.6	mph
Space mean speed for all vehicles,	S = 43.7	mph

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Merge Analysis

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Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7170	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1265	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	775	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7170	1265	775	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1992	351	215	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8078	1425	873	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.040 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 320 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9503	9140	Yes
v_3 or v_{av34}	3879 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3231 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9503	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 38.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.696	
Space mean speed in ramp influence area,	S_R = 47.0	mph
Space mean speed in outer lanes,	S_0 = 51.2	mph
Space mean speed for all vehicles,	S = 49.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/10/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7170	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1265	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	865	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7170	1265	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1992	351	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8078	1425	975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.040 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 320 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9503	9140	Yes
v_3 or v_{av34}	3879 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3231 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9503	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 38.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.696	
Space mean speed in ramp influence area,	S_R = 47.0	mph
Space mean speed in outer lanes,	S_0 = 51.2	mph
Space mean speed for all vehicles,	S = 49.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/10/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3135	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1185	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2680	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3135	1185	2680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	871	329	744	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3532	1335	3019	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3532 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4867	4570	Yes
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3532		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4867	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 39.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.793	
Space mean speed in ramp influence area,	S_R = 45.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 45.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/10/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4945	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1230	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2160	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4945	1230	2160	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1374	342	600	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5571	1386	2434	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3295 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6957	6855	Yes
v_3 or v_{av34}	2276 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3295 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6957	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 38.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.707	
Space mean speed in ramp influence area,	S_R = 46.8	mph
Space mean speed in outer lanes,	S_0 = 52.1	mph
Space mean speed for all vehicles,	S = 48.4	mph

APPENDIX G

RAMP ANALYSIS

- Year 2023

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3590	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	440	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	755	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3590	440	755	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	997	122	210	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4045	496	851	pcph

Estimation of V12 Merge Areas

L_{EQ} = 621.97 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2393 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4541	6855	No
v_3 or v_{av34}	1652 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2393		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4541	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.356

Space mean speed in ramp influence area, S_R = 52.6 mph

Space mean speed in outer lanes, S_0 = 54.4 mph

Space mean speed for all vehicles, S = 53.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	515	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1450	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4230	515	1450	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1175	143	403	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4766	580	1634	pcph

Estimation of V12 Merge Areas

L_{EQ} = 794.24 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2819 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5346	6855	No
v_3 or v_{av34}	1947 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 2819 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5346	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.403

Space mean speed in ramp influence area, S_R = 51.9 mph

Space mean speed in outer lanes, S_0 = 53.3 mph

Space mean speed for all vehicles, S = 52.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3590	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	755	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	440	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3590	755	440	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	997	210	122	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4045	851	496	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.620 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2830 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4045	6855	No
$v_{FO} = v_F - v_R$	3194	6855	No
v_R	851	2000	No
v_3 or v_{av34}	1215 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2830 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2830	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.505

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 63.3 mph

Space mean speed for all vehicles, S = 53.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4230	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1450	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	515	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4230	1450	515	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1175	403	143	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4766	1634	580	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.566 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3406 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4766	6855	No
$v_{FO} = v_F - v_R$	3132	6855	No
v_R	1634	2000	No
v_3 or v_{av34}	1360 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3406 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3406	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.575

Space mean speed in ramp influence area, S_R = 49.0 mph

Space mean speed in outer lanes, S_0 = 62.8 mph

Space mean speed for all vehicles, S = 52.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4430	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1425	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4430	400	1425	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1231	111	396	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4991	451	1606	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.614 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3241 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4991	6855	No
$v_{FO} = v_F - v_R$	4540	6855	No
v_R	451	2000	No
v_3 or v_{av34}	1750 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3241 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3241	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.469

Space mean speed in ramp influence area, S_R = 50.8 mph

Space mean speed in outer lanes, S_0 = 61.2 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1290	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4660		435		1290		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1294		121		358		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5250		490		1453		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.606 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3376 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5250	6855	No
$v_{FO} = v_F - v_R$	4760	6855	No
v_R	490	2000	No
v_3 or v_{av34}	1874 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3376 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3376	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.472

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 60.8 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4430	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1425	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	400	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4430	1425	400	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1231	396	111	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4991	1606	451	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1061.96 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2952 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6597	6855	No
v_3 or v_{av34}	2039 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2952		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6597	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 37.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.658	
Space mean speed in ramp influence area,	S_R = 47.6	mph
Space mean speed in outer lanes,	S_0 = 53.0	mph
Space mean speed for all vehicles,	S = 49.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4660	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1290	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	435	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4660	1290	435	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1294	358	121	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5250	1453	490	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1084.64 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3105 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6703	6855	No
v_3 or v_{av34}	2145 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3105		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6703	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 37.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.658	
Space mean speed in ramp influence area,	S_R = 47.6	mph
Space mean speed in outer lanes,	S_0 = 52.6	mph
Space mean speed for all vehicles,	S = 49.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4215	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	600	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	816	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4215	600	816	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1171	167	227	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4749	676	919	pcph

Estimation of V12 Merge Areas

L_{EQ} = 811.15 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2809 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5425	6855	No
v_3 or v_{av34}	1940 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2809 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5425	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.413

Space mean speed in ramp influence area, S_R = 51.7 mph

Space mean speed in outer lanes, S_0 = 53.3 mph

Space mean speed for all vehicles, S = 52.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5050	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	795	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1260	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5050	795	1260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1403	221	350	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5690	896	1420	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1059.60 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3366 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6586	6855	No
v_3 or v_{av34}	2324 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3366		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6586	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.563	
Space mean speed in ramp influence area,	S_R = 49.2	mph
Space mean speed in outer lanes,	S_0 = 51.8	mph
Space mean speed for all vehicles,	S = 50.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4215	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	816	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	600	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4215	816	600	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1171	227	167	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4749	919	676	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.599 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3213 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4749	6855	No
$v_{FO} = v_F - v_R$	3830	6855	No
v_R	919	2000	No
v_3 or v_{av34}	1536 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3213 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3213	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 53.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5050	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	795	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5050		1260		795		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1403		350		221		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5690		1420		896		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.552 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3779 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5690	6855	No
$v_{FO} = v_F - v_R$	4270	6855	No
v_R	1420	2000	No
v_3 or v_{av34}	1911 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3779 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3779	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.556

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 52.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5680	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	455	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1080	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5680	455	1080	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1578	126	300	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6399	513	1217	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3079 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6399	9140	No
$v_{FO} = v_F - v_R$	5886	9140	No
v_R	513	2000	No
v_3 or v_{av34}	1660 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3079 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3079	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.474

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 61.6 mph

Space mean speed for all vehicles, S = 55.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7275	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1120	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7275	865	1120	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2021	240	311	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8197	975	1262	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4124 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8197	9140	No
$v_{FO} = v_F - v_R$	7222	9140	No
v_R	975	2000	No
v_3 or v_{av34}	2036 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4124 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4124	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 60.1 mph

Space mean speed for all vehicles, S = 54.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	645	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	710	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5335	645	710	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1482	179	197	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6011	727	800	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.576 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6011	6855	No
$v_{FO} = v_F - v_R$	5284	6855	No
v_R	727	2000	No
v_3 or v_{av34}	2239 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3772 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3772	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.493

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 59.3 mph

Space mean speed for all vehicles, S = 53.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5875	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	615	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5875	560	615	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1632	156	171	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6619	631	693	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.565 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4017 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6619	6855	No
$v_{FO} = v_F - v_R$	5988	6855	No
v_R	631	2000	No
v_3 or v_{av34}	2602 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4017 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4017	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 57.9 mph

Space mean speed for all vehicles, S = 53.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5345	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	645	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5345	710	645	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1485	197	179	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6022	800	727	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1110.11 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3562 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6822	6855	No
v_3 or v_{av34}	2460 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 3562 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6822	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.592

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 51.0 mph

Space mean speed for all vehicles, S = 49.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5920	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	615	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	560	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5920	615	560	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1644	171	156	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6670	693	631	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1225.88 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3945 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7363	6855	Yes
v_3 or v_{av34}	2725 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3970		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7363	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 38.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.699	
Space mean speed in ramp influence area,	S_R = 47.0	mph
Space mean speed in outer lanes,	S_0 = 49.6	mph
Space mean speed for all vehicles,	S = 47.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4915	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1080	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	565	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4915	1080	565	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1365	300	157	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5538	1217	637	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1095.77 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3276 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6755	6855	No
v_3 or v_{av34}	2262 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 3276 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6755	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.635

Space mean speed in ramp influence area, S_R = 48.0 mph

Space mean speed in outer lanes, S_0 = 52.2 mph

Space mean speed for all vehicles, S = 49.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7180	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	915	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7180	1120	915	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1994	311	254	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8089	1262	1031	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.060 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 486 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9351	9140	Yes
v_3 or v_{av34}	3801 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	Yes	

If yes, v_{12A} = 3235 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9351	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.636

Space mean speed in ramp influence area, S_R = 48.0 mph

Space mean speed in outer lanes, S_0 = 51.2 mph

Space mean speed for all vehicles, S = 49.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4915	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1080	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	455	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4915	1080	455	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1365	300	126	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5538	1217	513	pcph

Estimation of V12 Merge Areas

L_{EQ} = 3145.31 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3276 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6755	6855	No
v_3 or v_{av34}	2262 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3276		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	6755	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.635	
Space mean speed in ramp influence area,	S_R = 48.0	mph
Space mean speed in outer lanes,	S_0 = 52.2	mph
Space mean speed for all vehicles,	S = 49.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7180	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	865	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7180	1120	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1994	311	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8089	1262	975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.060 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 486 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9351	9140	Yes
v_3 or v_{av34}	3801 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 3235 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9351	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.636	
Space mean speed in ramp influence area,	S_R = 48.0	mph
Space mean speed in outer lanes,	S_0 = 51.2	mph
Space mean speed for all vehicles,	S = 49.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4915	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1080	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4915	565	1080	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1365	157	300	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5538	637	1217	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.592 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3540 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5538	6855	No
$v_{FO} = v_F - v_R$	4901	6855	No
v_R	637	2000	No
v_3 or v_{av34}	1998 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3540		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3540	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 53.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7180	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	915	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1120	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7180	915	1120	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1994	254	311	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8089	1031	1262	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4108 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8089	9140	No
$v_{FO} = v_F - v_R$	7058	9140	No
v_R	1031	2000	No
v_3 or v_{av34}	1990 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4108 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4108	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.521

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 54.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7815	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1195	vph
Length of first accel/decel lane	300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7815	1195	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2171	332	189	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8805	1346	766	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4598 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8805	9140	No
$v_{FO} = v_F - v_R$	7459	9140	No
v_R	1346	2000	No
v_3 or v_{av34}	2103 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4598 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4598	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 41.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.549

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 59.9 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7105	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	870	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	490	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7105	870	490	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1974	242	136	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8005	980	552	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4043 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8005	9140	No
$v_{FO} = v_F - v_R$	7025	9140	No
v_R	980	2000	No
v_3 or v_{av34}	1981 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4043 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4043	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 54.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7815	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1195	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7815	680	1195	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2171	189	332	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8805	766	1346	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.122 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1075 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9571	9140	Yes
v_3 or v_{av34}	3865 pc/h	(Equation 13-14 or 17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 3522 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9571	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.570
Space mean speed in ramp influence area,	S_R = 49.1 mph
Space mean speed in outer lanes,	S_0 = 49.9 mph
Space mean speed for all vehicles,	S = 49.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	870	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7105	490	870	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1974	136	242	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8005	552	980	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.149 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1191 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8557	9140	No
v_3 or v_{av34}	3407 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 3202 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8557	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.452	
Space mean speed in ramp influence area,	S_R = 51.0	mph
Space mean speed in outer lanes,	S_0 = 51.4	mph
Space mean speed for all vehicles,	S = 51.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7815	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1570	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7815	680	1570	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2171	189	436	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8805	766	1769	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.122 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1075 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9571	9140	Yes
v_3 or v_{av34}	3865 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3522 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9571	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.570	
Space mean speed in ramp influence area,	S_R = 49.1	mph
Space mean speed in outer lanes,	S_0 = 49.9	mph
Space mean speed for all vehicles,	S = 49.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	835	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7105	490	835	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1974	136	232	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8005	552	941	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.149 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1191 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8557	9140	No
v_3 or v_{av34}	3407 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3202 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8557	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.452	
Space mean speed in ramp influence area,	S_R = 51.0	mph
Space mean speed in outer lanes,	S_0 = 51.4	mph
Space mean speed for all vehicles,	S = 51.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6305	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1570	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6305	1570	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1751	436	189	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7104	1769	766	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4095 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7104	9140	No
$v_{FO} = v_F - v_R$	5335	9140	No
v_R	1769	2000	No
v_3 or v_{av34}	1504 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4095 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4095	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.587

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 62.2 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6810	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	490	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6810	835	490	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1892	232	136	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7673	941	552	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3876 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7673	9140	No
$v_{FO} = v_F - v_R$	6732	9140	No
v_R	941	2000	No
v_3 or v_{av34}	1898 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3876 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3876	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.513

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 60.7 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6305	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1570	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	195	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6305	1570	195	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1751	436	54	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7104	1769	220	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4095 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7104	9140	No
$v_{FO} = v_F - v_R$	5335	9140	No
v_R	1769	2000	No
v_3 or v_{av34}	1504 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4095 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4095	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.587

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 62.2 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6810	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	820	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6810	835	820	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1892	232	228	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7673	941	924	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3876 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7673	9140	No
$v_{FO} = v_F - v_R$	6732	9140	No
v_R	941	2000	No
v_3 or v_{av34}	1898 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3876 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3876	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.513

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 60.7 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5410	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1570	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5410		195		1570		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1503		54		436		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6095		220		1769		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.598 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3730 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6095	6855	No
$v_{FO} = v_F - v_R$	5875	6855	No
v_R	220	2000	No
v_3 or v_{av34}	2365 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3730 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3730	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.448

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 59.6 mph

Space mean speed for all vehicles, S = 53.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4770	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	820	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	835	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4770		820		835		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1325		228		232		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5374		924		941		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.583 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3519 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5374	6855	No
$v_{FO} = v_F - v_R$	4450	6855	No
v_R	924	2000	No
v_3 or v_{av34}	1855 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3519 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3519	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 61.5 mph

Space mean speed for all vehicles, S = 53.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5410	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	865	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5410	195	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1503	54	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6095	220	975	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 1116.70 (Equation 13-12 or 13-13)

P_{FD} = 0.714 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4417 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6095	6855	No
$v_{FO} = v_F - v_R$	5875	6855	No
v_R	220	2000	No
v_3 or v_{av34}	1678 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 4417		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4417	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.448

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 62.4 mph

Space mean speed for all vehicles, S = 53.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4770	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	820	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1260	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4770	820	1260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1325	228	350	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5374	924	1420	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2231.00 (Equation 13-12 or 13-13)

P_{FD} = 0.833 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4630 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5374	6855	No
$v_{FO} = v_F - v_R$	4450	6855	No
v_R	924	2000	No
v_3 or v_{av34}	744 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4630 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4630	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 51.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5410	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	195	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5410	865	195	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1503	240	54	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6095	975	220	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.563 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3856 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6095	6855	No
$v_{FO} = v_F - v_R$	5120	6855	No
v_R	975	2000	No
v_3 or v_{av34}	2239 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3856 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3856	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 59.3 mph

Space mean speed for all vehicles, S = 53.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4770	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	820	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4770	1260	820	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1325	350	228	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5374	1420	924	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.560 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3636 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5374	6855	No
$v_{FO} = v_F - v_R$	3954	6855	No
v_R	1420	2000	No
v_3 or v_{av34}	1738 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3636 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3636	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.556

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 61.3 mph

Space mean speed for all vehicles, S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	58.5	mph
Volume on freeway	2495	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1100	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1935	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2495	1100	1935	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	693	306	538	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2811	1239	2180	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2811 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4050	4570	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2811		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4050	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.510

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 50.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5185	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1550	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5185	1420	1550	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1440	394	431	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5842	1600	1746	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3456 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7442	6855	Yes
v_3 or v_{av34}	2386 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3456 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	7442	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 41.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.898

Space mean speed in ramp influence area, S_R = 43.7 mph

Space mean speed in outer lanes, S_0 = 51.5 mph

Space mean speed for all vehicles, S = 45.9 mph

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	5980	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1661	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2246	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2246	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	52.4	mi/h
Number of lanes, N	3	
Density, D	42.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	ATA
Date Performed:	5/15/14
Analysis Time Period:	PM
Freeway/Direction:	H-1 EB
From/To:	Kualakai-Kunia
Jurisdiction:	
Analysis Year:	
Description:	

Flow Inputs and Adjustments

Volume, V	6435	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1788	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2417	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2417	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	47.9	mi/h
Number of lanes, N	3	
Density, D	50.5	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	ATA
Date Performed:	5/15/14
Analysis Time Period:	AM
Freeway/Direction:	H-1 WB
From/To:	Kualakai-Kunia
Jurisdiction:	
Analysis Year:	
Description:	

Flow Inputs and Adjustments

Volume, V	4815	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1338	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1808	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1808	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	59.2	mi/h
Number of lanes, N	3	
Density, D	30.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	5845	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1624	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2195	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2195	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	53.6	mi/h
Number of lanes, N	3	
Density, D	41.0	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9010	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2503	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2030	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2030	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	56.6	mi/h
Number of lanes, N	5	
Density, D	35.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8280	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2300	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2332	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2332	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	50.3	mi/h
Number of lanes, N	4	
Density, D	46.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	6135	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1704	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1728	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1728	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	59.7	mi/h
Number of lanes, N	4	
Density, D	28.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8220	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2283	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2315	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2315	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	50.7	mi/h
Number of lanes, N	4	
Density, D	45.6	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8650	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2403	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2436	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2436	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	47.3	mi/h
Number of lanes, N	4	
Density, D	51.5	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7645	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2124	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2153	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2153	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	54.4	mi/h
Number of lanes, N	4	
Density, D	39.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	5555	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1543	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2086	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2086	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	55.7	mi/h
Number of lanes, N	3	
Density, D	37.4	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8155	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2265	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2297	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2297	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	51.2	mi/h
Number of lanes, N	4	
Density, D	44.9	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

APPENDIX G

RAMP ANALYSIS

- Year 2023 with Mitigation

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3590	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	440	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	378	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3590	440	378	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	997	122	105	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4045	496	426	pcph

Estimation of V12 Merge Areas

L_{EQ} = 621.97 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2393 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4541	6855	No
v_3 or v_{av34}	1652 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2393		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4541	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.356

Space mean speed in ramp influence area, S_R = 52.6 mph

Space mean speed in outer lanes, S_0 = 54.4 mph

Space mean speed for all vehicles, S = 53.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	515	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	725	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4230	515	725	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1175	143	201	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4766	580	817	pcph

Estimation of V12 Merge Areas

L_{EQ} = 794.24 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2819 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5346	6855	No
v_3 or v_{av34}	1947 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2819 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5346	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.403

Space mean speed in ramp influence area, S_R = 51.9 mph

Space mean speed in outer lanes, S_0 = 53.3 mph

Space mean speed for all vehicles, S = 52.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3590	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	378	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	440	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3590		378		440		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	997		105		122		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4045		426		496		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.639 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2740 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4045	6855	No
$v_{FO} = v_F - v_R$	3619	6855	No
v_R	426	2000	No
v_3 or v_{av34}	1305 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2740 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2740	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.466

Space mean speed in ramp influence area, S_R = 50.8 mph

Space mean speed in outer lanes, S_0 = 63.0 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4230	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	725	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	515	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4230	725	515	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1175	201	143	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4766	817	580	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.603 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3199 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4766	6855	No
$v_{FO} = v_F - v_R$	3949	6855	No
v_R	817	2000	No
v_3 or v_{av34}	1567 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3199 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3199	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.502

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 62.0 mph

Space mean speed for all vehicles, S = 53.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4430	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1425	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4430		400		1425		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1231		111		396		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	4991		451		1606		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2430 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4991	9140	No
$v_{FO} = v_F - v_R$	4540	9140	No
v_R	451	2000	No
v_3 or v_{av34}	1280 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2430 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2430	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.469

Space mean speed in ramp influence area, S_R = 50.8 mph

Space mean speed in outer lanes, S_0 = 63.1 mph

Space mean speed for all vehicles, S = 56.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1290	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4660	435	1290	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1294	121	358	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5250	490	1453	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2565 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5250	9140	No
$v_{FO} = v_F - v_R$	4760	9140	No
v_R	490	2000	No
v_3 or v_{av34}	1342 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2565 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2565	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 21.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.472

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 62.8 mph

Space mean speed for all vehicles, S = 56.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4430	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1425	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	400	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4430	1425	400	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1231	396	111	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4991	1606	451	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.017 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 85 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6597	9140	No
v_3 or v_{av34}	2453 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1996		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6597	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.429

Space mean speed in ramp influence area, S_R = 51.4 mph

Space mean speed in outer lanes, S_0 = 54.9 mph

Space mean speed for all vehicles, S = 52.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4660	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1290	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	435	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4660	1290	435	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1294	358	121	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5250	1453	490	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.036 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 190 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6703	9140	No
v_3 or v_{av34}	2530 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2100 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6703	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.422	
Space mean speed in ramp influence area,	S_R = 51.5	mph
Space mean speed in outer lanes,	S_0 = 54.6	mph
Space mean speed for all vehicles,	S = 52.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4215	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	600	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	816	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4215	600	816	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1171	167	227	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4749	676	919	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.133 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 633 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5425	9140	No
v_3 or v_{av34}	2058 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1899 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5425	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.337	
Space mean speed in ramp influence area,	S_R = 52.9	mph
Space mean speed in outer lanes,	S_0 = 55.2	mph
Space mean speed for all vehicles,	S = 54.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5050	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	795	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1260	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5050	795	1260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1403	221	350	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5690	896	1420	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.106 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 602 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6586	9140	No
v_3 or v_{av34}	2544 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2276 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6586	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 26.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.379	
Space mean speed in ramp influence area,	S_R = 52.2	mph
Space mean speed in outer lanes,	S_0 = 54.2	mph
Space mean speed for all vehicles,	S = 53.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4215	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	816	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	600	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4215	816	600	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1171	227	167	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4749	919	676	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2589 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4749	9140	No
$v_{FO} = v_F - v_R$	3830	9140	No
v_R	919	2000	No
v_3 or v_{av34}	1080 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2589 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2589	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 63.9 mph

Space mean speed for all vehicles, S = 55.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5050	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	795	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5050		1260		795		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1403		350		221		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5690		1420		896		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3282 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5690	9140	No
$v_{FO} = v_F - v_R$	4270	9140	No
v_R	1420	2000	No
v_3 or v_{av34}	1204 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3282 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3282	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.556

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 63.4 mph

Space mean speed for all vehicles, S = 54.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5680	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	455	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1080	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5680	455	1080	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1578	126	300	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6399	513	1217	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2661 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5440	9140	No
$v_{FO} = v_F - v_R$	4927	9140	No
v_R	513	2000	No
v_3 or v_{av34}	1389 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2661 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2661	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.474

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 62.7 mph

Space mean speed for all vehicles, S = 56.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7275	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1120	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7275	865	1120	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2021	240	311	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8197	975	1262	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3409 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6558	9140	No
$v_{FO} = v_F - v_R$	5583	9140	No
v_R	975	2000	No
v_3 or v_{av34}	1574 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3409 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3409	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 29.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 61.9 mph

Space mean speed for all vehicles, S = 55.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	645	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	710	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5335	645	710	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1482	179	197	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6011	727	800	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3031 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6011	9140	No
$v_{FO} = v_F - v_R$	5284	9140	No
v_R	727	2000	No
v_3 or v_{av34}	1490 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3031 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3031	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.493

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 62.3 mph

Space mean speed for all vehicles, S = 55.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5875	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	615	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5875	560	615	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1632	156	171	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6619	631	693	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3242 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6619	9140	No
$v_{FO} = v_F - v_R$	5988	9140	No
v_R	631	2000	No
v_3 or v_{av34}	1688 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3242		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3242	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 61.5 mph

Space mean speed for all vehicles, S = 55.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5345	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	645	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5345	710	645	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1485	197	179	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6022	800	727	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.118 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 709 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6822	9140	No
v_3 or v_{av34}	2656 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2408		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6822	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.382

Space mean speed in ramp influence area, S_R = 52.2 mph

Space mean speed in outer lanes, S_0 = 53.8 mph

Space mean speed for all vehicles, S = 53.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5920	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	615	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	560	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5920	615	560	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1644	171	156	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6670	693	631	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.131 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 875 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7363	9140	No
v_3 or v_{av34}	2897 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2668 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7363	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.398	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_0 = 53.1	mph
Space mean speed for all vehicles,	S = 52.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4915	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1080	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	565	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4915	1080	565	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1365	300	157	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5538	1217	637	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.066 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 364 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6755	9140	No
v_3 or v_{av34}	2587 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2215 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6755	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.407

Space mean speed in ramp influence area, S_R = 51.8 mph

Space mean speed in outer lanes, S_0 = 54.3 mph

Space mean speed for all vehicles, S = 53.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7180	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	915	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7180	1120	915	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1994	311	254	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8089	1262	1031	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.060 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 347 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7046	9140	No
v_3 or v_{av34}	2718 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2313 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7046	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.425
Space mean speed in ramp influence area,	S_R = 51.5 mph
Space mean speed in outer lanes,	S_0 = 54.1 mph
Space mean speed for all vehicles,	S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/15/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4915	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1080	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	455	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4915	1080	455	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1365	300	126	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5538	1217	513	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.066 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 364 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6755	9140	No
v_3 or v_{av34}	2587 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2215		(Equation 13-15, 13-16, 18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6755	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.407	
Space mean speed in ramp influence area,	S_R = 51.8	mph
Space mean speed in outer lanes,	S_0 = 54.3	mph
Space mean speed for all vehicles,	S = 53.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7180	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	865	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7180	1120	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1994	311	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8089	1262	975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.060 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 347 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7046	9140	No
v_3 or v_{av34}	2718 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2313 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7046	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.425
Space mean speed in ramp influence area,	S_R = 51.5 mph
Space mean speed in outer lanes,	S_0 = 54.1 mph
Space mean speed for all vehicles,	S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4915	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	565	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1080	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4915	565	1080	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1365	157	300	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5538	637	1217	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2774 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5538	9140	No
$v_{FO} = v_F - v_R$	4901	9140	No
v_R	637	2000	No
v_3 or v_{av34}	1382 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2774		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2774	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.485

Space mean speed in ramp influence area, S_R = 50.5 mph

Space mean speed in outer lanes, S_0 = 62.7 mph

Space mean speed for all vehicles, S = 55.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7180	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	915	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1120	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7180	915	1120	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1994	254	311	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8089	1031	1262	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3403 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6472	9140	No
$v_{FO} = v_F - v_R$	5441	9140	No
v_R	1031	2000	No
v_3 or v_{av34}	1534 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3403 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3403	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.521

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 55.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7815	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1195	vph
Length of first accel/decel lane	300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7815	1195	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2171	332	189	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8805	1346	766	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3830 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7044	9140	No
$v_{FO} = v_F - v_R$	5698	9140	No
v_R	1346	2000	No
v_3 or v_{av34}	1607 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3830 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3830	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.549

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 61.8 mph

Space mean speed for all vehicles, S = 54.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7105	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	870	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	490	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7105	870	490	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1974	242	136	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8005	980	552	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3345 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6404	9140	No
$v_{FO} = v_F - v_R$	5424	9140	No
v_R	980	2000	No
v_3 or v_{av34}	1529 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3345 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3345	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 55.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7815	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1195	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7815	680	1195	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2171	189	332	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8805	766	1346	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.122 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 770 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7071	9140	No
v_3 or v_{av34}	2767 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2522 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7071	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.390	
Space mean speed in ramp influence area,	S_R = 52.1	mph
Space mean speed in outer lanes,	S_0 = 53.5	mph
Space mean speed for all vehicles,	S = 52.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	870	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7105	490	870	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1974	136	242	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8005	552	980	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.149 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 852 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6276	9140	No
v_3 or v_{av34}	2436 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2289 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6276	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.353	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_0 = 54.1	mph
Space mean speed for all vehicles,	S = 53.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7815	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1570	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7815	680	1570	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2171	189	436	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8805	766	1769	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.122 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 770 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7071	9140	No
v_3 or v_{av34}	2767 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2522 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7071	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.390

Space mean speed in ramp influence area, S_R = 52.1 mph

Space mean speed in outer lanes, S_0 = 53.5 mph

Space mean speed for all vehicles, S = 52.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	835	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7105	490	835	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1974	136	232	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8005	552	941	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.149 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 852 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6276	9140	No
v_3 or v_{av34}	2436 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2289		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6276	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.353	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_0 = 54.1	mph
Space mean speed for all vehicles,	S = 53.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6305	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1570	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6305		1570		680		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1751		436		189		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7104		1769		766		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3476 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5684	9140	No
$v_{FO} = v_F - v_R$	3915	9140	No
v_R	1769	2000	No
v_3 or v_{av34}	1104 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3476 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3476	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.587

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 63.8 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6810	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	490	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6810	835	490	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1892	232	136	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7673	941	552	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6139	9140	No
$v_{FO} = v_F - v_R$	5198	9140	No
v_R	941	2000	No
v_3 or v_{av34}	1466 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3207		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3207	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.513

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 62.4 mph

Space mean speed for all vehicles, S = 55.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6305	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1570	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	195	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6305	1570	195	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1751	436	54	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7104	1769	220	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3476 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5684	9140	No
$v_{FO} = v_F - v_R$	3915	9140	No
v_R	1769	2000	No
v_3 or v_{av34}	1104 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3476 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3476	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.587

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 63.8 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6810	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	820	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6810	835	820	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1892	232	228	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7673	941	924	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6139	9140	No
$v_{FO} = v_F - v_R$	5198	9140	No
v_R	941	2000	No
v_3 or v_{av34}	1466 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3207		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3207	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.513

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 62.4 mph

Space mean speed for all vehicles, S = 55.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5410	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1570	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5410		195		1570		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1503		54		436		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6095		220		1769		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2781 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6095	9140	No
$v_{FO} = v_F - v_R$	5875	9140	No
v_R	220	2000	No
v_3 or v_{av34}	1657 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2781 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2781	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.448

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 62.2 mph

Space mean speed for all vehicles, S = 56.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4770	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	820	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	835	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4770	820	835	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1325	228	232	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5374	924	941	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2864 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5374	9140	No
$v_{FO} = v_F - v_R$	4450	9140	No
v_R	924	2000	No
v_3 or v_{av34}	1255 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2864 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2864	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 63.7 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5410	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	865	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5410	195	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1503	54	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6095	220	975	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2781 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6095	9140	No
$v_{FO} = v_F - v_R$	5875	9140	No
v_R	220	2000	No
v_3 or v_{av34}	1657 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2781 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2781	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.448

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 62.2 mph

Space mean speed for all vehicles, S = 56.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4770	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	820	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1260	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4770	820	1260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1325	228	350	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5374	924	1420	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2864 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5374	9140	No
$v_{FO} = v_F - v_R$	4450	9140	No
v_R	924	2000	No
v_3 or v_{av34}	1255 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2864 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2864	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.511

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 63.7 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5410	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	195	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5410	865	195	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1503	240	54	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6095	975	220	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6095	9140	No
$v_{FO} = v_F - v_R$	5120	9140	No
v_R	975	2000	No
v_3 or v_{av34}	1444 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3207 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3207	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 62.4 mph

Space mean speed for all vehicles, S = 55.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4770	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1260	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	820	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4770	1260	820	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1325	350	228	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5374	1420	924	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3144 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5374	9140	No
$v_{FO} = v_F - v_R$	3954	9140	No
v_R	1420	2000	No
v_3 or v_{av34}	1115 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3144		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3144	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.556

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 63.7 mph

Space mean speed for all vehicles, S = 54.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	2495	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1100	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1935	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2495	1100	1935	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	693	306	538	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2811	1239	2180	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1663 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4050	6855	No
v_3 or v_{av34}	1148 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 1663 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4050	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.357	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_0 = 56.2	mph
Space mean speed for all vehicles,	S = 53.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/8/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5185	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1550	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5185	1420	1550	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1440	394	431	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5842	1600	1746	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.018 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 104 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7442	9140	No
v_3 or v_{av34}	2869 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2336 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7442	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.486	
Space mean speed in ramp influence area,	S_R = 50.5	mph
Space mean speed in outer lanes,	S_0 = 54.0	mph
Space mean speed for all vehicles,	S = 52.1	mph

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	5980	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1661	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1684	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1684	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	59.9	mi/h
Number of lanes, N	4	
Density, D	28.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	6435	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1788	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1813	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1813	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	59.2	mi/h
Number of lanes, N	4	
Density, D	30.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	4815	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1338	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1356	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1356	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	4	
Density, D	22.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	ATA
Date Performed:	5/15/14
Analysis Time Period:	PM
Freeway/Direction:	H-1 WB
From/To:	Kualakai-Kunia
Jurisdiction:	
Analysis Year:	
Description:	

Flow Inputs and Adjustments

Volume, V	5845	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1624	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1646	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1646	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	4	
Density, D	27.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9010	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2503	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1692	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1692	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	59.8	mi/h
Number of lanes, N	6	
Density, D	28.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8280	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2300	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1866	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1866	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	58.7	mi/h
Number of lanes, N	5	
Density, D	31.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	6135	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1704	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1382	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1382	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	5	
Density, D	23.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8220	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2283	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1852	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1852	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	58.8	mi/h
Number of lanes, N	5	
Density, D	31.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8650	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2403	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1949	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1949	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	57.8	mi/h
Number of lanes, N	5	
Density, D	33.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7645	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2124	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1723	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1723	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	59.7	mi/h
Number of lanes, N	5	
Density, D	28.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	5555	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1543	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1565	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1565	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	60.0	mi/h
Number of lanes, N	4	
Density, D	26.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8155	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2265	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1838	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1838	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	59.0	mi/h
Number of lanes, N	5	
Density, D	31.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

APPENDIX G

RAMP ANALYSIS

- Year 2035

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4195	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	705	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1675	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4195	705	1675	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1165	196	465	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4726	794	1887	pcph

Estimation of V12 Merge Areas

L_{EQ} = 831.48 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2795 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5520	6855	No
v_3 or v_{av34}	1931 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2795		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5520	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.427

Space mean speed in ramp influence area, S_R = 51.5 mph

Space mean speed in outer lanes, S_0 = 53.3 mph

Space mean speed for all vehicles, S = 52.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4425	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	750	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2475	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4425	750	2475	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1229	208	688	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4986	845	2789	pcph

Estimation of V12 Merge Areas

L_{EQ} = 898.03 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2949 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5831	6855	No
v_3 or v_{av34}	2037 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2949		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5831	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.459

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 53.0 mph

Space mean speed for all vehicles, S = 51.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/15/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4195	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1675	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	705	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4195	1675	705	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1165	465	196	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4726	1887	794	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.555 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3463 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4726	6855	No
$v_{FO} = v_F - v_R$	2839	6855	No
v_R	1887	2000	No
v_3 or v_{av34}	1263 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3463 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3463	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.598

Space mean speed in ramp influence area, S_R = 48.6 mph

Space mean speed in outer lanes, S_0 = 63.1 mph

Space mean speed for all vehicles, S = 51.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4425	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2475	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	750	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4425	2475	750	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1229	688	208	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4986	2789	845	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.507 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3903 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4986	6855	No
$v_{FO} = v_F - v_R$	2197	6855	No
v_R	2789	2000	Yes
v_3 or v_{av34}	1083 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3903 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3903	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.679

Space mean speed in ramp influence area, S_R = 47.3 mph

Space mean speed in outer lanes, S_0 = 63.9 mph

Space mean speed for all vehicles, S = 50.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4480	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	630	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	2365	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4480	630	2365	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1244	175	657	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5047	710	2665	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.601 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3317 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5047	6855	No
$v_{FO} = v_F - v_R$	4337	6855	No
v_R	710	2000	No
v_3 or v_{av34}	1730 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3317 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3317	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.492

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 61.3 mph

Space mean speed for all vehicles, S = 53.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4865	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	790	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4865	790	1680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1351	219	467	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5481	890	1893	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.582 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3562 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5481	6855	No
$v_{FO} = v_F - v_R$	4591	6855	No
v_R	890	2000	No
v_3 or v_{av34}	1919 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3562 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3562	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/15/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4480	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	2365	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	630	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4480	2365	630	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1244	657	175	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5047	2665	710	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1300.57 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2985 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7712	6855	Yes
v_3 or v_{av34}	2062 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2985 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	7712	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 45.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.395	
Space mean speed in ramp influence area,	S_R = 35.5	mph
Space mean speed in outer lanes,	S_0 = 52.9	mph
Space mean speed for all vehicles,	S = 38.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4865	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	790	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4865	1680	790	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1351	467	219	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5481	1893	890	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1228.24 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3242 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7374	6855	Yes
v_3 or v_{av34}	2239 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3242		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	7374	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 41.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.948	
Space mean speed in ramp influence area,	S_R = 42.9	mph
Space mean speed in outer lanes,	S_0 = 52.2	mph
Space mean speed for all vehicles,	S = 45.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/15/13
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6220	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	993	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6220	775	993	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1728	215	276	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7008	873	1119	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1336.73 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4145 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7881	6855	Yes
v_3 or v_{av34}	2863 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4308 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7881	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 42.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.980

Space mean speed in ramp influence area, S_R = 42.3 mph

Space mean speed in outer lanes, S_0 = 49.6 mph

Space mean speed for all vehicles, S = 44.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	885	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1611	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6230	885	1611	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1731	246	448	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7019	997	1815	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1365.62 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4152 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8016	6855	Yes
v_3 or v_{av34}	2867 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4319 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8016	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 43.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 1.080

Space mean speed in ramp influence area, S_R = 40.7 mph

Space mean speed in outer lanes, S_0 = 49.6 mph

Space mean speed for all vehicles, S = 43.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6220	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	993	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	775	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6220	993	775	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1728	276	215	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7008	1119	873	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.533 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4260 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7008	6855	Yes
$v_{FO} = v_F - v_R$	5889	6855	No
v_R	1119	2000	No
v_3 or v_{av34}	2748 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4308 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4308	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.529

Space mean speed in ramp influence area, S_R = 49.8 mph

Space mean speed in outer lanes, S_0 = 57.5 mph

Space mean speed for all vehicles, S = 52.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6230	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1611	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	885	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6230		1611		885		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1731		448		246		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7019		1815		997		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.501 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4422 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7019	6855	Yes
$v_{FO} = v_F - v_R$	5204	6855	No
v_R	1815	2000	No
v_3 or v_{av34}	2597 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4422 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4422	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.591

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 57.9 mph

Space mean speed for all vehicles, S = 51.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8040	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	460	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1110	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8040	460	1110	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2233	128	308	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9058	518	1251	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4241 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9058	9140	No
$v_{FO} = v_F - v_R$	8540	9140	No
v_R	518	2000	No
v_3 or v_{av34}	2408 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 4241		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4241	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 58.7 mph

Space mean speed for all vehicles, S = 54.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8995	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1355	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	8995		775		1355		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2499		215		376		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	10134		873		1527		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4911 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	10134	9140	Yes
$v_{FO} = v_F - v_R$	9261	9140	Yes
v_R	873	2000	No
v_3 or v_{av34}	2611 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4911 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4911	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 42.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.507

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 57.9 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6295	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	785	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	625	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6295	785	625	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1749	218	174	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7092	884	704	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.542 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4249 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7092	6855	Yes
$v_{FO} = v_F - v_R$	6208	6855	No
v_R	884	2000	No
v_3 or v_{av34}	2843 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 4392 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4392	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 57.5 mph

Space mean speed for all vehicles, S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6915	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	695	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6915	695	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1921	193	189	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7791	783	766	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.529 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4492 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7791	6855	Yes
$v_{FO} = v_F - v_R$	7008	6855	Yes
v_R	783	2000	No
v_3 or v_{av34}	3299 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 5091 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5091	4400	Yes

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 43.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.498

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 57.5 mph

Space mean speed for all vehicles, S = 52.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6295	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	625	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	785	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6295	625	785	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1749	174	218	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7092	704	884	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1318.54 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4195 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7796	6855	Yes
v_3 or v_{av34}	2897 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4392 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7796	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 41.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.923	
Space mean speed in ramp influence area,	S_R = 43.3	mph
Space mean speed in outer lanes,	S_0 = 49.6	mph
Space mean speed for all vehicles,	S = 45.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6915	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	695	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6915	680	695	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1921	189	193	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7791	766	783	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1481.40 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4608 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8557	6855	Yes
v_3 or v_{av34}	3183 pc/h	(Equation 13-14 or 17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 5091 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8557	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 47.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 1.650

Space mean speed in ramp influence area, S_R = 31.3 mph

Space mean speed in outer lanes, S_0 = 49.6 mph

Space mean speed for all vehicles, S = 35.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7030	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1110	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	660	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7030	1110	660	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1953	308	183	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7920	1251	744	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1612.79 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4685 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9171	6855	Yes
v_3 or v_{av34}	3235 pc/h	(Equation 13-14 or 17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 5220 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9171	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 52.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 2.806

Space mean speed in ramp influence area, S_R = 12.2 mph

Space mean speed in outer lanes, S_0 = 49.6 mph

Space mean speed for all vehicles, S = 15.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8755	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1355	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	865	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8755	1355	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2432	376	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9864	1527	975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.027 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 266 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	11391	9140	Yes
v_3 or v_{av34}	4799 pc/h	(Equation 13-14 or 17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3945 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	11391	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 44.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.214	
Space mean speed in ramp influence area,	S_R = 38.5	mph
Space mean speed in outer lanes,	S_0 = 48.0	mph
Space mean speed for all vehicles,	S = 42.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7030	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1110	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	460	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7030	1110	460	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1953	308	128	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7920	1251	518	pcph

Estimation of V12 Merge Areas

L_{EQ} = 3175.97 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4685 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9171	6855	Yes
v_3 or v_{av34}	3235 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 5220		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9171	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 52.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 2.806	
Space mean speed in ramp influence area,	S_R = 12.2	mph
Space mean speed in outer lanes,	S_0 = 49.6	mph
Space mean speed for all vehicles,	S = 15.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8755	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1355	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	775	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8755	1355	775	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2432	376	215	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9864	1527	873	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.027 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 266 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	11391	9140	Yes
v_3 or v_{av34}	4799 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3945 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	11391	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 44.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.214	
Space mean speed in ramp influence area,	S_R = 38.5	mph
Space mean speed in outer lanes,	S_0 = 48.0	mph
Space mean speed for all vehicles,	S = 42.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7030	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1110	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7030	660	1110	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1953	183	308	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7920	744	1251	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.528 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4531 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7920	6855	Yes
$v_{FO} = v_F - v_R$	7176	6855	Yes
v_R	744	2000	No
v_3 or v_{av34}	3389 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 5220 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5220	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 44.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.495

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 57.5 mph

Space mean speed for all vehicles, S = 52.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8755	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1355	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8755	865	1355	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2432	240	376	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9864	975	1527	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4851 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9864	9140	Yes
$v_{FO} = v_F - v_R$	8889	9140	No
v_R	975	2000	No
v_3 or v_{av34}	2506 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4851 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4851	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 41.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 58.3 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	9340	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1275	vph
Length of first accel/decel lane	300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	665	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9340	1275	665	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2594	354	185	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	10523	1437	749	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 5398 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	10523	9140	Yes
$v_{FO} = v_F - v_R$	9086	9140	No
v_R	1437	2000	No
v_3 or v_{av34}	2562 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 5398 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5398	4400	Yes

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 48.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.557

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 58.1 mph

Space mean speed for all vehicles, S = 53.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8150	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	880	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	420	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8150	880	420	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2264	244	117	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9182	991	473	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4562 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9182	9140	Yes
$v_{FO} = v_F - v_R$	8191	9140	No
v_R	991	2000	No
v_3 or v_{av34}	2310 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 4562 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4562	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 39.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.517

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 59.1 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	9340	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	665	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1275	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9340	665	1275	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2594	185	354	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	10523	749	1437	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1307 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	11272	9140	Yes
v_3 or v_{av34}	4608 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 4209 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	11272	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 40.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.841	
Space mean speed in ramp influence area,	S_R = 44.6	mph
Space mean speed in outer lanes,	S_0 = 46.8	mph
Space mean speed for all vehicles,	S = 45.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8150	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	880	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8150	420	880	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2264	117	244	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9182	473	991	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1457 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9655	9140	Yes
v_3 or v_{av34}	3862 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3672 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9655	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.532	
Space mean speed in ramp influence area,	S_R = 49.7	mph
Space mean speed in outer lanes,	S_0 = 49.2	mph
Space mean speed for all vehicles,	S = 49.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	9340	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	665	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1775	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9340	665	1775	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2594	185	493	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	10523	749	2000	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1307 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	11272	9140	Yes
v_3 or v_{av34}	4608 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 4209 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	11272	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 40.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.841	
Space mean speed in ramp influence area,	S_R = 44.6	mph
Space mean speed in outer lanes,	S_0 = 46.8	mph
Space mean speed for all vehicles,	S = 45.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8150	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	895	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8150	420	895	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2264	117	249	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9182	473	1008	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1457 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9655	9140	Yes
v_3 or v_{av34}	3862 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 3672 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9655	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 34.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.532

Space mean speed in ramp influence area, S_R = 49.7 mph

Space mean speed in outer lanes, S_0 = 49.2 mph

Space mean speed for all vehicles, S = 49.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7835	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	665	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7835	1775	665	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2176	493	185	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8827	2000	749	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4977 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8827	9140	No
$v_{FO} = v_F - v_R$	6827	9140	No
v_R	2000	2000	No
v_3 or v_{av34}	1925 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4977 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4977	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 42.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.608

Space mean speed in ramp influence area, S_R = 48.5 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 53.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7785	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	895	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	420	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	7785		895		420		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2163		249		117		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	8771		1008		473		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4393 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8771	9140	No
$v_{FO} = v_F - v_R$	7763	9140	No
v_R	1008	2000	No
v_3 or v_{av34}	2189 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4393 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4393	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.519

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 59.5 mph

Space mean speed for all vehicles, S = 54.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7835	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	215	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	7835		1775		215	vph	
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2176		493		60	v	
Trucks and buses	2		2		2	%	
Recreational vehicles	2		2		2	%	
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	8827		2000		242	pcph	

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4977 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8827	9140	No
$v_{FO} = v_F - v_R$	6827	9140	No
v_R	2000	2000	No
v_3 or v_{av34}	1925 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4977 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4977	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 42.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.608

Space mean speed in ramp influence area, S_R = 48.5 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 53.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7785	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	895	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1210	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7785	895	1210	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2163	249	336	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8771	1008	1363	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4393 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8771	9140	No
$v_{FO} = v_F - v_R$	7763	9140	No
v_R	1008	2000	No
v_3 or v_{av34}	2189 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4393 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4393	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.519

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 59.5 mph

Space mean speed for all vehicles, S = 54.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6655	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	215	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1775	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6655		215		1775		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1849		60		493		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7498		242		2000		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.561 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4316 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7498	6855	Yes
$v_{FO} = v_F - v_R$	7256	6855	Yes
v_R	242	2000	No
v_3 or v_{av34}	3182 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4798 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4798	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.450

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 58.5 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5350	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1210	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	895	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5350		1210		895		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1486		336		249		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6028		1363		1008		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.547 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3913 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6028	6855	No
$v_{FO} = v_F - v_R$	4665	6855	No
v_R	1363	2000	No
v_3 or v_{av34}	2115 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3913 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3913	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.551

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 60.6 mph

Space mean speed for all vehicles, S = 52.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6655	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	215	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1660	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6655	215	1660	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1849	60	461	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7498	242	1870	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 2280.65 (Equation 13-12 or 13-13)

P_{FD} = 0.893 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 6720 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7498	6855	Yes
$v_{FO} = v_F - v_R$	7256	6855	Yes
v_R	242	2000	No
v_3 or v_{av34}	778 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 6720 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	6720	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 51.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.450

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 51.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5350	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1210	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1430	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5350		1210		1430		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1486		336		397		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6028		1363		1611		pcph

Estimation of V12 Diverge Areas

L_{EQ} = 3552.42 (Equation 13-12 or 13-13)

P_{FD} = 0.864 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 5391 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6028	6855	No
$v_{FO} = v_F - v_R$	4665	6855	No
v_R	1363	2000	No
v_3 or v_{av34}	637 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 5391 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5391	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 39.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.551

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 64.2 mph

Space mean speed for all vehicles, S = 50.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6655	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1660	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	215	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6655	1660	215	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1849	461	60	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7498	1870	242	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.487 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4608 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7498	6855	Yes
$v_{FO} = v_F - v_R$	5628	6855	No
v_R	1870	2000	No
v_3 or v_{av34}	2890 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4798 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4798	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 41.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.596

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 57.5 mph

Space mean speed for all vehicles, S = 51.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1430	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1210	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5350		1430		1210		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1486		397		336		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6028		1611		1363		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.535 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3975 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6028	6855	No
$v_{FO} = v_F - v_R$	4417	6855	No
v_R	1611	2000	No
v_3 or v_{av34}	2053 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3975 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3975	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.573

Space mean speed in ramp influence area, S_R = 49.0 mph

Space mean speed in outer lanes, S_0 = 60.1 mph

Space mean speed for all vehicles, S = 52.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3560	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1400	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2950	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3560	1400	2950	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	989	389	819	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4011	1577	3324	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 4011 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5588	4570	Yes
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 4011		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5588	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 45.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 1.328

Space mean speed in ramp influence area, S_R = 36.6 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 36.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6150	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1510	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2260	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6150	1510	2260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1708	419	628	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6929	1701	2546	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 4099 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8630	6855	Yes
v_3 or v_{av34}	2830 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 4229 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8630	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 47.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.753	
Space mean speed in ramp influence area,	S_R = 29.6	mph
Space mean speed in outer lanes,	S_0 = 49.6	mph
Space mean speed for all vehicles,	S = 33.8	mph

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	ATA
Date Performed:	5/15/14
Analysis Time Period:	AM
Freeway/Direction:	H-1 EB
From/To:	Kualakai-Kunia
Jurisdiction:	
Analysis Year:	
Description:	

Flow Inputs and Adjustments

Volume, V	7080	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1967	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2659	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2659	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	39.6	mi/h
Number of lanes, N	3	
Density, D	67.1	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7610	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2114	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2858	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2858	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	31.3	mi/h
Number of lanes, N	3	
Density, D	91.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	6995	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1943	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2627	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2627	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	40.8	mi/h
Number of lanes, N	3	
Density, D	64.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	ATA
Date Performed:	5/15/14
Analysis Time Period:	PM
Freeway/Direction:	H-1 WB
From/To:	Kualakai-Kunia
Jurisdiction:	
Analysis Year:	
Description:	

Flow Inputs and Adjustments

Volume, V	7115	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1976	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2672	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2672	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	39.1	mi/h
Number of lanes, N	3	
Density, D	68.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	10615	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2949	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2392	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2392	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	48.6	mi/h
Number of lanes, N	5	
Density, D	49.2	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9620	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2672	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2710	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2710	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	37.6	mi/h
Number of lanes, N	4	
Density, D	72.0	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8500	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2361	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2394	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2394	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	48.6	mi/h
Number of lanes, N	4	
Density, D	49.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9940	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2761	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2800	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2800	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	33.8	mi/h
Number of lanes, N	4	
Density, D	82.7	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	10385	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2885	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2925	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2925	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	28.1	mi/h
Number of lanes, N	4	
Density, D	104.0	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8680	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2411	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2445	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2445	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	47.0	mi/h
Number of lanes, N	4	
Density, D	52.0	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7940	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2206	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2982	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2982	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	25.3	mi/h
Number of lanes, N	3	
Density, D	117.8	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9930	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2758	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2797	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2797	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	34.0	mi/h
Number of lanes, N	4	
Density, D	82.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

APPENDIX G

RAMP ANALYSIS

- Year 2035 with Mitigation

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4195	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	705	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	838	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4195	705	838	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1165	196	233	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4726	794	944	pcph

Estimation of V12 Merge Areas

L_{EQ} = 831.48 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2795 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5520	6855	No
v_3 or v_{av34}	1931 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2795		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5520	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.427

Space mean speed in ramp influence area, S_R = 51.5 mph

Space mean speed in outer lanes, S_0 = 53.3 mph

Space mean speed for all vehicles, S = 52.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4425	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	750	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1238	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4425	750	1238	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1229	208	344	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4986	845	1395	pcph

Estimation of V12 Merge Areas

L_{EQ} = 898.03 (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2949 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5831	6855	No
v_3 or v_{av34}	2037 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2949		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5831	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.459	
Space mean speed in ramp influence area,	S_R = 50.9	mph
Space mean speed in outer lanes,	S_0 = 53.0	mph
Space mean speed for all vehicles,	S = 51.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4195	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	838	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	705	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4195	838	705	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1165	233	196	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4726	944	794	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.598 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4726	6855	No
$v_{FO} = v_F - v_R$	3782	6855	No
v_R	944	2000	No
v_3 or v_{av34}	1519 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3207 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3207	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.513

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 62.2 mph

Space mean speed for all vehicles, S = 53.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4425	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1238	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	750	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2990	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4425	1238	750	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1229	344	208	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4986	1395	845	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.571 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3446 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4986	6855	No
$v_{FO} = v_F - v_R$	3591	6855	No
v_R	1395	2000	No
v_3 or v_{av34}	1540 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3446 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3446	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.554

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 62.1 mph

Space mean speed for all vehicles, S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4480	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	630	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	2365	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4480	630	2365	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1244	175	657	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5047	710	2665	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2601 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5047	9140	No
$v_{FO} = v_F - v_R$	4337	9140	No
v_R	710	2000	No
v_3 or v_{av34}	1223 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2601 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2601	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.492

Space mean speed in ramp influence area, S_R = 50.4 mph

Space mean speed in outer lanes, S_0 = 63.3 mph

Space mean speed for all vehicles, S = 55.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 3 Kualakai
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4865	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	790	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4865		790		1680		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1351		219		467		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	5481		890		1893		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2892 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5481	9140	No
$v_{FO} = v_F - v_R$	4591	9140	No
v_R	890	2000	No
v_3 or v_{av34}	1294 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2892 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2892	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 24.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 63.0 mph

Space mean speed for all vehicles, S = 55.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4480	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	2365	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	630	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4480	2365	630	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1244	657	175	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5047	2665	710	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = -0.115 Using Equation 4

$v_{12} = v_F (P_{FM})$ = -581 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7712	9140	No
v_3 or v_{av34}	2814 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2018		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7712	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 37.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.708	
Space mean speed in ramp influence area,	S_R = 46.8	mph
Space mean speed in outer lanes,	S_0 = 54.8	mph
Space mean speed for all vehicles,	S = 49.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kualakai Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	4865	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	790	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2830	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4865	1680	790	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1351	467	219	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5481	1893	890	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = -0.019 Using Equation 4

$v_{12} = v_F (P_{FM})$ = -102 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7374	9140	No
v_3 or v_{av34}	2791 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2192 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7374	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 33.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.518	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_0 = 54.4	mph
Space mean speed for all vehicles,	S = 51.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6220	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	993	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6220	775	993	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1728	215	276	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7008	873	1119	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.109 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 762 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7881	9140	No
v_3 or v_{av34}	3123 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2803		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7881	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.440
Space mean speed in ramp influence area,	S_R = 51.2 mph
Space mean speed in outer lanes,	S_0 = 52.7 mph
Space mean speed for all vehicles,	S = 52.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Kunia/Fort Weaver Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	885	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1611	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6230	885	1611	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1731	246	448	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7019	997	1815	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.093 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 654 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8016	9140	No
v_3 or v_{av34}	3182 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2807 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8016	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.461	
Space mean speed in ramp influence area,	S_R = 50.9	mph
Space mean speed in outer lanes,	S_0 = 52.7	mph
Space mean speed for all vehicles,	S = 51.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6220	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	993	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	775	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6220	993	775	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1728	276	215	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7008	1119	873	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3687 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7008	9140	No
$v_{FO} = v_F - v_R$	5889	9140	No
v_R	1119	2000	No
v_3 or v_{av34}	1660 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3687 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3687	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.529

Space mean speed in ramp influence area, S_R = 49.8 mph

Space mean speed in outer lanes, S_0 = 61.6 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5A Ewa
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6230	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1611	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	885	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1900	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6230		1611		885		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1731		448		246		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7019		1815		997		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4084 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7019	9140	No
$v_{FO} = v_F - v_R$	5204	9140	No
v_R	1815	2000	No
v_3 or v_{av34}	1467 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4084 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4084	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.591

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 62.4 mph

Space mean speed for all vehicles, S = 53.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8040	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	460	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1110	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8040	460	1110	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2233	128	308	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9058	518	1251	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3452 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7247	9140	No
$v_{FO} = v_F - v_R$	6729	9140	No
v_R	518	2000	No
v_3 or v_{av34}	1897 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3452 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3452	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 29.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_0 = 60.7 mph

Space mean speed for all vehicles, S = 55.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Exit 5B Kunia
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8995	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1355	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	8995		775		1355		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2499		215		376		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	10134		873		1527		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4027 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8108	9140	No
$v_{FO} = v_F - v_R$	7235	9140	No
v_R	873	2000	No
v_3 or v_{av34}	2040 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4027 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4027	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.507

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 60.1 mph

Space mean speed for all vehicles, S = 54.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6295	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	785	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	625	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6295	785	625	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1749	218	174	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7092	884	704	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3591 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7092	9140	No
$v_{FO} = v_F - v_R$	6208	9140	No
v_R	884	2000	No
v_3 or v_{av34}	1750 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3591 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3591	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 30.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 61.2 mph

Space mean speed for all vehicles, S = 55.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Exit 5 Kunia, Waipahu
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6915	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	695	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6915	695	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1921	193	189	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7791	783	766	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3838 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7791	9140	No
$v_{FO} = v_F - v_R$	7008	9140	No
v_R	783	2000	No
v_3 or v_{av34}	1976 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3838 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3838	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.498

Space mean speed in ramp influence area, S_R = 50.3 mph

Space mean speed in outer lanes, S_0 = 60.4 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6295	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	625	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	785	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6295	625	785	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1749	174	218	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7092	704	884	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.130 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 921 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7796	9140	No
v_3 or v_{av34}	3085 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 2836 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7796	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 29.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.420
Space mean speed in ramp influence area,	S_R = 51.6 mph
Space mean speed in outer lanes,	S_0 = 52.6 mph
Space mean speed for all vehicles,	S = 52.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Kunia First Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6915	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	695	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3225	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6915	680	695	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1921	189	193	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7791	766	783	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.122 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 951 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8557	9140	No
v_3 or v_{av34}	3420 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 3116 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8557	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.475	
Space mean speed in ramp influence area,	S_R = 50.7	mph
Space mean speed in outer lanes,	S_0 = 51.7	mph
Space mean speed for all vehicles,	S = 51.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7030	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1110	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	660	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7030	1110	660	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1953	308	183	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7920	1251	744	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.061 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 486 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9171	9140	Yes
v_3 or v_{av34}	3717 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3168 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9171	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.610
Space mean speed in ramp influence area,	S_R = 48.4 mph
Space mean speed in outer lanes,	S_0 = 51.5 mph
Space mean speed for all vehicles,	S = 50.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8755	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1355	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	865	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8755	1355	865	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2432	376	240	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9864	1527	975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.027 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 198 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8891	9140	No
v_3 or v_{av34}	3583 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2945		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8891	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.627	
Space mean speed in ramp influence area,	S_R = 48.1	mph
Space mean speed in outer lanes,	S_0 = 52.3	mph
Space mean speed for all vehicles,	S = 50.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7030	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1110	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	460	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7030	1110	460	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1953	308	128	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7920	1251	518	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.061 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 486 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9171	9140	Yes
v_3 or v_{av34}	3717 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3168 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	9171	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.610
Space mean speed in ramp influence area,	S_R = 48.4 mph
Space mean speed in outer lanes,	S_0 = 51.5 mph
Space mean speed for all vehicles,	S = 50.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8755	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1355	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	775	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	5950	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8755	1355	775	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2432	376	215	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9864	1527	873	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.027 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 198 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8891	9140	No
v_3 or v_{av34}	3583 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2945 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8891	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M_S = 0.627

Space mean speed in ramp influence area, S_R = 48.1 mph

Space mean speed in outer lanes, S_0 = 52.3 mph

Space mean speed for all vehicles, S = 50.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7030	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1110	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7030	660	1110	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1953	183	308	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7920	744	1251	pcph

Estimation of V12 Diverge Areas

$L_{EQ} =$ (Equation 13-12 or 13-13)

$P_{FD} = 0.436$ Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD} = 3873$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7920	9140	No
$v_{FO} = v_F - v_R$	7176	9140	No
v_R	744	2000	No
v_3 or v_{av34}	2023 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, $v_{12A} = 3873$ (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3873	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 33.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D_S = 0.495$

Space mean speed in ramp influence area, $S_R = 50.3$ mph

Space mean speed in outer lanes, $S_0 = 60.2$ mph

Space mean speed for all vehicles, $S = 54.9$ mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Paiwa Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8755	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1355	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8755	865	1355	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2432	240	376	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9864	975	1527	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3991 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7892	9140	No
$v_{FO} = v_F - v_R$	6917	9140	No
v_R	975	2000	No
v_3 or v_{av34}	1950 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3991 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3991	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 34.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.516

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 60.5 mph

Space mean speed for all vehicles, S = 54.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	9340	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1275	vph
Length of first accel/decel lane	300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	665	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9340	1275	665	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2594	354	185	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	10523	1437	749	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4481 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8419	9140	No
$v_{FO} = v_F - v_R$	6982	9140	No
v_R	1437	2000	No
v_3 or v_{av34}	1969 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4481 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4481	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 40.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.557

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_0 = 60.4 mph

Space mean speed for all vehicles, S = 53.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Offarmp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8150	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	880	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	420	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	8150		880		420		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2264		244		117		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	9182		991		473		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3762 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7346	9140	No
$v_{FO} = v_F - v_R$	6355	9140	No
v_R	991	2000	No
v_3 or v_{av34}	1792 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3762 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3762	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.517

Space mean speed in ramp influence area, S_R = 50.0 mph

Space mean speed in outer lanes, S_0 = 61.1 mph

Space mean speed for all vehicles, S = 54.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	9340	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	665	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1275	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9340	665	1275	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2594	185	354	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	10523	749	1437	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 996 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8772	9140	No
v_3 or v_{av34}	3513 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 3209 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8772	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.490	
Space mean speed in ramp influence area,	S_R = 50.4	mph
Space mean speed in outer lanes,	S_0 = 51.3	mph
Space mean speed for all vehicles,	S = 50.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8150	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	880	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8150	420	880	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2264	117	244	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9182	473	991	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1060 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7155	9140	No
v_3 or v_{av34}	2811 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2672 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7155	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 26.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.377

Space mean speed in ramp influence area, S_R = 52.3 mph

Space mean speed in outer lanes, S_0 = 53.1 mph

Space mean speed for all vehicles, S = 52.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	9340	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	665	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1775	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9340	665	1775	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2594	185	493	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	10523	749	2000	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 996 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8772	9140	No
v_3 or v_{av34}	3513 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	Yes	

If yes, v_{12A} = 3209 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8772	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.490	
Space mean speed in ramp influence area,	S_R = 50.4	mph
Space mean speed in outer lanes,	S_0 = 51.3	mph
Space mean speed for all vehicles,	S = 50.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Paiwa Onramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	8150	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	895	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8150	420	895	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2264	117	249	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	9182	473	1008	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1060 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7155	9140	No
v_3 or v_{av34}	2811 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2672		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7155	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 26.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.377	
Space mean speed in ramp influence area,	S_R = 52.3	mph
Space mean speed in outer lanes,	S_0 = 53.1	mph
Space mean speed for all vehicles,	S = 52.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7835	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	665	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	7835		1775		665	vph	
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2176		493		185	v	
Trucks and buses	2		2		2	%	
Recreational vehicles	2		2		2	%	
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	8827		2000		749	pcph	

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7062	9140	No
$v_{FO} = v_F - v_R$	5062	9140	No
v_R	2000	2000	No
v_3 or v_{av34}	1427 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4207 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4207	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 35.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.608

Space mean speed in ramp influence area, S_R = 48.5 mph

Space mean speed in outer lanes, S_0 = 62.5 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7785	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	895	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	420	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2680	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	7785		895		420		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	2163		249		117		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	8771		1008		473		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3628 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7017	9140	No
$v_{FO} = v_F - v_R$	6009	9140	No
v_R	1008	2000	No
v_3 or v_{av34}	1694 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3628 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3628	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 31.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.519

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 61.5 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7835	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1775	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	215	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7835	1775	215	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2176	493	60	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8827	2000	242	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7062	9140	No
$v_{FO} = v_F - v_R$	5062	9140	No
v_R	2000	2000	No
v_3 or v_{av34}	1427 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4207 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4207	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 35.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.608

Space mean speed in ramp influence area, S_R = 48.5 mph

Space mean speed in outer lanes, S_0 = 62.5 mph

Space mean speed for all vehicles, S = 53.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8A Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	58.5	mph
Volume on freeway	7785	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	895	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1210	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1740	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7785	895	1210	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	2163	249	336	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8771	1008	1363	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3628 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7017	9140	No
$v_{FO} = v_F - v_R$	6009	9140	No
v_R	1008	2000	No
v_3 or v_{av34}	1694 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3628 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3628	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.519

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 61.5 mph

Space mean speed for all vehicles, S = 54.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6655	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	215	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1775	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6655		215		1775		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1849		60		493		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7498		242		2000		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3406 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7498	9140	No
$v_{FO} = v_F - v_R$	7256	9140	No
v_R	242	2000	No
v_3 or v_{av34}	2046 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3406 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3406	4400	No

Level of Service Determination (if not F)

Density, D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D = 23.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.450

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 60.8 mph

Space mean speed for all vehicles, S = 55.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5350	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1210	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	895	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1056	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5350		1210		895		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1486		336		249		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6028		1363		1008		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3397 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6028	9140	No
$v_{FO} = v_F - v_R$	4665	9140	No
v_R	1363	2000	No
v_3 or v_{av34}	1315 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3397 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3397	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.551

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 63.6 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6655	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	215	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1660	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6655		215		1660		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1849		60		461		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7498		242		1870		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3406 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7498	9140	No
$v_{FO} = v_F - v_R$	7256	9140	No
v_R	242	2000	No
v_3 or v_{av34}	2046 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 3406 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3406	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.450

Space mean speed in ramp influence area, S_R = 51.1 mph

Space mean speed in outer lanes, S_0 = 60.8 mph

Space mean speed for all vehicles, S = 55.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8B Offramp
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5350	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1210	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1430	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	534	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5350	1210	1430	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1486	336	397	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6028	1363	1611	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3397 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6028	9140	No
$v_{FO} = v_F - v_R$	4665	9140	No
v_R	1363	2000	No
v_3 or v_{av34}	1315 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3397		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3397	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.551

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 63.6 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6655	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1660	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	215	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6655		1660		215	vph	
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1849		461		60	v	
Trucks and buses	2		2		2	%	
Recreational vehicles	2		2		2	%	
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	7498		1870		242	pcph	

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4324 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7498	9140	No
$v_{FO} = v_F - v_R$	5628	9140	No
v_R	1870	2000	No
v_3 or v_{av34}	1587 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 4324 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4324	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D_S = 0.596

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 61.9 mph

Space mean speed for all vehicles, S = 53.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 1/15/13
Analysis time period: PM
Freeway/Dir of Travel: H-1 EB
Junction: H1 EB Waiawa Exit 8C Offramp
Jurisdiction:
Analysis Year:
Description: with upstream adjacent ramp

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	5350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1430	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1210	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	735	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5350		1430		1210		vph
Peak-hour factor, PHF	0.90		0.90		0.90		
Peak 15-min volume, v15	1486		397		336		v
Trucks and buses	2		2		2		%
Recreational vehicles	2		2		2		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.986		0.986		0.986		
Driver population factor, fP	1.00		1.00		1.00		
Flow rate, vp	6028		1611		1363		pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3537 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6028	9140	No
$v_{FO} = v_F - v_R$	4417	9140	No
v_R	1611	2000	No
v_3 or v_{av34}	1245 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 3537 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3537	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.573

Space mean speed in ramp influence area, S_R = 49.0 mph

Space mean speed in outer lanes, S_0 = 63.2 mph

Space mean speed for all vehicles, S = 54.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: AM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	58.5	mph
Volume on freeway	3560	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1400	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2950	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3560	1400	2950	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	989	389	819	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4011	1577	3324	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2373 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5588	6855	No
v_3 or v_{av34}	1638 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12}/2	No	

If yes, v_{12A} = 2373 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	5588	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.489	
Space mean speed in ramp influence area,	S_R = 50.4	mph
Space mean speed in outer lanes,	S_0 = 54.4	mph
Space mean speed for all vehicles,	S = 51.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: ATA
Date performed: 5/15/14
Analysis time period: PM
Freeway/Dir of Travel: H-1 WB
Junction: H1 WB Waiawa Onramp from Kam
Jurisdiction:
Analysis Year:
Description: with downstream adjacent ramp

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	58.5	mph
Volume on freeway	6150	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1510	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2260	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1940	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6150	1510	2260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1708	419	628	v
Trucks and buses	2	2	2	%
Recreational vehicles	2	2	2	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.986	0.986	0.986	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6929	1701	2546	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.005 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 36 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8630	9140	No
v_3 or v_{av34}	3446 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2771 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8630	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 36.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	M_S = 0.627	
Space mean speed in ramp influence area,	S_R = 48.1	mph
Space mean speed in outer lanes,	S_0 = 52.8	mph
Space mean speed for all vehicles,	S = 50.3	mph

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7080	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1967	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1994	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1994	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	57.2	mi/h
Number of lanes, N	4	
Density, D	34.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7610	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2114	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2143	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2143	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	54.6	mi/h
Number of lanes, N	4	
Density, D	39.2	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	6995	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1943	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1970	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1970	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	57.5	mi/h
Number of lanes, N	4	
Density, D	34.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Kualakai-Kunia
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7115	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1976	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2004	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2004	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	57.0	mi/h
Number of lanes, N	4	
Density, D	35.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	10615	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2949	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1993	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1993	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	57.2	mi/h
Number of lanes, N	6	
Density, D	34.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9620	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2672	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2168	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2168	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	54.1	mi/h
Number of lanes, N	5	
Density, D	40.0	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8500	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2361	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1915	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1915	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	58.2	mi/h
Number of lanes, N	5	
Density, D	32.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Kunia-Paiwa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9940	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2761	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2240	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2240	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	52.6	mi/h
Number of lanes, N	5	
Density, D	42.6	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	10385	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2885	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2340	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2340	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	50.1	mi/h
Number of lanes, N	5	
Density, D	46.7	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 EB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	8680	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2411	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	1956	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	1956	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	57.7	mi/h
Number of lanes, N	5	
Density, D	33.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: AM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	7940	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2206	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2236	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2236	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	52.7	mi/h
Number of lanes, N	4	
Density, D	42.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.2

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: ATA
Date Performed: 5/15/14
Analysis Time Period: PM
Freeway/Direction: H-1 WB
From/To: Paiwa-Waiawa
Jurisdiction:
Analysis Year:
Description:

Flow Inputs and Adjustments

Volume, V	9930	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2758	v
Trucks and buses	2	%
Recreational vehicles	2	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.986	
Driver population factor, fp	1.00	
Flow rate, vp	2238	pc/h/ln

Speed Inputs and Adjustments

Lane width	-	ft
Right-side lateral clearance	-	ft
Total ramp density, TRD	-	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	58.5	mi/h
Lane width adjustment, fLW	-	mi/h
Lateral clearance adjustment, fLC	-	mi/h
TRD adjustment	-	mi/h
Free-flow speed, FFS	58.5	mi/h

LOS and Performance Measures

Flow rate, vp	2238	pc/h/ln
Free-flow speed, FFS	58.5	mi/h
Average passenger-car speed, S	52.6	mi/h
Number of lanes, N	5	
Density, D	42.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

APPENDIX H

ANALYSIS WITHOUT RIGHT-IN/OUT ALONG KUNIA ROAD ACROSS HONOWAI STREET

PURPOSE:

By Year 2035 with the Project buildout, the Phase 1C commercial site along Kunia Road is proposed to provide a right-in/out (RIRO) access across Honowai Street. However, due to potential plan to provide a southbound loop H-1 Freeway eastbound on-ramp in the future, this alternative without a RIRO access is considered.

RESULTS:

By eliminating the RIRO access, the entering trips would continue south and take Exit 6A towards Kapolei and use the main access along Farrington Highway (intersection 70). Exiting vehicles would exit from the intersection along Farrington Highway and would head back towards Fort Weaver road via the Farrington/Fort Weaver interchange.

See Figure H-1 for the re-routed trip distribution for the impacted intersections.

The re-route of traffic would not cause the study intersections to experience significant additional delay as a result. Therefore no additional improvements would be recommended without the RIRO access.

Table H-1 shows the delay and LOS comparison between the two scenarios.

HOOPILI TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

Year 2035 with PROJECT
NO RIRO ACCESS TRIP DISTRIBUTION

FIGURE
H–1

Table H-1: Year 2035 with Project and Mitigations with and without RIRO access Intersection Level of Service Summary

Intersection	Year 2035 with Project RIRO						Year 2035 without Project RIRO					
	AM			PM			AM			PM		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
45: Ft Weaver Rd & Laulaunui St												
EB LT	87	0.10	F	101	0.63	F	87	0.10	F	101	0.63	F
EB TH/RT	89	0.19	F	105	0.71	F	89	0.19	F	105	0.71	F
WB LT	112	0.75	F	98	0.51	F	112	0.75	F	98	0.51	F
WB TH	86	0.02	F	86	0.02	F	86	0.02	F	86	0.02	F
WB RT	81	0.46	F	87	0.10	F	81	0.46	F	87	0.10	F
NB LT	98	0.77	F	119	0.77	F	98	0.77	F	117	0.77	F
NB TH	37	0.98	D	25	0.75	C	37	0.98	D	24	0.72	C
NB RT	10	0.02	A	46	0.04	D	10	0.02	A	50	0.04	D
SB LT	118	0.52	F	135	0.81	F	118	0.52	F	135	0.81	F
SB TH	17	0.55	B	29	0.88	C	17	0.55	B	27	0.86	C
SB RT	11	0.08	B	10	0.11	B	11	0.08	B	10	0.11	B
Overall	35	0.94	C	35	0.86	D	35	0.94	C	34	0.85	C
69: Old Ft Weaver Rd (WEST) & Farrington Hwy												
EB TH/RT	19	0.70	B	14	0.50	B	19	0.70	B	14	0.48	B
WB TH	15	0.45	B	24	0.81	C	15	0.45	B	23	0.79	C
NB LT	32	0.10	C	33	0.20	C	32	0.10	C	33	0.20	C
NB RT	31	0.00	C	31	0.01	C	31	0.00	C	31	0.01	C
Overall	17	0.49	B	21	0.61	C	18	0.49	B	20	0.60	C
70: Old Ft Weaver Rd (EAST) & Farrington Hwy												
EB LT	57	0.41	E	53	0.66	D	57	0.41	E	47	0.65	D
EB TH	26	0.75	C	33	0.68	C	26	0.75	C	34	0.67	C
WB LT	55	0.53	D	65	0.81	E	55	0.53	D	69	0.84	E
WB TH	18	0.49	B	43	0.96	D	18	0.49	B	43	0.96	D
WB RT	2	0.08	A	4	0.37	A	2	0.18	A	10	0.80	A
NB TH	74	0.66	E	113	0.88	F	68	0.61	E	113	0.88	F
NB RT	55	0.03	E	55	0.04	D	55	0.03	D	55	0.04	D
SB LT	57	0.82	E	79	0.98	E	61	0.86	E	75	0.98	E
SB TH/RT	33	0.04	C	32	0.19	C	33	0.04	C	31	0.21	C
Overall	28	0.73	C	43	0.96	D	28	0.74	C	40	0.98	D
71: Old Ft Weaver Rd & Old Ft Weaver Rd (WEST)/Old Ft Weaver Rd (EAST)												
EB TH/RT	7	0.05	A	7	0.06	A	7	0.05	A	7	0.06	A
WB LT/TH	8	0.07	A	9	0.25	A	8	0.07	A	9	0.25	A
NB LT/RT	7	0.14	A	9	0.23	A	7	0.14	A	9	0.23	A
73: WB Farrington Hwy to SB Ft Weaver Rd & Farrington Hwy												
EB TH	9	0.67	A	15	0.70	B	9	0.67	A	14	0.68	B
WB LT	37	0.64	D	38	0.76	D	37	0.64	D	35	0.73	C
WB TH	0	0.23	A	0	0.38	A	0	0.23	A	0	0.37	A
Overall	10	0.66	A	13	0.72	B	10	0.66	A	12	0.70	B
77: Farrington Hwy & Farrington Hwy to NB Kunia Rd												
EB LT	21	0.70	C	69	0.99	E	21	0.70	C	46	0.88	D
EB TH	0	0.59	A	0	0.49	A	0	0.59	A	0	0.48	A
WB TH	18	0.67	B	22	0.86	C	18	0.67	B	23	0.88	C
WB RT	0	0.14	A	1	0.38	A	0	0.14	A	1	0.38	A
Overall	10	0.70	B	21	0.91	C	10	0.69	B	18	0.88	B