HCM 2010 Signalized Intersection Summary
9: Kapolei Pkwy & Geiger Rd

11/25/2014

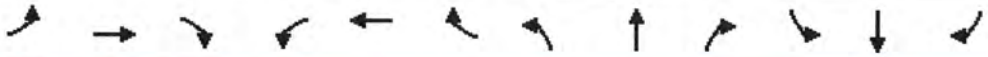
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	130	185	95	350	235	435	1015	180	160	720	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	11	141	19	103	380	77	473	1103	109	174	783	12
Adj No. of Lanes	1	2	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	18	549	73	129	442	375	501	1580	707	203	984	440
Arrive On Green	0.01	0.17	0.17	0.07	0.24	0.24	0.28	0.45	0.45	0.11	0.28	0.28
Sat Flow, veh/h	1774	3142	417	1774	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	11	78	82	103	380	77	473	1103	109	174	783	12
Grp Sat Flow(s),veh/h/ln	1774	1770	1789	1774	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	0.8	4.8	4.9	7.1	24.4	4.9	32.6	31.3	5.1	12.0	25.6	0.7
Cycle Q Clear(g_c), s	0.8	4.8	4.9	7.1	24.4	4.9	32.6	31.3	5.1	12.0	25.6	0.7
Prop In Lane	1.00		0.23	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	18	309	313	129	442	375	501	1580	707	203	984	440
V/C Ratio(X)	0.61	0.25	0.26	0.80	0.86	0.21	0.94	0.70	0.15	0.86	0.80	0.03
Avail Cap(c_a), veh/h	242	525	530	313	627	533	554	1580	707	313	1077	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.5	44.5	44.5	57.0	45.6	38.2	43.8	27.8	20.6	54.3	41.8	32.8
Incr Delay (d2), s/veh	29.0	0.4	0.4	10.8	8.5	0.3	23.9	1.4	0.1	13.5	3.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.4	2.5	3.9	13.6	2.2	19.2	15.6	2.3	6.7	13.0	0.3
LnGrp Delay(d),s/veh	90.5	44.9	45.0	67.8	54.1	38.5	67.7	29.2	20.7	67.8	45.7	32.8
LnGrp LOS	F	D	D	E	D	D	E	C	C	E	D	C
Approach Vol, veh/h		171			560			1685			969	
Approach Delay, s/veh		47.9			54.5			39.4			49.5	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.3	61.7	15.1	27.8	41.3	40.7	7.3	35.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	22.0	55.0	22.0	37.0	39.0	38.0	17.0	42.0
Max Q Clear Time (g_c+I1), s	14.0	33.3	9.1	6.9	34.6	27.6	2.8	26.4
Green Ext Time (p_c), s	0.3	14.6	0.2	3.8	0.7	7.1	0.0	3.2

Intersection Summary	
HCM 2010 Ctrl Delay	45.2
HCM 2010 LOS	D

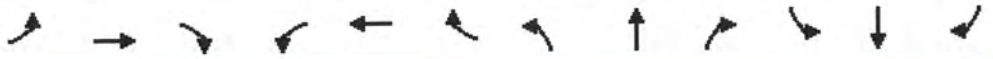
HCM Signalized Intersection Capacity Analysis
10: Ft Weaver Rd & Geiger Rd/Iroquois Rd

11/25/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	295	145	185	55	240	285	250	1365	5	185	950	150
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	3307	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	3307	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)	321	158	201	60	261	310	272	1484	5	201	1033	163
RTOR Reduction (vph)	0	0	62	0	0	200	0	0	2	0	0	82
Lane Group Flow (vph)	160	319	139	60	261	110	272	1484	3	201	1033	81
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)	33.0	33.0	33.0	39.9	39.9	39.9	23.3	123.0	123.0	19.1	118.8	118.8
Effective Green, g (s)	35.0	35.0	35.0	41.9	41.9	41.9	25.3	126.0	124.0	21.1	121.8	119.8
Actuated g/C Ratio	0.15	0.15	0.15	0.17	0.17	0.17	0.11	0.52	0.52	0.09	0.51	0.50
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)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	234	482	230	309	325	486	361	2669	817	301	2580	790
v/s Ratio Prot	c0.10	0.10		0.03	c0.14		c0.08	c0.29		0.06	0.20	
v/s Ratio Perm			0.09			0.04			0.00			0.05
v/c Ratio	0.68	0.66	0.60	0.19	0.80	0.23	0.75	0.56	0.00	0.67	0.40	0.10
Uniform Delay, d1	97.2	96.9	96.0	84.6	95.1	85.1	104.3	38.2	28.1	106.1	36.5	31.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.73	1.62	7.45
Incremental Delay, d2	10.2	4.5	6.4	0.6	15.1	0.5	8.6	0.8	0.0	5.0	0.4	0.2
Delay (s)	107.4	101.4	102.4	85.3	110.1	85.6	112.9	39.1	28.1	82.7	59.5	236.8
Level of Service	F	F	F	F	F	F	F	D	C	F	E	F
Approach Delay (s)		103.1			95.7			50.5			83.5	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	75.2	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	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	420	5	135	5	15	15	250	2630	20	75	1275	365
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		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	0.91		1.00	1.00	1.00	1.00	0.83	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		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1681	1687	1434		1841	1583	1770	5085	1311	1770	5085	1536
Flt Permitted	0.95	0.95	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1681	1687	1434		1841	1583	1770	5085	1311	1770	5085	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	457	5	147	5	16	16	272	2859	22	82	1386	397
RTOR Reduction (vph)	0	0	83	0	0	15	0	0	8	0	0	191
Lane Group Flow (vph)	233	229	64	0	21	1	272	2859	14	82	1386	206
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)	41.3	41.3	41.3		7.1	7.1	43.3	152.9	152.9	14.7	124.3	124.3
Effective Green, g (s)	41.3	41.3	41.3		7.1	9.1	43.3	154.9	153.9	16.7	126.3	124.3
Actuated g/C Ratio	0.17	0.17	0.17		0.03	0.04	0.18	0.65	0.64	0.07	0.53	0.52
Clearance Time (s)	5.0	5.0	5.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	3.0	5.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	289	290	246		54	60	319	3281	840	123	2675	795
v/s Ratio Prot	c0.14	0.14			c0.01		c0.15	c0.56		0.05	0.27	
v/s Ratio Perm			0.04			0.00			0.01			0.13
v/c Ratio	0.81	0.79	0.26		0.39	0.01	0.85	0.87	0.02	0.67	0.52	0.26
Uniform Delay, d1	95.5	95.2	86.1		114.3	111.1	95.3	34.5	15.6	108.9	37.0	32.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.22	0.62	1.00	1.06	1.00	1.79
Incremental Delay, d2	15.8	14.0	0.8		4.6	0.1	9.9	1.5	0.0	12.3	0.7	0.8
Delay (s)	111.3	109.2	86.9		118.9	111.2	125.7	22.8	15.6	128.3	37.8	58.3
Level of Service	F	F	F		F	F	F	C	B	F	D	E
Approach Delay (s)		104.6			115.6			31.6			46.1	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	44.8	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)	22.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	295	795	40	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	321	864	43	5	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	908	0	-	0	1218	886
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	332	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	750	-	-	-	199	343
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	727	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	750	-	-	-	198	343
Mov Cap-2 Maneuver	-	-	-	-	198	-
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	722	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	23.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	750	-	-	-	198
HCM Lane V/C Ratio	0.007	-	-	-	0.027
HCM Control Delay (s)	9.8	-	-	-	23.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	10	315	670	25	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	342	728	27	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	755	0	-	0	1106	742
Stage 1	-	-	-	-	742	-
Stage 2	-	-	-	-	364	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	855	-	-	-	233	416
Stage 1	-	-	-	-	471	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	855	-	-	-	230	416
Mov Cap-2 Maneuver	-	-	-	-	230	-
Stage 1	-	-	-	-	471	-
Stage 2	-	-	-	-	694	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	855	-	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-	-
HCM Control Delay (s)	9.3	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	90	0	75	200	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	0	82	217	0	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	98	0	478	98
Stage 1	-	-	-	-	98	-
Stage 2	-	-	-	-	380	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1495	-	546	958
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1495	-	516	958
Mov Cap-2 Maneuver	-	-	-	-	516	-
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	653	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	958	-	-	1495	-
HCM Lane V/C Ratio	0.006	-	-	0.055	-
HCM Control Delay (s)	8.8	-	-	7.5	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-

HCM 2010 Signalized Intersection Summary
1: Kapolei Pkwy & Kualakai Pkwy

11/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	750	650	10	230	415	540	55	345	130	630	350	655
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	815	707	11	250	451	533	60	375	18	685	380	447
Adj No. of Lanes	2	3	0	2	3	2	1	2	0	2	2	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	896	1876	29	318	995	1153	78	523	25	751	1154	1631
Arrive On Green	0.26	0.36	0.36	0.09	0.20	0.20	0.04	0.15	0.15	0.22	0.33	0.33
Sat Flow, veh/h	3442	5159	80	3442	5085	2787	1774	3439	165	3442	3539	2776
Grp Volume(v), veh/h	815	464	254	250	451	533	60	192	201	685	380	447
Grp Sat Flow(s),veh/h/ln	1721	1695	1849	1721	1695	1393	1774	1770	1834	1721	1770	1388
Q Serve(g_s), s	30.4	13.4	13.4	9.4	10.4	18.4	4.4	13.7	13.8	25.7	10.7	10.5
Cycle Q Clear(g_c), s	30.4	13.4	13.4	9.4	10.4	18.4	4.4	13.7	13.8	25.7	10.7	10.5
Prop In Lane	1.00		0.04	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	896	1233	672	318	995	1153	78	269	279	751	1154	1631
V/C Ratio(X)	0.91	0.38	0.38	0.78	0.45	0.46	0.77	0.72	0.72	0.91	0.33	0.27
Avail Cap(c_a), veh/h	1039	1233	672	935	1458	1407	509	628	650	831	1154	1631
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	31.1	31.1	58.8	47.0	28.1	62.7	53.4	53.5	50.6	33.7	13.5
Incr Delay (d2), s/veh	10.6	0.2	0.4	4.3	0.3	0.3	14.3	3.5	3.5	13.5	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	6.3	6.9	4.7	4.9	7.1	2.5	6.9	7.3	13.7	5.3	4.0
LnGrp Delay(d),s/veh	58.1	31.3	31.4	63.1	47.4	28.4	77.0	57.0	57.0	64.0	33.9	13.6
LnGrp LOS	E	C	C	E	D	C	E	E	E	E	C	B
Approach Vol, veh/h		1533			1234			453			1512	
Approach Delay, s/veh		45.5			42.4			59.6			41.5	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.9	26.2	18.3	54.2	10.8	49.2	40.5	31.9
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	32.0	47.0	36.0	42.0	38.0	41.0	40.0	38.0
Max Q Clear Time (g_c+I1), s	27.7	15.8	11.4	15.4	6.4	12.7	32.4	20.4
Green Ext Time (p_c), s	1.2	3.3	0.8	12.0	0.1	7.8	2.1	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	44.8
HCM 2010 LOS	D

Notes

User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	105	170	65	180	75	295	35	810	120	320	1100	55
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	114	185	59	196	82	69	38	880	116	348	1196	57
Adj No. of Lanes	1	1	0	1	1	1	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	434	440	140	319	606	515	48	1249	164	391	2327	111
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.03	0.27	0.27	0.22	0.47	0.47
Sat Flow, veh/h	1231	1355	432	1131	1863	1583	1774	4550	597	1774	4974	237
Grp Volume(v), veh/h	114	0	244	196	82	69	38	655	341	348	815	438
Grp Sat Flow(s),veh/h/ln	1231	0	1787	1131	1863	1583	1774	1695	1757	1774	1695	1821
Q Serve(g_s), s	7.2	0.0	10.7	16.4	3.1	3.1	2.1	17.4	17.5	19.0	16.9	16.9
Cycle Q Clear(g_c), s	10.3	0.0	10.7	27.1	3.1	3.1	2.1	17.4	17.5	19.0	16.9	16.9
Prop In Lane	1.00		0.24	1.00		1.00	1.00		0.34	1.00		0.13
Lane Grp Cap(c), veh/h	434	0	581	319	606	515	48	930	482	391	1586	852
V/C Ratio(X)	0.26	0.00	0.42	0.61	0.14	0.13	0.79	0.70	0.71	0.89	0.51	0.51
Avail Cap(c_a), veh/h	636	0	874	505	912	775	354	982	509	780	1795	964
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	0.0	26.4	37.0	23.8	23.8	48.4	32.7	32.7	37.8	18.7	18.7
Incr Delay (d2), s/veh	0.3	0.0	0.5	1.9	0.1	0.1	23.8	2.2	4.2	7.0	0.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	5.4	5.3	1.6	1.4	1.4	8.4	9.0	10.0	7.9	8.5
LnGrp Delay(d),s/veh	27.8	0.0	26.9	38.9	23.9	23.9	72.2	34.8	36.9	44.8	18.9	19.2
LnGrp LOS	C		C	D	C	C	E	C	D	D	B	B
Approach Vol, veh/h		358			347			1034			1601	
Approach Delay, s/veh		27.2			32.4			36.9			24.6	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	28.1	33.5		38.6	8.7	52.8		38.6
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	44.0	29.0		49.0	20.0	53.0		49.0
Max Q Clear Time (g_c+I1), s	21.0	19.5		29.1	4.1	18.9		12.7
Green Ext Time (p_c), s	1.0	8.0		3.5	0.0	21.7		3.8

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	8.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	5	5	145	5	10	210
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	158	5	11	228

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	11	0	329	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	321	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1608	-	665	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	735	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1608	-	599	1074
Mov Cap-2 Maneuver	-	-	-	-	599	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	662	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.2	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1037	-	-	1608	-
HCM Lane V/C Ratio	0.231	-	-	0.098	-
HCM Control Delay (s)	9.5	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.3	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	185	680	0	0	420	20	0	0	0	20	0	135
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	201	739	0	0	457	22	0	0	0	22	0	147

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	478	0	0	739	0	0	1682	1619	739	1608	1608	467
Stage 1	-	-	-	-	-	-	1141	1141	-	467	467	-
Stage 2	-	-	-	-	-	-	541	478	-	1141	1141	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1084	-	-	867	-	-	75	103	417	84	105	596
Stage 1	-	-	-	-	-	-	244	275	-	576	562	-
Stage 2	-	-	-	-	-	-	525	556	-	244	275	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1084	-	-	867	-	-	43	71	417	63	72	596
Mov Cap-2 Maneuver	-	-	-	-	-	-	43	71	-	63	72	-
Stage 1	-	-	-	-	-	-	167	188	-	395	562	-
Stage 2	-	-	-	-	-	-	396	556	-	167	188	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	0	34.4
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1084	-	-	867	-	-	285
HCM Lane V/C Ratio	-	0.186	-	-	-	-	-	0.591
HCM Control Delay (s)	0	9.1	0	-	0	-	-	34.4
HCM Lane LOS	A	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	-	0.7	-	-	0	-	-	3.5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	740	15	15	430	10	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	804	16	16	467	11	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	821	0	1313	813
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	500	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	808	-	175	378
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	609	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	808	-	172	378
Mov Cap-2 Maneuver	-	-	-	-	172	-
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	597	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	20.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	270	-	-	808	-
HCM Lane V/C Ratio	0.121	-	-	0.02	-
HCM Control Delay (s)	20.2	-	-	9.5	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	730	0	0	435	5	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	793	0	0	473	5	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	478	0	0	793	0	0	1280	1282	793	1280	1280	476
Stage 1	-	-	-	-	-	-	804	804	-	476	476	-
Stage 2	-	-	-	-	-	-	476	478	-	804	804	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1084	-	-	828	-	-	143	165	389	143	166	589
Stage 1	-	-	-	-	-	-	377	396	-	570	557	-
Stage 2	-	-	-	-	-	-	570	556	-	377	396	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1084	-	-	828	-	-	142	164	389	142	165	589
Mov Cap-2 Maneuver	-	-	-	-	-	-	142	164	-	142	165	-
Stage 1	-	-	-	-	-	-	374	393	-	565	557	-
Stage 2	-	-	-	-	-	-	570	556	-	374	393	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1084	-	-	828	-	-	-
HCM Lane V/C Ratio	-	0.005	-	-	-	-	-	-
HCM Control Delay (s)	0	8.3	0	-	0	-	-	0
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	760	435	5	30	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	826	473	5	33	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	478	0	-	0	1302	476
Stage 1	-	-	-	-	476	-
Stage 2	-	-	-	-	826	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1084	-	-	-	177	589
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	430	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1084	-	-	-	177	589
Mov Cap-2 Maneuver	-	-	-	-	177	-
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	27.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1084	-	-	-	197
HCM Lane V/C Ratio	-	-	-	-	0.193
HCM Control Delay (s)	0	-	-	-	27.6
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.7

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	765	0	0	415	20	0	0	0	50	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	832	0	0	451	22	0	0	0	54	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	473	0	0	832	0	0	1326	1326	832	1315	1315	462
Stage 1	-	-	-	-	-	-	853	853	-	462	462	-
Stage 2	-	-	-	-	-	-	473	473	-	853	853	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1089	-	-	801	-	-	133	156	369	135	158	600
Stage 1	-	-	-	-	-	-	354	376	-	580	565	-
Stage 2	-	-	-	-	-	-	572	558	-	354	376	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1089	-	-	801	-	-	127	154	369	134	156	600
Mov Cap-2 Maneuver	-	-	-	-	-	-	127	154	-	134	156	-
Stage 1	-	-	-	-	-	-	350	372	-	574	565	-
Stage 2	-	-	-	-	-	-	551	558	-	350	372	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	41.6
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1089	-	-	801	-	-	172
HCM Lane V/C Ratio	-	0.01	-	-	-	-	-	0.442
HCM Control Delay (s)	0	8.3	-	-	0	-	-	41.6
HCM Lane LOS	A	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	2

HCM 2010 Signalized Intersection Summary
9: Kapolei Pkwy & Geiger Rd

11/25/2014

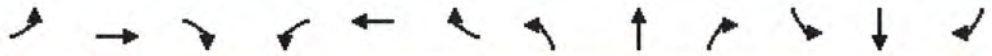
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	335	485	155	215	250	205	715	100	170	910	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	364	341	168	234	74	223	777	30	185	989	8
Adj No. of Lanes	1	2	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	449	402	195	603	513	252	1163	520	214	1087	486
Arrive On Green	0.04	0.25	0.25	0.11	0.32	0.32	0.14	0.33	0.33	0.12	0.31	0.31
Sat Flow, veh/h	1774	1770	1583	1774	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	54	364	341	168	234	74	223	777	30	185	989	8
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	3.9	24.7	26.2	11.9	12.4	4.2	15.8	24.2	1.7	13.1	34.4	0.5
Cycle Q Clear(g_c), s	3.9	24.7	26.2	11.9	12.4	4.2	15.8	24.2	1.7	13.1	34.4	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	70	449	402	195	603	513	252	1163	520	214	1087	486
V/C Ratio(X)	0.77	0.81	0.85	0.86	0.39	0.14	0.89	0.67	0.06	0.86	0.91	0.02
Avail Cap(c_a), veh/h	374	636	569	249	603	513	360	1163	520	360	1133	507
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.9	44.9	45.5	56.1	33.5	30.7	53.9	37.0	29.4	55.3	42.7	30.9
Incr Delay (d2), s/veh	15.8	5.3	8.3	21.2	0.4	0.1	16.8	1.5	0.0	10.8	10.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	12.8	12.4	7.0	6.5	1.9	8.9	12.0	0.7	7.1	18.4	0.2
LnGrp Delay(d),s/veh	76.7	50.2	53.8	77.3	33.9	30.9	70.7	38.5	29.5	66.1	53.2	30.9
LnGrp LOS	E	D	D	E	C	C	E	D	C	E	D	C
Approach Vol, veh/h		759			476			1030			1182	
Approach Delay, s/veh		53.7			48.7			45.2			55.1	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.4	48.1	20.0	38.5	24.2	45.3	11.1	47.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	26.0	41.0	18.0	46.0	26.0	41.0	27.0	37.0
Max Q Clear Time (g_c+I1), s	15.1	26.2	13.9	28.2	17.8	36.4	5.9	14.4
Green Ext Time (p_c), s	0.4	10.3	0.2	4.3	0.4	2.9	0.1	6.7

Intersection Summary	
HCM 2010 Ctrl Delay	51.0
HCM 2010 LOS	D

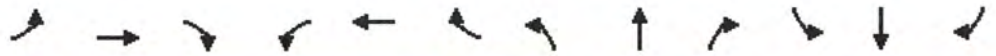
HCM Signalized Intersection Capacity Analysis
10: Ft Weaver Rd & Geiger Rd/Iroquois Rd

11/25/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	230	225	250	15	220	150	215	870	15	350	1545	220
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	3345	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	3345	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)	250	245	272	16	239	163	234	946	16	380	1679	239
RTOR Reduction (vph)	0	0	68	0	0	113	0	0	8	0	0	73
Lane Group Flow (vph)	160	335	204	16	239	50	234	946	8	380	1679	166
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)	36.9	36.9	36.9	34.1	34.1	34.1	21.6	112.9	112.9	31.1	122.4	122.4
Effective Green, g (s)	38.9	38.9	38.9	36.1	36.1	36.1	23.6	115.9	113.9	33.1	125.4	123.4
Actuated g/C Ratio	0.16	0.16	0.16	0.15	0.15	0.15	0.10	0.48	0.47	0.14	0.52	0.51
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)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	260	542	256	266	280	419	337	2455	751	473	2656	813
v/s Ratio Prot	0.10	0.10		0.01	c0.13		0.07	0.19		c0.11	c0.33	
v/s Ratio Perm			c0.13			0.02			0.00			0.10
v/c Ratio	0.62	0.62	0.80	0.06	0.85	0.12	0.69	0.39	0.01	0.80	0.63	0.20
Uniform Delay, d1	93.6	93.6	96.8	87.4	99.4	88.2	104.7	39.4	33.3	100.3	40.9	31.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.93	1.18
Incremental Delay, d2	6.1	3.0	17.8	0.2	23.3	0.3	6.1	0.5	0.0	9.4	1.1	0.6
Delay (s)	99.7	96.7	114.6	87.6	122.6	88.5	110.8	39.9	33.3	123.7	39.0	37.9
Level of Service	F	F	F	F	F	F	F	D	C	F	D	D
Approach Delay (s)		103.6			108.0			53.7			52.9	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	66.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	440	40	135	35	35	25	125	1510	60	75	2635	385
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		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	0.91		1.00	1.00	1.00	1.00	0.83	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	1699	1434		1817	1583	1770	5085	1311	1770	5085	1536
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	1699	1434		1817	1583	1770	5085	1311	1770	5085	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	478	43	147	38	38	27	136	1641	65	82	2864	418
RTOR Reduction (vph)	0	0	82	0	0	25	0	0	27	0	0	189
Lane Group Flow (vph)	258	263	65	0	76	2	136	1641	38	82	2864	229
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)	44.1	44.1	44.1		15.4	15.4	25.1	140.6	140.6	15.9	131.4	131.4
Effective Green, g (s)	44.1	44.1	44.1		15.4	17.4	25.1	142.6	141.6	17.9	133.4	131.4
Actuated g/C Ratio	0.18	0.18	0.18		0.06	0.07	0.10	0.59	0.59	0.07	0.56	0.55
Clearance Time (s)	5.0	5.0	5.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	3.0	5.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	308	312	263		116	114	185	3021	773	132	2826	840
v/s Ratio Prot	0.15	c0.15			c0.04		c0.08	0.32		0.05	c0.56	
v/s Ratio Perm			0.05			0.00			0.03			0.15
v/c Ratio	0.84	0.84	0.25		0.66	0.02	0.74	0.54	0.05	0.62	1.01	0.27
Uniform Delay, d1	94.5	94.6	83.8		109.7	103.4	104.2	29.2	20.8	107.8	53.3	28.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.90	1.15	2.12	0.98	0.99	1.44
Incremental Delay, d2	18.4	18.9	0.7		12.5	0.1	7.1	0.3	0.0	8.7	20.3	0.8
Delay (s)	112.9	113.6	84.5		122.3	103.4	100.5	33.7	44.2	113.8	73.1	42.4
Level of Service	F	F	F		F	F	F	C	D	F	E	D
Approach Delay (s)		106.9			117.3			39.0			70.2	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	65.5	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)	22.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	810	430	5	35	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	880	467	5	38	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	473	0	-	0	1350	470
Stage 1	-	-	-	-	470	-
Stage 2	-	-	-	-	880	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1089	-	-	-	166	594
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	406	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1089	-	-	-	166	594
Mov Cap-2 Maneuver	-	-	-	-	166	-
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	406	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	30.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1089	-	-	-	182
HCM Lane V/C Ratio	-	-	-	-	0.239
HCM Control Delay (s)	0	-	-	-	30.9
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.9

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	695	435	0	20	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	755	473	0	22	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	473	0	-	0	1228	473
Stage 1	-	-	-	-	473	-
Stage 2	-	-	-	-	755	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1089	-	-	-	197	591
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	464	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1089	-	-	-	197	591
Mov Cap-2 Maneuver	-	-	-	-	197	-
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	464	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	21.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1089	-	-	-	253
HCM Lane V/C Ratio	-	-	-	-	0.129
HCM Control Delay (s)	0	-	-	-	21.3
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	210	0	5	150	0	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	228	0	5	163	0	92

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	228	0	402	228
Stage 1	-	-	-	-	228	-
Stage 2	-	-	-	-	174	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1340	-	604	811
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	856	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1340	-	602	811
Mov Cap-2 Maneuver	-	-	-	-	602	-
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	853	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	811	-	-	1340	-
HCM Lane V/C Ratio	0.114	-	-	0.004	-
HCM Control Delay (s)	10	-	-	7.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

HCM 2010 Signalized Intersection Summary
1: Kapolei Pkwy & Kualakai Pkwy

11/25/2014

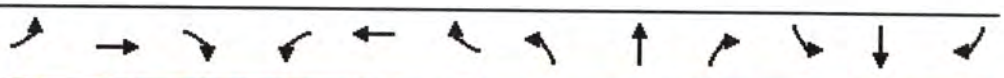
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	870	805	10	230	485	585	55	370	130	625	370	655
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	946	875	11	250	527	582	60	402	5	679	402	423
Adj No. of Lanes	2	3	0	2	3	2	1	2	0	2	2	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	986	2054	26	310	1019	1145	78	541	7	724	1125	1681
Arrive On Green	0.29	0.40	0.40	0.09	0.20	0.20	0.04	0.15	0.15	0.21	0.32	0.32
Sat Flow, veh/h	3442	5176	65	3442	5085	2787	1774	3580	44	3442	3539	2776
Grp Volume(v), veh/h	946	573	313	250	527	582	60	199	208	679	402	423
Grp Sat Flow(s),veh/h/ln	1721	1695	1851	1721	1695	1393	1774	1770	1855	1721	1770	1388
Q Serve(g_s), s	41.1	18.6	18.7	10.8	14.0	23.6	5.1	16.3	16.3	29.5	13.3	10.8
Cycle Q Clear(g_c), s	41.1	18.6	18.7	10.8	14.0	23.6	5.1	16.3	16.3	29.5	13.3	10.8
Prop In Lane	1.00		0.04	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	986	1345	734	310	1019	1145	78	268	280	724	1125	1681
V/C Ratio(X)	0.96	0.43	0.43	0.81	0.52	0.51	0.77	0.74	0.74	0.94	0.36	0.25
Avail Cap(c_a), veh/h	997	1345	734	997	1272	1284	456	606	635	748	1125	1681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.3	33.3	33.3	67.8	54.2	33.3	71.9	61.6	61.6	59.0	39.9	14.0
Incr Delay (d2), s/veh	19.3	0.2	0.4	4.9	0.4	0.4	14.9	4.0	3.9	19.0	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.2	8.8	9.6	5.4	6.6	9.1	2.8	8.3	8.7	16.0	6.5	4.1
LnGrp Delay(d),s/veh	72.6	33.5	33.7	72.7	54.6	33.7	86.7	65.7	65.5	78.0	40.1	14.1
LnGrp LOS	E	C	C	E	D	C	F	E	E	E	D	B
Approach Vol, veh/h		1832			1359			467			1504	
Approach Delay, s/veh		53.7			48.9			68.3			49.9	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	37.0	29.0	19.7	66.2	11.6	54.3	49.5	36.4
Change Period (Y+Rc), s	5.0	6.0	6.0	6.0	5.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	33.0	52.0	44.0	38.0	39.0	46.0	44.0	38.0
Max Q Clear Time (g_c+I1), s	31.5	18.3	12.8	20.7	7.1	15.3	43.1	25.6
Green Ext Time (p_c), s	0.5	3.7	0.9	11.2	0.1	8.1	0.4	4.8

Intersection Summary	
HCM 2010 Ctrl Delay	52.7
HCM 2010 LOS	D

Notes

User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	145	230	75	205	145	325	40	890	130	320	1180	135
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	158	250	73	223	158	106	43	967	129	348	1283	137
Adj No. of Lanes	1	1	0	1	1	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	542	158	338	729	619	55	1412	188	443	1906	203
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.03	0.31	0.31	0.13	0.41	0.41
Sat Flow, veh/h	1111	1386	405	1052	1863	1583	1774	4542	604	3442	4667	498
Grp Volume(v), veh/h	158	0	323	223	158	106	43	721	375	348	932	488
Grp Sat Flow(s),veh/h/ln	1111	0	1791	1052	1863	1583	1774	1695	1756	1721	1695	1775
Q Serve(g_s), s	11.7	0.0	14.2	21.2	6.0	4.6	2.6	19.8	19.9	10.4	23.9	23.9
Cycle Q Clear(g_c), s	17.7	0.0	14.2	35.5	6.0	4.6	2.6	19.8	19.9	10.4	23.9	23.9
Prop In Lane	1.00		0.23	1.00		1.00	1.00		0.34	1.00		0.28
Lane Grp Cap(c), veh/h	440	0	701	338	729	619	55	1054	546	443	1384	725
V/C Ratio(X)	0.36	0.00	0.46	0.66	0.22	0.17	0.78	0.68	0.69	0.79	0.67	0.67
Avail Cap(c_a), veh/h	517	0	825	412	858	730	334	1054	546	1424	1690	885
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	0.0	24.0	37.2	21.5	21.1	51.1	32.1	32.1	44.9	25.7	25.7
Incr Delay (d2), s/veh	0.5	0.0	0.5	2.8	0.1	0.1	20.3	1.8	3.6	3.1	0.8	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	7.1	6.4	3.1	2.0	1.6	9.5	10.1	5.2	11.3	12.0
LnGrp Delay(d),s/veh	27.9	0.0	24.5	40.1	21.7	21.3	71.4	33.9	35.7	48.0	26.5	27.2
LnGrp LOS	C		C	D	C	C	E	C	D	D	C	C
Approach Vol, veh/h		481			487			1139			1768	
Approach Delay, s/veh		25.6			30.0			35.9			30.9	
Approach LOS		C			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.7	39.1		47.6	9.3	49.4		47.6
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	44.0	29.0		49.0	20.0	53.0		49.0
Max Q Clear Time (g_c+I1), s	12.4	21.9		37.5	4.6	25.9		19.7
Green Ext Time (p_c), s	1.3	6.4		4.1	0.1	17.6		5.8

Intersection Summary	
HCM 2010 Ctrl Delay	31.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	0	0	215	5	5	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	234	5	5	103

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	0	0	473	0
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	473	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	-	-	550	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	627	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	550	-
Mov Cap-2 Maneuver	-	-	-	-	550	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	627	-

Approach	EB	WB	NB
HCM Control Delay, s	0		
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	-	-	-
HCM Lane LOS	-	-	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	-

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	80	320	0	0	800	20	0	0	0	15	0	195
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	87	348	0	0	870	22	0	0	0	16	0	212

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	891	0	0	348	0	0	1508	1413	348	1402	1402	880
Stage 1	-	-	-	-	-	-	522	522	-	880	880	-
Stage 2	-	-	-	-	-	-	986	891	-	522	522	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	761	-	-	1211	-	-	99	138	695	117	140	346
Stage 1	-	-	-	-	-	-	538	531	-	342	365	-
Stage 2	-	-	-	-	-	-	298	361	-	538	531	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	761	-	-	1211	-	-	34	118	695	104	120	346
Mov Cap-2 Maneuver	-	-	-	-	-	-	34	118	-	104	120	-
Stage 1	-	-	-	-	-	-	462	456	-	293	365	-
Stage 2	-	-	-	-	-	-	115	361	-	462	456	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0	0	48.1
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	761	-	-	1211	-	-	297
HCM Lane V/C Ratio	-	0.114	-	-	-	-	-	0.769
HCM Control Delay (s)	0	10.3	0	-	0	-	-	48.1
HCM Lane LOS	A	B	A	-	A	-	-	E
HCM 95th %tile Q(veh)	-	0.4	-	-	0	-	-	5.9

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	325	10	25	845	10	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	353	11	27	918	11	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	364	0	1332	359
Stage 1	-	-	-	-	359	-
Stage 2	-	-	-	-	973	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1195	-	170	685
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	366	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1195	-	166	685
Mov Cap-2 Maneuver	-	-	-	-	166	-
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	358	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	22.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	222	-	-	1195	-
HCM Lane V/C Ratio	0.073	-	-	0.023	-
HCM Control Delay (s)	22.5	-	-	8.1	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	330	0	0	895	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	359	0	0	973	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	973	0	0	359	0	0	1332	1332	359	1332	1332	973
Stage 1	-	-	-	-	-	-	359	359	-	973	973	-
Stage 2	-	-	-	-	-	-	973	973	-	359	359	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	709	-	-	1200	-	-	131	154	685	131	154	306
Stage 1	-	-	-	-	-	-	659	627	-	303	330	-
Stage 2	-	-	-	-	-	-	303	330	-	659	627	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	709	-	-	1200	-	-	131	154	685	131	154	306
Mov Cap-2 Maneuver	-	-	-	-	-	-	131	154	-	131	154	-
Stage 1	-	-	-	-	-	-	659	627	-	303	330	-
Stage 2	-	-	-	-	-	-	303	330	-	659	627	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	709	-	-	1200	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	325	870	25	20	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	353	946	27	22	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	973	0	-	0	1323	959
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	364	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	709	-	-	-	172	312
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	709	-	-	-	171	312
Mov Cap-2 Maneuver	-	-	-	-	171	-
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	698	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	25.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	709	-	-	-	212
HCM Lane V/C Ratio	0.008	-	-	-	0.179
HCM Control Delay (s)	10.1	-	-	-	25.7
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	325	0	0	875	40	0	0	0	25	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	353	0	0	951	43	0	0	0	27	0	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	995	0	0	353	0	0	1356	1370	353	1348	1348	973
Stage 1	-	-	-	-	-	-	375	375	-	973	973	-
Stage 2	-	-	-	-	-	-	981	995	-	375	375	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	695	-	-	1206	-	-	126	146	691	128	151	306
Stage 1	-	-	-	-	-	-	646	617	-	303	330	-
Stage 2	-	-	-	-	-	-	300	323	-	646	617	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	695	-	-	1206	-	-	118	144	691	126	149	306
Mov Cap-2 Maneuver	-	-	-	-	-	-	118	144	-	126	149	-
Stage 1	-	-	-	-	-	-	636	607	-	298	330	-
Stage 2	-	-	-	-	-	-	284	323	-	636	607	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	35.2
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	695	-	-	1206	-	-	162
HCM Lane V/C Ratio	-	0.016	-	-	-	-	-	0.268
HCM Control Delay (s)	0	10.3	-	-	0	-	-	35.2
HCM Lane LOS	A	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	1

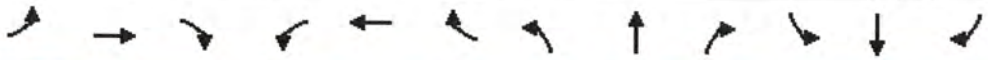
HCM 2010 Signalized Intersection Summary
9: Kapolei Pkwy & Geiger Rd

11/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	375	535	200	265	275	250	785	110	195	975	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	54	408	353	217	288	94	272	853	24	212	1060	8
Adj No. of Lanes	1	1	1	1	1	1	2	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	483	410	244	665	565	331	1013	453	240	1151	515
Arrive On Green	0.04	0.26	0.26	0.14	0.36	0.36	0.10	0.29	0.29	0.14	0.33	0.33
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	54	408	353	217	288	94	272	853	24	212	1060	8
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.0	27.4	28.0	15.8	15.5	5.4	10.2	29.9	1.4	15.5	38.0	0.5
Cycle Q Clear(g_c), s	4.0	27.4	28.0	15.8	15.5	5.4	10.2	29.9	1.4	15.5	38.0	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	71	483	410	244	665	565	331	1013	453	240	1151	515
V/C Ratio(X)	0.77	0.85	0.86	0.89	0.43	0.17	0.82	0.84	0.05	0.88	0.92	0.02
Avail Cap(c_a), veh/h	431	721	613	310	665	565	470	1013	453	336	1181	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.7	46.3	46.6	55.9	32.3	29.0	58.5	44.2	34.1	56.0	42.8	30.2
Incr Delay (d2), s/veh	15.7	6.0	8.0	22.0	0.4	0.1	7.7	6.5	0.0	17.9	11.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	14.9	13.1	9.3	8.1	2.4	5.2	15.5	0.6	8.8	20.4	0.2
LnGrp Delay(d),s/veh	78.4	52.3	54.6	77.9	32.7	29.1	66.2	50.7	34.1	73.9	54.4	30.2
LnGrp LOS	E	D	D	E	C	C	E	D	C	E	D	C
Approach Vol, veh/h		815			599			1149			1280	
Approach Delay, s/veh		55.0			48.5			54.1			57.5	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.8	43.7	24.1	40.2	18.7	48.9	11.2	53.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	25.0	37.0	23.0	51.0	18.0	44.0	32.0	42.0
Max Q Clear Time (g_c+I1), s	17.5	31.9	17.8	30.0	12.2	40.0	6.0	17.5
Green Ext Time (p_c), s	0.3	4.3	0.3	4.1	0.5	2.8	0.1	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	54.5
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	245	290	15	275	185	270	1065	15	360	1775	240
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	3345	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	3345	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)	272	266	315	16	299	201	293	1158	16	391	1929	261
RTOR Reduction (vph)	0	0	72	0	0	110	0	0	9	0	0	75
Lane Group Flow (vph)	174	364	243	16	299	91	293	1158	7	391	1929	186
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)	40.2	40.2	40.2	36.8	36.8	36.8	25.2	106.4	106.4	31.6	112.8	112.8
Effective Green, g (s)	42.2	42.2	42.2	38.8	38.8	38.8	27.2	109.4	107.4	33.6	115.8	113.8
Actuated g/C Ratio	0.18	0.18	0.18	0.16	0.16	0.16	0.11	0.46	0.45	0.14	0.48	0.47
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)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	283	588	278	286	301	450	389	2317	708	480	2453	750
v/s Ratio Prot	0.11	0.11		0.01	c0.16		0.09	0.23		c0.11	c0.38	
v/s Ratio Perm			c0.15			0.03			0.00			0.12
v/c Ratio	0.61	0.62	0.88	0.06	0.99	0.20	0.75	0.50	0.01	0.81	0.79	0.25
Uniform Delay, d1	91.4	91.5	96.3	85.1	100.5	87.2	103.1	46.0	36.8	100.2	51.8	37.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	0.92	1.07
Incremental Delay, d2	5.6	2.8	26.6	0.2	50.0	0.5	8.0	0.8	0.0	10.1	2.6	0.8
Delay (s)	97.0	94.3	122.9	85.3	150.4	87.7	111.2	46.8	36.8	125.1	50.0	41.2
Level of Service	F	F	F	F	F	F	F	D	D	F	D	D
Approach Delay (s)		105.4			124.0			59.5			60.5	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	73.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	40	125	35	35	30	130	1760	65	80	2845	450
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		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	0.91		1.00	1.00	1.00	1.00	0.83	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	1698	1434		1817	1583	1770	5085	1311	1770	5085	1536
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	1698	1434		1817	1583	1770	5085	1311	1770	5085	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	43	136	38	38	33	141	1913	71	87	3092	489
RTOR Reduction (vph)	0	0	81	0	0	31	0	0	28	0	0	223
Lane Group Flow (vph)	264	268	55	0	76	2	141	1913	43	87	3092	266
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)	44.6	44.6	44.6		15.4	15.4	25.6	139.6	139.6	16.4	130.4	130.4
Effective Green, g (s)	44.6	44.6	44.6		15.4	17.4	25.6	141.6	140.6	18.4	132.4	130.4
Actuated g/C Ratio	0.19	0.19	0.19		0.06	0.07	0.11	0.59	0.59	0.08	0.55	0.54
Clearance Time (s)	5.0	5.0	5.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	3.0	5.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	312	315	266		116	114	188	3000	768	135	2805	834
v/s Ratio Prot	0.16	c0.16			c0.04		c0.08	c0.38		0.05	c0.61	
v/s Ratio Perm			0.04			0.00			0.03			0.17
v/c Ratio	0.85	0.85	0.21		0.66	0.02	0.75	0.64	0.06	0.64	1.10	0.32
Uniform Delay, d1	94.4	94.5	82.7		109.7	103.4	104.1	32.3	21.3	107.6	53.8	30.3
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.88	1.15	2.07	0.98	0.99	1.42
Incremental Delay, d2	19.3	19.9	0.5		12.5	0.1	7.6	0.4	0.1	10.0	52.1	1.0
Delay (s)	113.6	114.3	83.2		122.3	103.5	99.4	37.7	44.1	115.1	105.5	44.0
Level of Service	F	F	F		F	F	F	D	D	F	F	D
Approach Delay (s)		107.7			116.6			42.0			97.5	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	80.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	350	915	25	20	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	380	995	27	22	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1022	0	-	0	1399	1008
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	391	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	679	-	-	-	155	292
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	683	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	679	-	-	-	154	292
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	678	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	30.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	679	-	-	-	170
HCM Lane V/C Ratio	0.008	-	-	-	0.16
HCM Control Delay (s)	10.3	-	-	-	30.2
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	325	805	20	15	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	353	875	22	16	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	897	0	-	0	1250	886
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	364	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	757	-	-	-	191	343
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	757	-	-	-	190	343
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	698	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	22.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	757	-	-	-	231
HCM Lane V/C Ratio	0.007	-	-	-	0.118
HCM Control Delay (s)	9.8	-	-	-	22.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	95	0	55	215	0	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	0	60	234	0	136

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	103	0	456	103
Stage 1	-	-	-	-	103	-
Stage 2	-	-	-	-	353	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1489	-	562	952
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	711	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1489	-	539	952
Mov Cap-2 Maneuver	-	-	-	-	539	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	682	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	952	-	-	1489	-
HCM Lane V/C Ratio	0.143	-	-	0.04	-
HCM Control Delay (s)	9.4	-	-	7.5	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 2010 Signalized Intersection Summary
1: Kapolei Pkwy & Kualakai Pkwy

11/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	680	700	5	120	860	540	5	105	15	435	140	465
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	739	761	5	130	935	587	5	114	3	473	152	318
Adj No. of Lanes	2	3	0	2	3	2	1	2	0	2	2	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	855	2379	16	206	1362	1196	9	335	9	556	890	1390
Arrive On Green	0.25	0.46	0.46	0.06	0.27	0.27	0.01	0.10	0.10	0.16	0.25	0.25
Sat Flow, veh/h	3442	5213	34	3442	5085	2787	1774	3524	92	3442	3539	2773
Grp Volume(v), veh/h	739	495	271	130	935	587	5	57	60	473	152	318
Grp Sat Flow(s),veh/h/ln	1721	1695	1857	1721	1695	1393	1774	1770	1846	1721	1770	1387
Q Serve(g_s), s	21.7	9.8	9.8	3.9	17.4	16.1	0.3	3.2	3.2	14.1	3.6	6.8
Cycle Q Clear(g_c), s	21.7	9.8	9.8	3.9	17.4	16.1	0.3	3.2	3.2	14.1	3.6	6.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	855	1548	848	206	1362	1196	9	168	176	556	890	1390
V/C Ratio(X)	0.86	0.32	0.32	0.63	0.69	0.49	0.55	0.34	0.34	0.85	0.17	0.23
Avail Cap(c_a), veh/h	1237	1548	848	1237	1828	1452	201	636	664	716	1607	1952
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.0	18.3	18.3	48.6	34.7	21.8	52.5	44.7	44.7	43.1	30.9	14.9
Incr Delay (d2), s/veh	4.6	0.1	0.2	3.2	0.7	0.3	42.2	1.2	1.1	7.8	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	4.6	5.1	2.0	8.2	6.2	0.3	1.6	1.7	7.3	1.7	2.6
LnGrp Delay(d),s/veh	42.6	18.4	18.5	51.7	35.4	22.1	94.7	45.9	45.9	50.8	31.0	15.0
LnGrp LOS	D	B	B	D	D	C	F	D	D	D	C	B
Approach Vol, veh/h		1505			1652			122			943	
Approach Delay, s/veh		30.3			32.0			47.9			35.6	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.1	16.1	12.3	54.3	6.5	32.6	32.3	34.3
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	22.0	38.0	38.0	38.0	12.0	48.0	38.0	38.0
Max Q Clear Time (g_c+I1), s	16.1	5.2	5.9	11.8	2.3	8.8	23.7	19.4
Green Ext Time (p_c), s	0.9	3.1	0.4	17.1	0.0	3.2	2.5	8.9

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Notes

User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	140	20	315	200	410	60	1130	475	275	580	75
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	98	152	19	342	217	139	65	1228	462	299	630	69
Adj No. of Lanes	1	1	0	1	1	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	347	590	74	422	677	576	84	1357	509	380	2028	220
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.05	0.37	0.37	0.11	0.44	0.44
Sat Flow, veh/h	1021	1624	203	1209	1863	1583	1774	3645	1367	3442	4658	505
Grp Volume(v), veh/h	98	0	171	342	217	139	65	1142	548	299	457	242
Grp Sat Flow(s),veh/h/ln	1021	0	1827	1209	1863	1583	1774	1695	1621	1721	1695	1774
Q Serve(g_s), s	9.0	0.0	7.7	32.4	9.8	7.2	4.2	37.4	37.5	9.9	10.3	10.5
Cycle Q Clear(g_c), s	18.8	0.0	7.7	40.1	9.8	7.2	4.2	37.4	37.5	9.9	10.3	10.5
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.84	1.00		0.28
Lane Grp Cap(c), veh/h	347	0	664	422	677	576	84	1262	604	380	1476	772
V/C Ratio(X)	0.28	0.00	0.26	0.81	0.32	0.24	0.77	0.90	0.91	0.79	0.31	0.31
Avail Cap(c_a), veh/h	351	0	670	426	684	581	257	1273	609	1028	1794	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.6	0.0	26.2	40.3	26.9	26.0	55.2	34.8	34.9	50.8	21.6	21.6
Incr Delay (d2), s/veh	0.4	0.0	0.2	11.2	0.3	0.2	13.8	9.3	17.4	3.6	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	3.9	12.1	5.1	3.2	2.4	19.1	19.7	4.9	4.8	5.2
LnGrp Delay(d),s/veh	34.1	0.0	26.4	51.5	27.1	26.2	68.9	44.1	52.3	54.4	21.7	21.9
LnGrp LOS	C		C	D	C	C	E	D	D	D	C	C
Approach Vol, veh/h		269			698			1755			998	
Approach Delay, s/veh		29.2			38.9			47.6			31.5	
Approach LOS		C			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.9	49.6		48.6	11.6	57.0		48.6
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	35.0	44.0		43.0	17.0	62.0		43.0
Max Q Clear Time (g_c+I1), s	11.9	39.5		42.1	6.2	12.5		20.8
Green Ext Time (p_c), s	1.0	4.1		0.5	0.1	30.4		4.9

Intersection Summary	
HCM 2010 Ctrl Delay	40.3
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	8.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	5	5	160	5	10	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	174	5	11	250

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	11	0	361	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	353	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1608	-	638	1074
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	711	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1608	-	568	1074
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	634	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.3	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1036	-	-	1608	-
HCM Lane V/C Ratio	0.252	-	-	0.108	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.4	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	205	725	0	0	445	20	0	0	0	20	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	223	788	0	0	484	22	0	0	0	22	0	158

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	505	0	0	788	0	0	1807	1739	788	1729	1729	495
Stage 1	-	-	-	-	-	-	1234	1234	-	495	495	-
Stage 2	-	-	-	-	-	-	573	505	-	1234	1234	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1060	-	-	831	-	-	61	87	391	69	88	575
Stage 1	-	-	-	-	-	-	216	249	-	556	546	-
Stage 2	-	-	-	-	-	-	505	540	-	216	249	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1060	-	-	831	-	-	31	54	391	49	55	575
Mov Cap-2 Maneuver	-	-	-	-	-	-	31	54	-	49	55	-
Stage 1	-	-	-	-	-	-	135	156	-	348	546	-
Stage 2	-	-	-	-	-	-	367	540	-	135	156	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	0	0	49
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1060	-	-	831	-	-	250
HCM Lane V/C Ratio	-	0.21	-	-	-	-	-	0.717
HCM Control Delay (s)	0	9.3	0	-	0	-	-	49
HCM Lane LOS	A	A	A	-	A	-	-	E
HCM 95th %tile Q(veh)	-	0.8	-	-	0	-	-	4.9

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	790	15	15	465	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	859	16	16	505	11	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	875	0	1405	867
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	538	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	771	-	154	352
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	585	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	771	-	151	352
Mov Cap-2 Maneuver	-	-	-	-	151	-
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	573	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	21.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	255	-	-	771	-
HCM Lane V/C Ratio	0.149	-	-	0.021	-
HCM Control Delay (s)	21.6	-	-	9.8	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	785	0	0	475	5	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	853	0	0	516	5	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	522	0	0	853	0	0	1383	1386	853	1383	1383	519
Stage 1	-	-	-	-	-	-	864	864	-	519	519	-
Stage 2	-	-	-	-	-	-	519	522	-	864	864	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1044	-	-	786	-	-	121	143	359	121	144	557
Stage 1	-	-	-	-	-	-	349	371	-	540	533	-
Stage 2	-	-	-	-	-	-	540	531	-	349	371	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1044	-	-	786	-	-	120	142	359	120	143	557
Mov Cap-2 Maneuver	-	-	-	-	-	-	120	142	-	120	143	-
Stage 1	-	-	-	-	-	-	346	368	-	535	533	-
Stage 2	-	-	-	-	-	-	540	531	-	346	368	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1044	-	-	786	-	-	-
HCM Lane V/C Ratio	-	0.005	-	-	-	-	-	-
HCM Control Delay (s)	0	8.5	0	-	0	-	-	0
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	810	470	20	45	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	880	511	22	49	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	533	0	-	0	1413	522
Stage 1	-	-	-	-	522	-
Stage 2	-	-	-	-	891	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1035	-	-	-	152	555
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	401	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1035	-	-	-	151	555
Mov Cap-2 Maneuver	-	-	-	-	151	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	399	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	36.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1035	-	-	-	174
HCM Lane V/C Ratio	0.005	-	-	-	0.344
HCM Control Delay (s)	8.5	-	-	-	36.1
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.4

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	820	0	0	460	45	0	0	0	70	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	891	0	0	500	49	0	0	0	76	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	549	0	0	891	0	0	1459	1473	891	1448	1448	524
Stage 1	-	-	-	-	-	-	924	924	-	524	524	-
Stage 2	-	-	-	-	-	-	535	549	-	924	924	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1021	-	-	761	-	-	107	127	341	109	131	553
Stage 1	-	-	-	-	-	-	323	348	-	537	530	-
Stage 2	-	-	-	-	-	-	529	516	-	323	348	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1021	-	-	761	-	-	102	125	341	108	129	553
Mov Cap-2 Maneuver	-	-	-	-	-	-	102	125	-	108	129	-
Stage 1	-	-	-	-	-	-	318	343	-	529	530	-
Stage 2	-	-	-	-	-	-	508	516	-	318	343	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	0	85.8
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1021	-	-	761	-	-	132
HCM Lane V/C Ratio	-	0.016	-	-	-	-	-	0.741
HCM Control Delay (s)	0	8.6	-	-	0	-	-	85.8
HCM Lane LOS	A	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	4.3

HCM 2010 Signalized Intersection Summary
9: Kapolei Pkwy & Geiger Rd

11/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	170	215	100	380	290	505	1265	245	175	805	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	11	185	30	109	413	80	549	1375	159	190	875	17
Adj No. of Lanes	1	1	1	1	1	1	2	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	18	351	298	134	473	402	646	1451	649	218	1222	547
Arrive On Green	0.01	0.19	0.19	0.08	0.25	0.25	0.19	0.41	0.41	0.12	0.35	0.35
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	11	185	30	109	413	80	549	1375	159	190	875	17
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	0.7	10.6	1.9	7.2	25.1	4.7	18.2	44.4	7.8	12.4	25.4	0.8
Cycle Q Clear(g_c), s	0.7	10.6	1.9	7.2	25.1	4.7	18.2	44.4	7.8	12.4	25.4	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	18	351	298	134	473	402	646	1451	649	218	1222	547
V/C Ratio(X)	0.60	0.53	0.10	0.81	0.87	0.20	0.85	0.95	0.24	0.87	0.72	0.03
Avail Cap(c_a), veh/h	180	582	495	180	582	495	1163	1495	669	255	1222	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.3	43.3	39.7	53.9	42.3	34.7	46.4	33.7	22.9	51.0	33.7	25.6
Incr Delay (d2), s/veh	28.2	1.2	0.1	18.1	11.8	0.2	3.2	12.7	0.2	23.8	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	5.6	0.8	4.2	14.5	2.1	9.0	24.1	3.4	7.6	12.7	0.4
LnGrp Delay(d),s/veh	86.5	44.5	39.9	72.0	54.1	34.9	49.7	46.4	23.1	74.8	35.7	25.7
LnGrp LOS	F	D	D	E	D	C	D	D	C	E	D	C
Approach Vol, veh/h		226			602			2083			1082	
Approach Delay, s/veh		45.9			54.8			45.5			42.4	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.5	54.5	15.0	28.3	28.2	46.9	7.2	36.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	17.0	50.0	12.0	37.0	40.0	27.0	12.0	37.0
Max Q Clear Time (g_c+I1), s	14.4	46.4	9.2	12.6	20.2	27.4	2.7	27.1
Green Ext Time (p_c), s	0.1	2.2	0.1	4.2	2.0	0.0	0.0	2.9

Intersection Summary	
HCM 2010 Ctrl Delay	46.1
HCM 2010 LOS	D

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

11/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	355	170	235	60	260	315	245	1460	10	220	1210	170
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	3306	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	3306	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)	386	185	255	65	283	342	266	1587	11	239	1315	185
RTOR Reduction (vph)	0	0	61	0	0	202	0	0	6	0	0	75
Lane Group Flow (vph)	193	378	194	65	283	140	266	1587	5	239	1315	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
Actuated Green, G (s)	36.1	36.1	36.1	41.4	41.4	41.4	23.1	116.6	116.6	20.9	114.4	114.4
Effective Green, g (s)	38.1	38.1	38.1	43.4	43.4	43.4	25.1	119.6	117.6	22.9	117.4	115.4
Actuated g/C Ratio	0.16	0.16	0.16	0.18	0.18	0.18	0.10	0.50	0.49	0.10	0.49	0.48
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)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	255	524	251	320	336	503	359	2534	775	327	2487	761
v/s Ratio Prot	0.12	0.11		0.04	c0.15		c0.08	c0.31		0.07	0.26	
v/s Ratio Perm			c0.12			0.05			0.00			0.07
v/c Ratio	0.76	0.72	0.77	0.20	0.84	0.28	0.74	0.63	0.01	0.73	0.53	0.14
Uniform Delay, d1	96.5	95.9	96.8	83.6	95.0	84.8	104.3	43.9	31.3	105.6	42.2	34.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.53	3.84
Incremental Delay, d2	14.2	5.9	15.7	0.7	18.7	0.6	8.0	1.2	0.0	7.7	0.8	0.4
Delay (s)	110.7	101.9	112.5	84.3	113.7	85.4	112.3	45.1	31.3	98.0	65.2	133.7
Level of Service	F	F	F	F	F	F	F	D	C	F	E	F
Approach Delay (s)		107.2			96.9			54.6			77.0	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	76.4	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)	16.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	125	10	15	15	330	2675	20	80	1570	440
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		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	0.91		1.00	1.00	1.00	1.00	0.83	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	1687	1434		1826	1583	1770	5085	1311	1770	5085	1536
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	1687	1434		1826	1583	1770	5085	1311	1770	5085	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	136	11	16	16	359	2908	22	87	1707	478
RTOR Reduction (vph)	0	0	81	0	0	15	0	0	8	0	0	256
Lane Group Flow (vph)	255	261	55	0	27	1	359	2908	14	87	1707	222
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)	45.2	45.2	45.2		7.8	7.8	51.4	148.3	148.3	14.7	111.6	111.6
Effective Green, g (s)	45.2	45.2	45.2		7.8	9.8	51.4	150.3	149.3	16.7	113.6	111.6
Actuated g/C Ratio	0.19	0.19	0.19		0.03	0.04	0.21	0.63	0.62	0.07	0.47	0.46
Clearance Time (s)	5.0	5.0	5.0		6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0	4.0		3.0	3.0	5.0	6.0	6.0	3.0	6.0	6.0
Lane Grp Cap (vph)	316	317	270		59	64	379	3184	815	123	2406	714
v/s Ratio Prot	0.15	c0.15			c0.01		c0.20	c0.57		0.05	0.34	
v/s Ratio Perm			0.04			0.00			0.01			0.14
v/c Ratio	0.81	0.82	0.20		0.46	0.01	0.95	0.91	0.02	0.71	0.71	0.31
Uniform Delay, d1	93.2	93.6	82.2		114.0	110.4	93.0	39.2	17.3	109.3	50.1	40.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.30	0.63	1.00	1.05	0.98	1.68
Incremental Delay, d2	14.7	16.4	0.5		5.5	0.1	18.6	2.3	0.0	16.5	1.8	1.1
Delay (s)	107.9	110.0	82.7		119.6	110.5	139.8	27.0	17.3	131.7	51.1	68.7
Level of Service	F	F	F		F	F	F	C	B	F	D	E
Approach Delay (s)		103.5			116.2			39.3			57.9	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	53.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	240.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	5	885	505	25	50	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	962	549	27	54	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	576	0	-	0	1536	563
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	973	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	997	-	-	-	128	526
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	366	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	997	-	-	-	127	526
Mov Cap-2 Maneuver	-	-	-	-	127	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	364	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	50.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	997	-	-	-	136
HCM Lane V/C Ratio	0.005	-	-	-	0.44
HCM Control Delay (s)	8.6	-	-	-	50.8
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	10	735	455	20	35	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	799	495	22	38	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	516	0	-	0	1326	505
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	821	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1050	-	-	-	172	567
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	432	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1050	-	-	-	170	567
Mov Cap-2 Maneuver	-	-	-	-	170	-
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	427	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	27.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1050	-	-	-	215
HCM Lane V/C Ratio	0.01	-	-	-	0.253
HCM Control Delay (s)	8.5	-	-	-	27.3
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	1

Intersection	
Int Delay, s/veh	3.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	230	0	140	165	0	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	250	0	152	179	0	147

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	250	0	734	250
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	484	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1316	-	387	789
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	620	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1316	-	342	789
Mov Cap-2 Maneuver	-	-	-	-	342	-
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	548	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	789	-	-	1316	-
HCM Lane V/C Ratio	0.186	-	-	0.116	-
HCM Control Delay (s)	10.6	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0.4	-

APPENDIX E

A Technical Memorandum for Honouliuli WWTP Facilities Plan

TECHNICAL MEMORANDUM

Estimates of Parameters for Use in Traffic Impact Analysis Report

Background

A Facilities Plan for the Honouliuli Wastewater Treatment Plant (WWTP) is being developed. As part of the Facilities Plan development, an environmental impact statement (EIS) is being prepared. One component of the EIS is a traffic impact analysis report (TIAR).

The TIAR require certain data inputs including the level and timing of projected activities for the site.

This technical memorandum provides the following data items for use by the TIAR:

- Number of WWTP employees for the existing and potential ultimate operational scenarios;
- Estimated years of peak construction and ultimate operation;
- Estimated construction activity for peak year of construction during the AM and PM peak hour traffic time periods. The construction activity information provided includes truck trips and construction worker count.

The sources of information used to provide these data items come from the Honouliuli WWTP Facilities Plan. Data sources referenced in this technical memorandum are:

- Evaluation of Services Technical Memorandum – Item 12.1- August 2012
- Honouliuli WWTP Site Layout Phase 1 Plan
- Figure 5-3: Anticipated Schedule for Two Construction Packages
- Biosolids Processing and Phase 2 Capacity expansion are additional separate packages that will also be executed during the planning period.
- Construction man-hour estimate from Task 12.N cost estimate

Number of Honouliuli WWTP Employees

Existing WWTP Employees

Table 3-1. Honouliuli WWP Current Staffing Levels from the Evaluation of Services Technical Memorandum – Item 12.1 – August 2012 documents the current staffing level at the Honouliuli WWTP at 39 full time equivalent (FTE) positions.

Potential Future WWTP Employees

There are several potential future scenarios of future employment at the Honouliuli WWTP. For the purposes of the EIS, the potential future scenario which involves relocation major components of the City and County of Honolulu wastewater staff to Honouliuli will be used. Based on Table 4-1 Functional Areas Estimated Staffing and Estimated Footprint the projected future WWTP employees are estimated at 320 FTE positions.

Table 1 summarizes the existing and projected future employment at the Honouliuli WWTP.

Table 1

Number of Honouliuli WWTP Employees

Scenario	Number of Employees (FTE)
Existing	39
Projected Ultimate	320
Notes: FTE = full-time equivalents	

Benchmark Years

The benchmark years that will be used for the TIAR are:

- Peak year of construction
- Year of operation

Peak Year of Construction

There are, potentially, four construction packages:

- Phase 1 – Package 1
- Phase 1 – Package 2
- Biosolids Processing
- Phase 2

Based on the Construction man-hour estimate from Task 12.N cost estimate, Phase 1-Package 1 will involve the largest man-hour effort of the four construction packages. Assuming that the peak year of construction would occur at the midpoint of the Package 1 construction, the man-hour estimate documents this as the year 2021.

Year of Operation

For the purposes of the EIS, the year of operation will be assumed to be the year when the non-process staff relocation to Honouliuli WWTP is complete. Based on the schedule indicated by the Construction man-hour estimate from Task 12.N cost estimate, Package 2, the non-process facilities, will be complete by 2027.

Assuming that Package 2 occurs according to this schedule and assuming it takes about 2 to 3 years to fully relocate and assimilate non-process staff to Honouliuli WWTP, a reasonable year of operation to be analyzed would be 2030.

Table 2 summarizes the Benchmark Years for use by the TIAR.

Table 2

Benchmark Years for TIAR

Scenario	Benchmark Year
Peak Year of Construction	2021
Year of Operation	2030
Notes: Based on Construction Man-Hour Estimate from Task 12-N Cost Estimate	

Intensity of Construction Activity

Two items related to construction activity are estimated:

- Construction worker count
- Number of truck trips

For the purposes of the TIAR, the time periods of interest are the AM and PM peak traffic hours of adjacent street traffic. These time periods are used because they represent the time periods when the greatest amounts of the surrounding community traffic are traveling. Therefore any traffic generated by the project, in this case the construction associated with the project, would impact the greatest amount of community traffic during these periods.

Construction Worker Count

The peak year of construction has been identified as the year 2021 assuming that mid-point of Phase 1 – Package 1 construction represents that maximum construction activity for the Honouliuli WWTP expansion. The estimated peak construction staffing for Package 1 is 185 construction workers. Typically, not all employees arrive and leave during the same hour. However to make the analysis conservative, all employees are assumed to arrive and leave within the same hours. The other three packages have much less earthwork and reinforced concrete construction so the peak conditions from Phase 1 – Package 1 will govern. All the other projects will have a lower construction worker count.

State of Hawai'i Department of Transportation (HDOT) traffic counts at Station B72007600297-Fort Weaver Road between Geiger Road and Kolowaka Road were reviewed to determine peaking characteristics of traffic in the 'Ewa area. This data was dated August 15, 2011. The bi-directional AM peak hour occurred from 6:30 AM to 7:30 AM with the makai-bound AM peak hour occurring from 6:45 AM to 7:45 AM. The makai-bound direction would be the direction impacted by construction workers driving to the Honouliuli WWTP site. Given that construction often begins very early in the day, it is likely that most construction workers inbound to Honouliuli WWTP would miss the AM peak hour associated with the commuter peak. However, to be conservative, the inbound construction workers are assumed to arrive during the AM peak hour.

The bi-directional PM peak commuter hour at the same count station occurred between 5:00 PM and 6:00 PM. Construction workers leaving the Honouliuli WWTP would leave much earlier than this peak hour. However, the mauka-bound directional peak hour occurred between 3:00 PM and 4:00 PM. Although the traffic volume involved in this directional peak hour is about half the amount of the directional peak during PM peak commuter hour, it is possible that the 3:00 PM to 4:00 PM peak could experience some

impact from the departing construction workers. Therefore, for construction impacts, this 3:00 PM to 4:00 PM time period should be the PM peak hour analyzed. The later commuter peak is not likely to be affected by the construction traffic, and if the TIAR elects to evaluate the commuter PM peak hour, then the construction worker impact should be assumed to be zero.

Table 3 summarizes these estimates.

Number of Truck Trips

The number of truck trips generated during the AM and PM peak hours would vary greatly from day to day, depending on the type of construction activity occurring. The maximum truck trip activity would occur during either a concrete pour or during export of excess soil from the site. Although there is a large amount of construction in Package 1, concrete pours are likely to be divided into segments. It is estimated that a typical segment could handle 4 cement trucks per hour generating 8 truck trips per hour (4 in each direction). The other three packages have much less earthwork and reinforced concrete construction so the peak conditions from Phase 1 – Package 1 will govern. All the other projects will have a lower construction vehicle count than the values listed below. .

In either case, it would be very common for the contractor to avoid the peak hours or the specs could mandate that the contractor avoid the peak hours. Even in the unlikely scenario that concrete trucks or dump trucks do not avoid the peak hours, it is likely that these activities would probably generate only 4 truck trips each way (8 truck trips total) during the peak hour.

Table 3
Construction Activity

Item	AM Peak Hour (6:30 – 7:30 AM)	PM Peak Hour (3:00 – 4:00 PM)
Construction Worker Count	185[a]	185/0[a]
Truck Trips (two-way volume)*	8 vph	8 vph[b]

Notes: Based on Construction Man-Hour Estimate from Task 12-N Cost Estimate

*Truck trips are two-way trips. There are 4 vph into the site and 4 vph out of the site. vph=vehicles per hour.

[a] Construction workers would be inbound during the AM peak hour and outbound during the PM peak hour. This analysis assumes 1 vehicle trip per construction worker. Construction workers might overlap with the commuter AM peak hour, but would be in the opposite direction from the peak commuter direction. To be conservative, the construction worker arrivals are shown as occurring during the AM peak hour of adjacent street traffic. Construction workers leaving the site would miss the PM peak commuter hour. The could coincide with the directional PM peak hour in the mauka-bound direction which occurs between 3 PM and 4 PM. This peak is half the traffic volume of the commuter peak. If the TIAR evaluates this mid-afternoon peak, then the outbound construction workers would be 185. If the PM peak commuter hour is evaluated, the outbound construction workers would be 0.

[b] It is not likely that these truck trips would occur during the commuter peak hours, but if they did, this would be the estimated volumes.

Appendix G
Economic and Fiscal Impacts, AECOM, November 2014

Appendix G.
Economic and Fiscal Impacts

Appendix G.
Economic and Fiscal Impacts

This report analyzes the potential economic and fiscal impacts of the proposed upgrading of the Honouliuli Wastewater Treatment Plant (WWTP), and relocating of non-process related functions and facilities from the Sand Island WWTP and other locations to the Honouliuli WWTP. The analysis estimates the economic impacts of the project, which cover expenditures and sales, employment, and payroll, and the fiscal impacts of the project on revenues of the State of Hawaii. The impacts from the project would occur both in the construction period and on an annual basis during operations.

G.1 Methodology

Construction period impacts are estimated using projected construction costs, and annual operations impacts are estimated using projected operations costs. In this analysis, these costs are transformed into economic and fiscal impacts by multiplying the costs or spending by multipliers from the 2007 Hawaii inter-county input-output (I-O) model updated by the Department of Business, Economic Development, and Tourism (DBEDT) in 2014 (DBEDT, 2014), as well as the 2007 Hawaii state I-O model updated by DBEDT in 2013 (DBEDT, 2013). The Hawaii state I-O model measures how money flows through the state through purchases and sales (inputs and outputs) that businesses and households make. It measures what comes in, through purchases that businesses and households make that come from outside of the state, or imports; and what goes out, through sales and services, or exports. The inter-county I-O model measures how money flows among various economic sectors within each county and between counties.

Economic and fiscal impacts were evaluated for both the initial change in the economy as a result of the project – in other words, the new money spent by the project and the new people employed – as well as the impacts of those changes on the overall economy of the City and County of Honolulu. New spending from project construction and operations would create sales for businesses, new employment (jobs), and earnings (wages). The new spending would ripple through the economy, creating direct (or initial), indirect (or successive), and induced effects. In the context of the project, these are characterized as follows:

- Direct effects measure the volume of economic activity initially produced by constructing and operating the project.
- Indirect effects measure the economic activity produced by the purchases of inputs from local industries necessary to construct and operate the project.
- Induced effects measure the economic activity produced by the construction spending by households that results from changes in earnings through the direct and indirect effects of the project.

I-O model multipliers are used to enable a fairly accurate analysis without difficult and costly survey taking. While the advantages outweigh the disadvantages, it is important to understand the following limitations of using any multipliers:

- One assumption is the accuracy of the data used. To perform the analysis, assumptions are used as a best guess of construction costs and future spending.
- Another assumption is that there are no supply constraints. For example, if operation of the project creates a greater need for energy, the price of energy could go up. However, for the analysis, there is no adjustment for this potential cost increase.
- Use of I-O model multipliers also assumes that all businesses of the same type conduct business the same way, using a certain number of employees and a certain amount of raw materials to produce sales. In reality, some companies may have ways to use fewer employees or raw materials.

- Finally, there is no way of knowing exactly when an effect will occur. If a purchase is made, for example, in 2012 or in 2030, that does not mean that effects would occur in the same year. An effect may not occur for several years or may be spread over several years. In most cases, however, it is reasonable to assume that the greatest effect will occur in the year after money is spent.

G.2 Economic and Fiscal Impacts of Construction

The project would construct process and non-process facilities at the Honouliuli WWTP. The construction expenditures would result in one-time increases in economic output, employment, and earnings, and one-time increases in fiscal revenues of the state. The economic impacts of project construction would include the impact of expenditures on construction materials, and on earnings of construction workers and professional service providers during the construction period. Construction costs were used to estimate economic and fiscal impacts during the construction period.

The project would cost an estimated $760 million to complete, inclusive of the costs of upgrading the Honouliuli WWTP and the costs of constructing facilities at the Honouliuli WWTP required to relocate non-process related functions to the plant. This amount includes both hard and soft costs. Hard costs comprise the construction materials and construction labor, while soft costs comprise engineering, commissioning, legal, and fiscal expenses not directly involved in the construction. Engineering, commissioning, legal, and fiscal costs were estimated to be 20 percent of the hard costs (AECOM, 2014b), or approximately 16.7 percent of the total construction costs. **Table G-1** shows the estimated hard costs, soft costs, and total costs of constructing the project.

Table G-1. Construction Costs

		Cost	
		%	$
Hard Costs	Heavy and Civil Engineering Construction	83.3	633,333,333
Soft Costs	Architectural and Engineering Services	16.7	126,666,667
Total Construction Costs		**100.0**	**760,000,000**

Source: AECOM, 2014c.

Multipliers for heavy and civil engineering construction were applied to hard costs; whereas, multipliers for architectural and engineering services were applied to the soft costs. **Table G-2** shows the resulting economic and fiscal impacts. On a one-time basis, project construction would have an estimated total economic impact of $1.6 billion in output, supporting a total of approximately 13,430 jobs, earnings of $520 million, and fiscal revenues of $70 million. The state taxes in the 2007 I-O model predominantly comprise general excise and use tax, and individual income tax, which together account for about 79 percent of total state taxes, as well as 11 other categories of taxes that represent lesser portions of the tax revenues of the state.