

TRAFFIC IMPACT ANALYSIS REPORT UPDATE

FOR THE PROPOSED

HOKUA PLACE

KAPA`A, KAUAI, HAWAII

TAX MAP KEY: (4) 4-3-03: 01

APPENDIX B

CAPACITY ANALYSIS WORKSHEETS

EXISTING TRAFFIC CONDITIONS



Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	24	8	36	1	8	4	664	12	3	728	36
Future Volume (vph)	8	24	8	36	1	8	4	664	12	3	728	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1621	1501	1589	0	1631	1760	0	0	1799	0
Flt Permitted			0.962				0.367				0.998	
Satd. Flow (perm)	0	0	1582	1420	1526	0	630	1760	0	0	1795	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				36	374							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1113			697	
Travel Time (s)			9.5					25.3			15.8	
Confl. Peds. (#/hr)	2	4		7	4	4	4		7	4		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	15%	0%	4%	0%	6%	9%	4%	0%	0%	1%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	40	36	1	0	12	676	0	0	771	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4				5				6	
Permitted Phases	4	4		4	8	5	2	2		6		
Detector Phase	4	4	4	4	8	5	5	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	3.0	3.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	7.0	7.0	26.0		34.0	34.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0	8.0	8.0	178.0		170.0	170.0	
Total Split (%)	15.2%	15.2%	15.2%	15.2%	15.2%	3.8%	3.8%	84.8%		81.0%	81.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.0	1.0	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)			6.0	6.0	6.0		4.0	6.0			6.0	
Lead/Lag						Lead	Lead			Lag	Lag	
Lead-Lag Optimize?						Yes	Yes					
Recall Mode	None	None	None	None	None	None	None	C-Max		C-Max	C-Max	
Act Effct Green (s)			10.9	10.9	10.9		191.7	190.9			187.0	
Actuated g/C Ratio			0.05	0.05	0.05		0.91	0.91			0.89	
v/c Ratio			0.49	0.34	0.00		0.02	0.42			0.48	
Control Delay			115.8	31.5	0.0		1.3	2.8			4.5	
Queue Delay			0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay			115.8	31.5	0.0		1.3	2.8			4.5	
LOS			F	C	A		A	A			A	
Approach Delay			75.8					2.8			4.5	



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	4
Future Volume (vph)	4
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	4
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	



Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS			E					A			A	
Queue Length 50th (ft)			55	0	0		1	127			157	
Queue Length 95th (ft)			103	44	0		4	201			360	
Internal Link Dist (ft)			337					1033			617	
Turn Bay Length (ft)							60					
Base Capacity (vph)			195	207	516		602	1600			1598	
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.21	0.17	0.00		0.02	0.42			0.48	

Intersection Summary

Area Type: Other

Cycle Length: 210

Actuated Cycle Length: 210

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 7.3

Intersection LOS: A

Intersection Capacity Utilization 66.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huluhili St

	Ø2 (R)			Ø4
178 s			32 s	
	Ø6 (R)			Ø8
8 s	170 s		32 s	



Lane Group	SBR2
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection

Int Delay, s/veh 2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	100	264	16	40	100	8
Future Vol, veh/h	100	264	16	40	100	8
Conflicting Peds, #/hr	0	0	0	0	1	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	100	100	100	100	100	100
Heavy Vehicles, %	3	6	17	0	6	9
Mvmt Flow	100	264	16	40	100	8

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	364
Stage 1	-	-	232
Stage 2	-	-	73
Critical Hdwy	-	-	4.27
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	-	-	2.353
Pot Cap-1 Maneuver	-	-	1116
Stage 1	-	-	797
Stage 2	-	-	940
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1116
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	785
Stage 2	-	-	939

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	676	-	-	1116	-
HCM Lane V/C Ratio	0.16	-	-	0.014	-
HCM Control Delay (s)	11.3	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Intersection

Int Delay, s/veh 4.4

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	368	360	116	12	7	84
Future Vol, veh/h	368	360	116	12	7	84
Conflicting Peds, #/hr	7	0	0	7	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	100	100	100	100	100	100
Heavy Vehicles, %	1	5	20	0	0	8
Mvmt Flow	368	360	116	12	7	84

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	135	0	1225
Stage 1	-	-	129
Stage 2	-	-	1096
Critical Hdwy	4.11	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.209	-	3.5
Pot Cap-1 Maneuver	1456	-	199
Stage 1	-	-	902
Stage 2	-	-	323
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1447	-	134
Mov Cap-2 Maneuver	-	-	134
Stage 1	-	-	612
Stage 2	-	-	321

Approach	EB	WB	SW
HCM Control Delay, s	4.2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	1447	-	-	-	625
HCM Lane V/C Ratio	0.254	-	-	-	0.146
HCM Control Delay (s)	8.3	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	1	-	-	-	0.5

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	8	716	188	12	12	24
Future Vol, veh/h	8	716	188	12	12	24
Conflicting Peds, #/hr	6	0	0	6	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	100	100	100	100	100	100
Heavy Vehicles, %	0	2	4	14	24	19
Mvmt Flow	8	716	188	12	12	24

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	206	0	932
Stage 1	-	-	200
Stage 2	-	-	732
Critical Hdwy	4.1	-	6.64
Critical Hdwy Stg 1	-	-	5.64
Critical Hdwy Stg 2	-	-	5.64
Follow-up Hdwy	2.2	-	3.716
Pot Cap-1 Maneuver	1377	-	270
Stage 1	-	-	784
Stage 2	-	-	438
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1370	-	265
Mov Cap-2 Maneuver	-	-	265
Stage 1	-	-	772
Stage 2	-	-	436

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1370	-	-	-	477
HCM Lane V/C Ratio	0.006	-	-	-	0.075
HCM Control Delay (s)	7.6	0	-	-	13.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	344	2	16	672	764	68
Future Volume (Veh/h)	344	2	16	672	764	68
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	344	2	16	672	764	68
Pedestrians	8					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)					2	
Upstream signal (ft)				697		
pX, platoon unblocked	0.93					
vC, conflicting volume	1476	772	772			
vC1, stage 1 conf vol	772					
vC2, stage 2 conf vol	704					
vCu, unblocked vol	1474	772	772			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	16	99	98			
cM capacity (veh/h)	409	400	846			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	346	16	672	764	68	
Volume Left	344	16	0	0	0	
Volume Right	2	0	0	0	68	
cSH	409	846	1700	1700	1700	
Volume to Capacity	0.85	0.02	0.40	0.45	0.04	
Queue Length 95th (ft)	203	1	0	0	0	
Control Delay (s)	46.6	9.3	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	46.6	0.2		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay			8.7			
Intersection Capacity Utilization			66.1%	ICU Level of Service	C	
Analysis Period (min)			15			

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	1	0	1	0	4	88	748	20	7	713	4
Future Vol, veh/h	0	1	0	1	0	4	88	748	20	7	713	4
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	16	16	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	11	5	4	0	2	2	2
Mvmt Flow	0	1	0	1	0	4	88	748	20	7	713	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1668	1689	715	1680	1681	777	717	0	0	784	0	0
Stage 1	729	729	-	950	950	-	-	-	-	-	-	-
Stage 2	939	960	-	730	731	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.31	4.15	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.399	2.245	-	-	2.218	-	-
Pot Cap-1 Maneuver	77	94	434	76	96	383	870	-	-	834	-	-
Stage 1	417	431	-	315	341	-	-	-	-	-	-	-
Stage 2	320	338	-	417	430	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	70	83	434	68	84	377	870	-	-	822	-	-
Mov Cap-2 Maneuver	70	83	-	68	84	-	-	-	-	-	-	-
Stage 1	375	427	-	279	302	-	-	-	-	-	-	-
Stage 2	284	299	-	412	426	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	48.9	23.7	1	0.1
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	870	-	-	83 198	822	-	-
HCM Lane V/C Ratio	0.101	-	-	0.012 0.025	0.009	-	-
HCM Control Delay (s)	9.6	-	-	48.9 23.7	9.4	-	-
HCM Lane LOS	A	-	-	E C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0 0.1	0	-	-

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	
Traffic Vol, veh/h	4	1	12	0	2	92	0	0	0	0	204	8
Future Vol, veh/h	4	1	12	0	2	92	0	0	0	0	204	8
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	0	0	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	5	0	0	0	0	4	17
Mvmt Flow	4	1	12	0	2	92	0	0	0	0	204	8

Major/Minor	Minor2			Minor1			Major2		
Conflicting Flow All	266	215	215	215	219	4	0	0	0
Stage 1	215	215	-	0	0	-	-	-	-
Stage 2	51	0	-	215	219	-	-	-	-
Critical Hdwy	7.1	6.5	6.37	7.1	6.5	6.25	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.453	3.5	4	3.345	2.2	-	-
Pot Cap-1 Maneuver	691	686	789	746	683	1071	-	-	-
Stage 1	792	729	-	-	-	-	-	-	-
Stage 2	-	-	-	792	726	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	624	682	784	734	679	1067	-	-	-
Mov Cap-2 Maneuver	624	682	-	734	679	-	-	-	-
Stage 1	792	725	-	-	-	-	-	-	-
Stage 2	-	-	-	779	722	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	10	8.8	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	733	1054	-	-	-
HCM Lane V/C Ratio	0.023	0.089	-	-	-
HCM Control Delay (s)	10	8.8	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0.3	-	-	-

Intersection				
Intersection Delay, s/veh	20.0			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	652	228	136	724
Demand Flow Rate, veh/h	669	247	138	732
Vehicles Circulating, veh/h	556	129	628	348
Vehicles Exiting, veh/h	524	637	597	28
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	30.0	5.1	7.1	18.2
Approach LOS	D	A	A	C
Lane	Left	Left	Left	Left
Designated Moves	LTR	LT	LTR	LTR
Assumed Moves	LTR	LT	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	669	247	138	732
Cap Entry Lane, veh/h	783	1210	727	968
Entry HV Adj Factor	0.975	0.922	0.986	0.989
Flow Entry, veh/h	652	228	136	724
Cap Entry, veh/h	763	1115	717	957
V/C Ratio	0.855	0.204	0.190	0.757
Control Delay, s/veh	30.0	5.1	7.1	18.2
LOS	D	A	A	C
95th %tile Queue, veh	10	1	1	7

Intersection

Int Delay, s/veh 12.3

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	68	416	40	104	300	17
Future Vol, veh/h	68	416	40	104	300	17
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	100	100	100	100	100	100
Heavy Vehicles, %	9	1	0	2	2	0
Mvmt Flow	68	416	40	104	300	17

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	144	0	92
Stage 1	-	-	92
Stage 2	-	-	552
Critical Hdwy	4.19	-	6.2
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.281	-	3.3
Pot Cap-1 Maneuver	1397	-	971
Stage 1	-	-	932
Stage 2	-	-	577
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1397	-	971
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	873
Stage 2	-	-	577

Approach	EB	WB	SE
HCM Control Delay, s	1.1	0	35.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	1397	-	-	-	422
HCM Lane V/C Ratio	0.049	-	-	-	0.751
HCM Control Delay (s)	7.7	0	-	-	35.1
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.2	-	-	-	6.2

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	8	304	140	32	13	0
Future Vol, veh/h	8	304	140	32	13	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	2	11	0	0	0
Mvmt Flow	8	304	140	32	13	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	172	0	476
Stage 1	-	-	156
Stage 2	-	-	320
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1417	-	551
Stage 1	-	-	877
Stage 2	-	-	741
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1417	-	547
Mov Cap-2 Maneuver	-	-	547
Stage 1	-	-	871
Stage 2	-	-	741

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1417	-	-	-	547
HCM Lane V/C Ratio	0.006	-	-	-	0.024
HCM Control Delay (s)	7.6	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection



















Int Delay, s/veh 0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↗
Traffic Vol, veh/h	4	736	100	620	800	4
Future Vol, veh/h	4	736	100	620	800	4
Conflicting Peds, #/hr	1	0	0	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	3	2	3	3	0
Mvmt Flow	4	736	100	620	800	4

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1312	801	0
Stage 1	801	-	-
Stage 2	511	-	-
Critical Hdwy	6.9	4.13	-
Critical Hdwy Stg 1	5.7	-	-
Critical Hdwy Stg 2	6.1	-	-
Follow-up Hdwy	3.69	2.219	-
Pot Cap-1 Maneuver	144	820	-
Stage 1	402	-	-
Stage 2	527	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	126	819	-
Mov Cap-2 Maneuver	233	-	-
Stage 1	353	-	-
Stage 2	526	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.7	1.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	819	-	233	-	-	-
HCM Lane V/C Ratio	0.122	-	0.017	-	-	-
HCM Control Delay (s)	10	-	20.7	0	-	-
HCM Lane LOS	B	-	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	0.1	-	-	-

												
Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	20	8	36	8	60	56	548	16	3	580	32
Future Volume (vph)	16	20	8	36	8	60	56	548	16	3	580	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1765	1561	1589	0	1745	1821	0	0	1770	0
Flt Permitted			0.961				0.397				0.998	
Satd. Flow (perm)	0	0	1489	1324	1423	0	679	1821	0	0	1766	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				64	340							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1123			607	
Travel Time (s)			9.5					25.5			13.8	
Confl. Peds. (#/hr)	37	30		47	30	30	75		49	49		30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	44	36	8	0	116	564	0	0	643	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4				5				6	
Permitted Phases	4	4		4	8	5	2	2		6		
Detector Phase	4	4	4	4	8	5	5	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	4.0	4.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	8.0	8.0	26.0		34.0	34.0	
Total Split (s)	28.0	28.0	28.0	28.0	28.0	8.0	8.0	92.0		84.0	84.0	
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%	6.7%	6.7%	76.7%		70.0%	70.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.5	3.5	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	0.5	0.5	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)			6.0	6.0	6.0		4.0	6.0			6.0	
Lead/Lag						Lead	Lead			Lag	Lag	
Lead-Lag Optimize?						Yes	Yes					
Recall Mode	None	None	None	None	None	None	None	C-Max		C-Max	C-Max	
Act Effct Green (s)			9.3	9.3	9.3		103.3	102.5			90.5	
Actuated g/C Ratio			0.08	0.08	0.08		0.86	0.85			0.75	
v/c Ratio			0.39	0.22	0.02		0.18	0.36			0.48	
Control Delay			61.6	6.9	0.1		2.4	3.4			8.2	
Queue Delay			0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay			61.6	6.9	0.1		2.4	3.4			8.2	
LOS			E	A	A		A	A			A	
Approach Delay			37.0					3.2			8.2	



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	28
Future Volume (vph)	28
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	35
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	



Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS			D					A			A	
Queue Length 50th (ft)			33	0	0		11	85			181	
Queue Length 95th (ft)			71	12	0		25	147			302	
Internal Link Dist (ft)			337					1043			527	
Turn Bay Length (ft)							60					
Base Capacity (vph)			272	295	538		645	1556			1332	
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.16	0.12	0.01		0.18	0.36			0.48	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 7.4

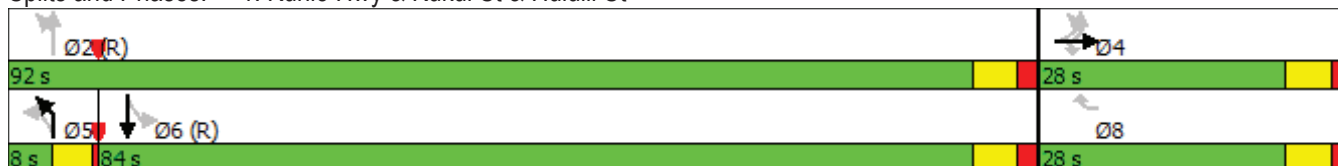
Intersection LOS: A

Intersection Capacity Utilization 95.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huliuli St





Lane Group	SBR2
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection

Int Delay, s/veh 7.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	112	308	12	48	340	32
Future Vol, veh/h	112	308	12	48	340	32
Conflicting Peds, #/hr	0	4	4	0	0	3
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	100	100	100	100	100	100
Heavy Vehicles, %	2	4	4	6	1	0
Mvmt Flow	112	308	12	48	340	32

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	424	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	4.14	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	2.236	-
Pot Cap-1 Maneuver	-	-	1125	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	1121	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	656	-	-	1121	-
HCM Lane V/C Ratio	0.567	-	-	0.011	-
HCM Control Delay (s)	17.4	-	-	8.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.6	-	-	0	-

Intersection

Int Delay, s/veh 12.9

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	328	220	372	84	48	236
Future Vol, veh/h	328	220	372	84	48	236
Conflicting Peds, #/hr	15	0	0	15	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	100	100	100	100	100	100
Heavy Vehicles, %	3	3	1	2	2	1
Mvmt Flow	328	220	372	84	48	236

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	471	0	1305
Stage 1	-	-	429
Stage 2	-	-	876
Critical Hdwy	4.13	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.227	-	3.518
Pot Cap-1 Maneuver	1086	-	177
Stage 1	-	-	657
Stage 2	-	-	407
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1072	-	112
Mov Cap-2 Maneuver	-	-	112
Stage 1	-	-	422
Stage 2	-	-	402

Approach	EB	WB	SW
HCM Control Delay, s	5.9	0	47
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	1072	-	-	-	351
HCM Lane V/C Ratio	0.306	-	-	-	0.809
HCM Control Delay (s)	9.8	0	-	-	47
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	1.3	-	-	-	7

Intersection

Int Delay, s/veh 0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	36	532	548	60	16	24
Future Vol, veh/h	36	532	548	60	16	24
Conflicting Peds, #/hr	2	0	0	2	0	58
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	100	100	100	100	100	100
Heavy Vehicles, %	13	3	1	0	0	6
Mvmt Flow	36	532	548	60	16	24

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	610	0	1184
Stage 1	-	-	580
Stage 2	-	-	604
Critical Hdwy	4.23	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.317	-	3.5
Pot Cap-1 Maneuver	917	-	211
Stage 1	-	-	564
Stage 2	-	-	550
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	915	-	198
Mov Cap-2 Maneuver	-	-	198
Stage 1	-	-	531
Stage 2	-	-	549

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	19
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	915	-	-	-	297
HCM Lane V/C Ratio	0.039	-	-	-	0.135
HCM Control Delay (s)	9.1	0	-	-	19
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	296	3	20	640	656	152
Future Volume (Veh/h)	296	3	20	640	656	152
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	296	3	20	640	656	152
Pedestrians	19					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)					2	
Upstream signal (ft)				607		
pX, platoon unblocked	0.93					
vC, conflicting volume	1355	675	675			
vC1, stage 1 conf vol	675					
vC2, stage 2 conf vol	680					
vCu, unblocked vol	1344	675	675			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	32	99	98			
cM capacity (veh/h)	437	450	910			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	299	20	640	656	152	
Volume Left	296	20	0	0	0	
Volume Right	3	0	0	0	152	
cSH	437	910	1700	1700	1700	
Volume to Capacity	0.68	0.02	0.38	0.39	0.09	
Queue Length 95th (ft)	126	2	0	0	0	
Control Delay (s)	29.2	9.0	0.0	0.0	0.0	
Lane LOS	D	A				
Approach Delay (s)	29.2	0.3		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			57.8%	ICU Level of Service	B	
Analysis Period (min)			15			

Intersection

Int Delay, s/veh 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	0	0	2	0	12	380	652	12	12	608	5
Future Vol, veh/h	1	0	0	2	0	12	380	652	12	12	608	5
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	7	7	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	11	5	4	0	2	2	2
Mvmt Flow	1	0	0	2	0	12	380	652	12	12	608	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2060	2066	611	2060	2062	666	613	0	0	671	0	0
Stage 1	635	635	-	1425	1425	-	-	-	-	-	-	-
Stage 2	1425	1431	-	635	637	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.31	4.15	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.399	2.245	-	-	2.218	-	-
Pot Cap-1 Maneuver	41	55	497	41	55	444	952	-	-	919	-	-
Stage 1	470	476	-	170	203	-	-	-	-	-	-	-
Stage 2	170	202	-	470	475	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	27	32	497	28	32	441	952	-	-	913	-	-
Mov Cap-2 Maneuver	27	32	-	28	32	-	-	-	-	-	-	-
Stage 1	282	470	-	101	121	-	-	-	-	-	-	-
Stage 2	99	121	-	464	469	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	143.4	33.1	4.1	0.2
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	952	-	-	27 142	913	-	-
HCM Lane V/C Ratio	0.399	-	-	0.037 0.099	0.013	-	-
HCM Control Delay (s)	11.3	-	-	143.4 33.1	9	-	-
HCM Lane LOS	B	-	-	F D	A	-	-
HCM 95th %tile Q(veh)	1.9	-	-	0.1 0.3	0	-	-

Intersection

Int Delay, s/veh 7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	
Traffic Vol, veh/h	8	1	0	3	2	384	0	0	0	0	200	4
Future Vol, veh/h	8	1	0	3	2	384	0	0	0	0	200	4
Conflicting Peds, #/hr	13	0	0	0	0	13	0	0	0	7	0	16
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	5	0	0	0	0	4	17
Mvmt Flow	8	1	0	3	2	384	0	0	0	0	200	4

Major/Minor	Minor2			Minor1			Major2					
Conflicting Flow All	424	225	218	210	227	20				7	0	0
Stage 1	218	218	-	7	7	-				-	-	-
Stage 2	206	7	-	203	220	-				-	-	-
Critical Hdwy	7.1	6.5	6.37	7.1	6.5	6.25				4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-				-	-	-
Follow-up Hdwy	3.5	4	3.453	3.5	4	3.345				2.2	-	-
Pot Cap-1 Maneuver	544	678	786	752	676	1049				1627	-	-
Stage 1	789	726	-	-	-	-				-	-	-
Stage 2	-	-	-	804	725	-				-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	332	664	775	747	662	1031				1617	-	-
Mov Cap-2 Maneuver	332	664	-	747	662	-				-	-	-
Stage 1	789	716	-	-	-	-				-	-	-
Stage 2	-	-	-	803	715	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	15.5	10.6	0
HCM LOS	C	B	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	352	1025	1617	-	-
HCM Lane V/C Ratio	0.026	0.38	-	-	-
HCM Control Delay (s)	15.5	10.6	0	-	-
HCM Lane LOS	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	1.8	0	-	-

Intersection				
Intersection Delay, s/veh	14.2			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	260	552	640	392
Demand Flow Rate, veh/h	278	564	640	407
Vehicles Circulating, veh/h	439	333	262	892
Vehicles Exiting, veh/h	860	569	455	5
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.9	11.5	11.5	26.6
Approach LOS	A	B	B	D
Lane	Left	Left	Left	Left
Designated Moves	LTR	LT	LTR	LTR
Assumed Moves	LTR	LT	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	278	564	640	407
Cap Entry Lane, veh/h	882	983	1056	556
Entry HV Adj Factor	0.937	0.979	1.000	0.964
Flow Entry, veh/h	260	552	640	392
Cap Entry, veh/h	826	962	1056	536
V/C Ratio	0.315	0.574	0.606	0.733
Control Delay, s/veh	7.9	11.5	11.5	26.6
LOS	A	B	B	D
95th %tile Queue, veh	1	4	4	6

Intersection

Int Delay, s/veh 4.1

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	52	116	276	280	120	68
Future Vol, veh/h	52	116	276	280	120	68
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	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	1	2	0
Mvmt Flow	52	116	276	280	120	68

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	556	0	416
Stage 1	-	-	416
Stage 2	-	-	220
Critical Hdwy	4.1	-	6.2
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.2	-	3.3
Pot Cap-1 Maneuver	1025	-	641
Stage 1	-	-	666
Stage 2	-	-	817
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1025	-	641
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	630
Stage 2	-	-	817

Approach	EB	WB	SE
HCM Control Delay, s	2.7	0	17.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	1025	-	-	-	478
HCM Lane V/C Ratio	0.051	-	-	-	0.393
HCM Control Delay (s)	8.7	0	-	-	17.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.9

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑		↘	
Traffic Vol, veh/h	4	176	288	44	12	1
Future Vol, veh/h	4	176	288	44	12	1
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	100	100	100	100	100	100
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	4	176	288	44	12	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	332	0	494
Stage 1	-	-	310
Stage 2	-	-	184
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1239	-	538
Stage 1	-	-	748
Stage 2	-	-	852
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1239	-	536
Mov Cap-2 Maneuver	-	-	536
Stage 1	-	-	745
Stage 2	-	-	852

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1239	-	-	-	547
HCM Lane V/C Ratio	0.003	-	-	-	0.024
HCM Control Delay (s)	7.9	0	-	-	11.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection

Int Delay, s/veh 6.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘ ↗	↗	↗	↗
Traffic Vol, veh/h	24	360	664	748	446	78
Future Vol, veh/h	24	360	664	748	446	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	1	3	1
Mvmt Flow	24	360	664	748	446	78

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2148	446	446
Stage 1	446	-	-
Stage 2	1702	-	-
Critical Hdwy	6.6	6.23	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.8	-	-
Follow-up Hdwy	3.5	3.319	2.2
Pot Cap-1 Maneuver	48	611	1125
Stage 1	649	-	-
Stage 2	136	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 20	611	1125
Mov Cap-2 Maneuver	426	-	-
Stage 1	266	-	-
Stage 2	136	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.7	6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1125	-	426	611	-	-
HCM Lane V/C Ratio	0.59	-	0.056	0.589	-	-
HCM Control Delay (s)	12.7	-	14	19	-	-
HCM Lane LOS	B	-	B	C	-	-
HCM 95th %tile Q(veh)	4	-	0.2	3.8	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

TRAFFIC IMPACT ANALYSIS REPORT UPDATE

FOR THE PROPOSED

HOKUA PLACE



















KAPA`A, KAUAI, HAWAII

TAX MAP KEY: (4) 4-3-03: 01

APPENDIX C

CAPACITY ANALYSIS WORKSHEETS

PEAK HOUR TRAFFIC WITHOUT PROJECT

												
Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	27	9	41	1	9	5	751	14	3	824	41
Future Volume (vph)	9	27	9	41	1	9	5	751	14	3	824	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1621	1501	1589	0	1630	1761	0	0	1800	0
Flt Permitted			0.962				0.320				0.998	
Satd. Flow (perm)	0	0	1602	1447	1542	0	547	1761	0	0	1797	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				76	246							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1113			697	
Travel Time (s)			9.5					25.3			15.8	
Confl. Peds. (#/hr)	2	4		7	4	4	4		7	4		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	15%	0%	4%	0%	6%	9%	4%	0%	0%	1%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	45	41	1	0	14	765	0	0	873	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4				5				6	
Permitted Phases	4	4		4	8	5	2	2		6		
Detector Phase	4	4	4	4	8	5	5	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	1.0	1.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	5.0	5.0	26.0		34.0	34.0	
Total Split (s)	27.0	27.0	27.0	27.0	27.0	5.0	5.0	73.0		68.0	68.0	
Total Split (%)	27.0%	27.0%	27.0%	27.0%	27.0%	5.0%	5.0%	73.0%		68.0%	68.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.0	1.0	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)			6.0	6.0	6.0		4.0	6.0			6.0	
Lead/Lag						Lead	Lead			Lag	Lag	
Lead-Lag Optimize?						Yes	Yes					
Recall Mode	None	None	None	None	None	None	None	C-Max		C-Max	C-Max	
Act Effct Green (s)			8.6	8.6	8.6		84.0	83.2			81.2	
Actuated g/C Ratio			0.09	0.09	0.09		0.84	0.83			0.81	
v/c Ratio			0.33	0.21	0.00		0.03	0.52			0.60	
Control Delay			48.8	5.1	0.0		2.1	5.1			7.9	
Queue Delay			0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay			48.8	5.1	0.0		2.1	5.1			7.9	
LOS			D	A	A		A	A			A	
Approach Delay			27.9					5.1			7.9	
Approach LOS			C					A			A	
Queue Length 50th (ft)			28	0	0		1	134			168	
Queue Length 95th (ft)			61	10	0		5	241			480	
Internal Link Dist (ft)			337					1033			617	
Turn Bay Length (ft)							60					



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	4
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	



Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)			336	363	518		520	1464			1458	
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.13	0.11	0.00		0.03	0.52			0.60	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	7.6
Intersection LOS:	A
Intersection Capacity Utilization:	70.9%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huluhili St





Lane Group	SBR2
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection

Int Delay, s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	118	311	19	47	118	9
Future Vol, veh/h	118	311	19	47	118	9
Conflicting Peds, #/hr	0	0	0	0	1	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	100	100	100	100	100	100
Heavy Vehicles, %	3	6	17	0	6	9
Mvmt Flow	118	311	19	47	118	9

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	429
Stage 1	-	-	274
Stage 2	-	-	86
Critical Hdwy	-	-	4.27
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	-	-	2.353
Pot Cap-1 Maneuver	-	-	1055
Stage 1	-	-	763
Stage 2	-	-	927
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1055
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	749
Stage 2	-	-	926

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	627	-	-	1055	-
HCM Lane V/C Ratio	0.203	-	-	0.018	-
HCM Control Delay (s)	12.2	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection

Int Delay, s/veh 4.6

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	413	404	130	13	8	94
Future Vol, veh/h	413	404	130	13	8	94
Conflicting Peds, #/hr	7	0	0	7	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	100	100	100	100	100	100
Heavy Vehicles, %	1	5	20	0	0	8
Mvmt Flow	413	404	130	13	8	94

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	150	0	1374
Stage 1	-	-	144
Stage 2	-	-	1230
Critical Hdwy	4.11	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.209	-	3.5
Pot Cap-1 Maneuver	1437	-	162
Stage 1	-	-	888
Stage 2	-	-	279
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1428	-	100
Mov Cap-2 Maneuver	-	-	100
Stage 1	-	-	553
Stage 2	-	-	277

Approach	EB	WB	SW
HCM Control Delay, s	4.3	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	1428	-	-	-	547
HCM Lane V/C Ratio	0.289	-	-	-	0.186
HCM Control Delay (s)	8.5	0	-	-	13.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	1.2	-	-	-	0.7

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	9	803	211	13	13	27
Future Vol, veh/h	9	803	211	13	13	27
Conflicting Peds, #/hr	6	0	0	6	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	100	100	100	100	100	100
Heavy Vehicles, %	0	2	4	14	24	19
Mvmt Flow	9	803	211	13	13	27

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	230	0	1045
Stage 1	-	-	224
Stage 2	-	-	821
Critical Hdwy	4.1	-	6.64
Critical Hdwy Stg 1	-	-	5.64
Critical Hdwy Stg 2	-	-	5.64
Follow-up Hdwy	2.2	-	3.716
Pot Cap-1 Maneuver	1350	-	230
Stage 1	-	-	764
Stage 2	-	-	397
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1343	-	225
Mov Cap-2 Maneuver	-	-	225
Stage 1	-	-	751
Stage 2	-	-	395

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1343	-	-	-	431
HCM Lane V/C Ratio	0.007	-	-	-	0.093
HCM Control Delay (s)	7.7	0	-	-	14.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	389	2	18	760	864	91
Future Volume (Veh/h)	389	2	18	760	864	91
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	389	2	18	760	864	91
Pedestrians	8					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)					2	
Upstream signal (ft)				697		
pX, platoon unblocked	0.84					
vC, conflicting volume	1668	872	872			
vC1, stage 1 conf vol	872					
vC2, stage 2 conf vol	796					
vCu, unblocked vol	1700	872	872			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	99	98			
cM capacity (veh/h)	359	350	776			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	391	18	760	864	91	
Volume Left	389	18	0	0	0	
Volume Right	2	0	0	0	91	
cSH	359	776	1700	1700	1700	
Volume to Capacity	1.09	0.02	0.45	0.51	0.05	
Queue Length 95th (ft)	356	2	0	0	0	
Control Delay (s)	107.8	9.7	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	107.8	0.2		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay			19.9			
Intersection Capacity Utilization			73.8%	ICU Level of Service	D	
Analysis Period (min)			15			

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	1	0	1	0	5	100	846	23	8	783	5
Future Vol, veh/h	0	1	0	1	0	5	100	846	23	8	783	5
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	16	16	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	11	5	4	0	2	2	2
Mvmt Flow	0	1	0	1	0	5	100	846	23	8	783	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1865	1887	786	1876	1878	877	788	0	0	885	0	0
Stage 1	802	802	-	1074	1074	-	-	-	-	-	-	-
Stage 2	1063	1085	-	802	804	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.31	4.15	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.399	2.245	-	-	2.218	-	-
Pot Cap-1 Maneuver	56	71	395	55	72	335	818	-	-	765	-	-
Stage 1	381	399	-	269	299	-	-	-	-	-	-	-
Stage 2	272	295	-	381	398	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	49	61	395	48	62	329	818	-	-	754	-	-
Mov Cap-2 Maneuver	49	61	-	48	62	-	-	-	-	-	-	-
Stage 1	335	395	-	233	259	-	-	-	-	-	-	-
Stage 2	235	255	-	376	394	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	65	27.4	1	0.1
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	818	-	-	61 167	754	-	-
HCM Lane V/C Ratio	0.122	-	-	0.016 0.036	0.011	-	-
HCM Control Delay (s)	10	-	-	65 27.4	9.8	-	-
HCM Lane LOS	B	-	-	F D	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.1 0.1	0	-	-

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	
Traffic Vol, veh/h	5	1	14	0	2	104	0	0	0	0	231	9
Future Vol, veh/h	5	1	14	0	2	104	0	0	0	0	231	9
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	0	0	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	5	0	0	0	0	4	17
Mvmt Flow	5	1	14	0	2	104	0	0	0	0	231	9

Major/Minor	Minor2			Minor1			Major2				
Conflicting Flow All	300	243	243	243	247	4			0	0	0
Stage 1	243	243	-	0	0	-			-	-	-
Stage 2	57	0	-	243	247	-			-	-	-
Critical Hdwy	7.1	6.5	6.37	7.1	6.5	6.25			4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	-	-	-			-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-			-	-	-
Follow-up Hdwy	3.5	4	3.453	3.5	4	3.345			2.2	-	-
Pot Cap-1 Maneuver	656	662	760	715	659	1071			-	-	-
Stage 1	765	708	-	-	-	-			-	-	-
Stage 2	-	-	-	765	706	-			-	-	-
Platoon blocked, %											
Mov Cap-1 Maneuver	585	658	755	701	655	1067			-	-	-
Mov Cap-2 Maneuver	585	658	-	701	655	-			-	-	-
Stage 1	765	704	-	-	-	-			-	-	-
Stage 2	-	-	-	750	702	-			-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	10.3	8.8	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	699	1054	-	-	-
HCM Lane V/C Ratio	0.029	0.101	-	-	-
HCM Control Delay (s)	10.3	8.8	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0.3	-	-	-

Intersection				
Intersection Delay, s/veh	38.7			
Intersection LOS	E			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	730	256	116	812
Demand Flow Rate, veh/h	750	278	117	822
Vehicles Circulating, veh/h	624	144	705	391
Vehicles Exiting, veh/h	589	678	669	31
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	64.9	5.4	7.4	30.1
Approach LOS	F	A	A	D
Lane	Left	Left	Left	Left
Designated Moves	LTR	LT	LTR	LTR
Assumed Moves	LTR	LT	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	750	278	117	822
Cap Entry Lane, veh/h	730	1191	672	926
Entry HV Adj Factor	0.974	0.922	0.991	0.988
Flow Entry, veh/h	730	256	116	812
Cap Entry, veh/h	711	1099	667	915
V/C Ratio	1.027	0.233	0.174	0.888
Control Delay, s/veh	64.9	5.4	7.4	30.1
LOS	F	A	A	D
95th %tile Queue, veh	18	1	1	12

Intersection

Int Delay, s/veh 7.8

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	80	490	353	20	47	122
Future Vol, veh/h	80	490	353	20	47	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	2	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	9	1	2	0	0	2
Mvmt Flow	80	490	353	20	47	122

Major/Minor

	Minor2	Major2		
Conflicting Flow All	216	122	0	0
Stage 1	216	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.52	6.2	4.1	-
Critical Hdwy Stg 1	5.52	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4.018	3.3	2.2	-
Pot Cap-1 Maneuver	682	935	-	-
Stage 1	724	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	935	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach

	SE	NW
HCM Control Delay, s	11.4	
HCM LOS	B	

Minor Lane/Major Mvmt

	NWL	NWT	SELn1
Capacity (veh/h)	-	-	935
HCM Lane V/C Ratio	-	-	0.399
HCM Control Delay (s)	-	-	11.4
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	1.9

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	8	358	165	38	15	0
Future Vol, veh/h	8	358	165	38	15	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	2	11	0	0	0
Mvmt Flow	8	358	165	38	15	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	203	0	184
Stage 1	-	-	184
Stage 2	-	-	374
Critical Hdwy	4.1	-	6.2
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.3
Pot Cap-1 Maneuver	1381	-	864
Stage 1	-	-	852
Stage 2	-	-	700
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1381	-	864
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	846
Stage 2	-	-	700

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1381	-	-	-	491
HCM Lane V/C Ratio	0.006	-	-	-	0.031
HCM Control Delay (s)	7.6	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection



















Int Delay, s/veh 0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↗
Traffic Vol, veh/h	5	833	113	702	905	5
Future Vol, veh/h	5	833	113	702	905	5
Conflicting Peds, #/hr	1	0	0	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	3	2	3	3	0
Mvmt Flow	5	833	113	702	905	5

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1484	906	0
Stage 1	906	-	-
Stage 2	578	-	-
Critical Hdwy	6.9	4.13	-
Critical Hdwy Stg 1	5.7	-	-
Critical Hdwy Stg 2	6.1	-	-
Follow-up Hdwy	3.69	2.219	-
Pot Cap-1 Maneuver	110	749	-
Stage 1	357	-	-
Stage 2	486	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	93	748	-
Mov Cap-2 Maneuver	194	-	-
Stage 1	303	-	-
Stage 2	486	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24	1.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	748	-	194	-	-	-
HCM Lane V/C Ratio	0.151	-	0.026	-	-	-
HCM Control Delay (s)	10.7	-	24	0	-	-
HCM Lane LOS	B	-	C	A	-	-
HCM 95th %tile Q(veh)	0.5	-	0.1	-	-	-

												
Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	23	9	41	9	68	63	620	18	3	656	36
Future Volume (vph)	18	23	9	41	9	68	63	620	18	3	656	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1765	1561	1589	0	1745	1821	0	0	1770	0
Flt Permitted			0.961				0.362				0.998	
Satd. Flow (perm)	0	0	1488	1324	1423	0	626	1821	0	0	1766	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				64	301							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1123			607	
Travel Time (s)			9.5					25.5			13.8	
Confl. Peds. (#/hr)	37	30		47	30	30	75		49	49		30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	50	41	9	0	131	638	0	0	727	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4				5				6	
Permitted Phases	4	4		4	8	5	2	2		6		
Detector Phase	4	4	4	4	8	5	5	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	4.0	4.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	8.0	8.0	26.0		34.0	34.0	
Total Split (s)	27.0	27.0	27.0	27.0	27.0	8.0	8.0	93.0		85.0	85.0	
Total Split (%)	22.5%	22.5%	22.5%	22.5%	22.5%	6.7%	6.7%	77.5%		70.8%	70.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.5	3.5	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	0.5	0.5	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)			6.0	6.0	6.0			4.0		6.0	6.0	
Lead/Lag						Lead	Lead			Lag	Lag	
Lead-Lag Optimize?						Yes	Yes					
Recall Mode	None	None	None	None	None	None	None	C-Max		C-Max	C-Max	
Act Effct Green (s)			9.7	9.7	9.7			102.9	102.1		89.8	
Actuated g/C Ratio			0.08	0.08	0.08			0.86	0.85		0.75	
v/c Ratio			0.42	0.25	0.02			0.22	0.41		0.55	
Control Delay			62.1	8.6	0.1			2.7	3.9		9.6	
Queue Delay			0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay			62.1	8.6	0.1			2.7	3.9		9.6	
LOS			E	A	A			A	A		A	
Approach Delay			38.0					3.7			9.6	
Approach LOS			D					A			A	
Queue Length 50th (ft)			38	0	0			13	105		226	
Queue Length 95th (ft)			77	18	0			29	184		385	
Internal Link Dist (ft)			337					1043			527	
Turn Bay Length (ft)							60					



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	32
Future Volume (vph)	32
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	35
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	



Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)			260	284	497		602	1549			1321	
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.19	0.14	0.02		0.22	0.41			0.55	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.55
Intersection Signal Delay:	8.3
Intersection LOS:	A
Intersection Capacity Utilization:	103.7%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huluhili St





Lane Group	SBR2
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection

Int Delay, s/veh 10.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	131	361	14	56	399	38
Future Vol, veh/h	131	361	14	56	399	38
Conflicting Peds, #/hr	0	4	4	0	0	3
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	100	100	100	100	100	100
Heavy Vehicles, %	2	4	4	6	1	0
Mvmt Flow	131	361	14	56	399	38

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	496
Stage 1	-	-	316
Stage 2	-	-	84
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	5.41
Critical Hdwy Stg 2	-	-	5.41
Follow-up Hdwy	-	-	2.236
Pot Cap-1 Maneuver	-	-	1058
Stage 1	-	-	741
Stage 2	-	-	942
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1054
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	728
Stage 2	-	-	942

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	24.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	607	-	-	1054	-
HCM Lane V/C Ratio	0.72	-	-	0.013	-
HCM Control Delay (s)	24.7	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	6	-	-	0	-

Intersection							
Int Delay, s/veh	46.8						
Movement	EBL	EBT	WBT	WBR	SWL	SWR	
Lane Configurations		↕	↕		↕		
Traffic Vol, veh/h	385	258	436	99	56		277
Future Vol, veh/h	385	258	436	99	56		277
Conflicting Peds, #/hr	15	0	0	15	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	100	100	100	100	100		100
Heavy Vehicles, %	3	3	1	2	2		1
Mvmt Flow	385	258	436	99	56		277
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	550	0	-	0	1529		501
Stage 1	-	-	-	-	501		-
Stage 2	-	-	-	-	1028		-
Critical Hdwy	4.13	-	-	-	6.42		6.21
Critical Hdwy Stg 1	-	-	-	-	5.42		-
Critical Hdwy Stg 2	-	-	-	-	5.42		-
Follow-up Hdwy	2.227	-	-	-	3.518		3.309
Pot Cap-1 Maneuver	1015	-	-	-	129		572
Stage 1	-	-	-	-	609		-
Stage 2	-	-	-	-	345		-
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1002	-	-	-	69		565
Mov Cap-2 Maneuver	-	-	-	-	69		-
Stage 1	-	-	-	-	331		-
Stage 2	-	-	-	-	341		-
Approach	EB		WB		SW		
HCM Control Delay, s	6.5		0		199.9		
HCM LOS					F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1		
Capacity (veh/h)	1002	-	-	-	256		
HCM Lane V/C Ratio	0.384	-	-	-	1.301		
HCM Control Delay (s)	10.8	0	-	-	199.9		
HCM Lane LOS	B	A	-	-	F		
HCM 95th %tile Q(veh)	1.8	-	-	-	17		

Intersection

Int Delay, s/veh 1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	42	624	643	70	19	28
Future Vol, veh/h	42	624	643	70	19	28
Conflicting Peds, #/hr	2	0	0	2	0	58
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	100	100	100	100	100	100
Heavy Vehicles, %	13	3	1	0	0	6
Mvmt Flow	42	624	643	70	19	28

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	715	0	1388
Stage 1	-	-	680
Stage 2	-	-	708
Critical Hdwy	4.23	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.317	-	3.5
Pot Cap-1 Maneuver	837	-	159
Stage 1	-	-	507
Stage 2	-	-	492
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	836	-	146
Mov Cap-2 Maneuver	-	-	146
Stage 1	-	-	467
Stage 2	-	-	491

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	24.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	836	-	-	-	233
HCM Lane V/C Ratio	0.05	-	-	-	0.202
HCM Control Delay (s)	9.5	0	-	-	24.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	332	3	22	718	736	170
Future Volume (Veh/h)	332	3	22	718	736	170
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	332	3	22	718	736	170
Pedestrians	19					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)	2					
Upstream signal (ft)	607					
pX, platoon unblocked	0.91					
vC, conflicting volume	1517	755	755			
vC1, stage 1 conf vol	755					
vC2, stage 2 conf vol	762					
vCu, unblocked vol	1519	755	755			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	16	99	97			
cM capacity (veh/h)	394	405	850			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	335	22	718	736	170	
Volume Left	332	22	0	0	0	
Volume Right	3	0	0	0	170	
cSH	394	850	1700	1700	1700	
Volume to Capacity	0.85	0.03	0.42	0.43	0.10	
Queue Length 95th (ft)	202	2	0	0	0	
Control Delay (s)	48.4	9.3	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	48.4	0.3		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay			8.3			
Intersection Capacity Utilization			64.0%	ICU Level of Service	B	
Analysis Period (min)			15			

Intersection

Int Delay, s/veh 3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	0	0	2	0	14	430	738	14	14	688	5
Future Vol, veh/h	1	0	0	2	0	14	430	738	14	14	688	5
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	7	7	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	11	5	4	0	2	2	2
Mvmt Flow	1	0	0	2	0	14	430	738	14	14	688	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2332	2338	691	2331	2333	753	693	0	0	759	0	0
Stage 1	719	719	-	1612	1612	-	-	-	-	-	-	-
Stage 2	1613	1619	-	719	721	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.31	4.15	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.399	2.245	-	-	2.218	-	-
Pot Cap-1 Maneuver	26	37	448	26	37	395	888	-	-	852	-	-
Stage 1	423	436	-	133	165	-	-	-	-	-	-	-
Stage 2	132	164	-	423	435	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	15	19	448	16	19	392	888	-	-	847	-	-
Mov Cap-2 Maneuver	15	19	-	16	19	-	-	-	-	-	-	-
Stage 1	218	429	-	68	85	-	-	-	-	-	-	-
Stage 2	66	84	-	416	428	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	261.5	47.7	4.7	0.2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	888	-	-	15 100	847	-	-
HCM Lane V/C Ratio	0.484	-	-	0.067 0.16	0.017	-	-
HCM Control Delay (s)	12.8	-	-	261.5 47.7	9.3	-	-
HCM Lane LOS	B	-	-	F E	A	-	-
HCM 95th %tile Q(veh)	2.7	-	-	0.2 0.5	0.1	-	-

Intersection

Int Delay, s/veh 7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	
Traffic Vol, veh/h	9	1	0	2	3	434	0	0	0	0	226	5
Future Vol, veh/h	9	1	0	2	3	434	0	0	0	0	226	5
Conflicting Peds, #/hr	13	0	0	0	0	13	0	0	0	7	0	16
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	5	0	0	0	0	4	17
Mvmt Flow	9	1	0	2	3	434	0	0	0	0	226	5

Major/Minor	Minor2			Minor1			Major2				
Conflicting Flow All	477	252	245	236	254	20			7	0	0
Stage 1	245	245	-	7	7	-			-	-	-
Stage 2	232	7	-	229	247	-			-	-	-
Critical Hdwy	7.1	6.5	6.37	7.1	6.5	6.25			4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	-	-	-			-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-			-	-	-
Follow-up Hdwy	3.5	4	3.453	3.5	4	3.345			2.2	-	-
Pot Cap-1 Maneuver	502	655	758	723	653	1049			1627	-	-
Stage 1	763	707	-	-	-	-			-	-	-
Stage 2	-	-	-	778	706	-			-	-	-
Platoon blocked, %											-
Mov Cap-1 Maneuver	282	642	747	718	640	1031			1617	-	-
Mov Cap-2 Maneuver	282	642	-	718	640	-			-	-	-
Stage 1	763	697	-	-	-	-			-	-	-
Stage 2	-	-	-	777	696	-			-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	17.5	11.1	0
HCM LOS	C	B	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	299	1025	1617	-	-
HCM Lane V/C Ratio	0.033	0.428	-	-	-
HCM Control Delay (s)	17.5	11.1	0	-	-
HCM Lane LOS	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	2.2	0	-	-

Intersection				
Intersection Delay, s/veh	27.7			
Intersection LOS	D			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	306	648	751	460
Demand Flow Rate, veh/h	326	661	751	476
Vehicles Circulating, veh/h	514	391	307	1046
Vehicles Exiting, veh/h	1008	667	533	6
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	16.8	16.9	72.9
Approach LOS	A	C	C	F
Lane	Left	Left	Left	Left
Designated Moves	LTR	LT	LTR	LTR
Assumed Moves	LTR	LT	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	326	661	751	476
Cap Entry Lane, veh/h	817	926	1009	475
Entry HV Adj Factor	0.939	0.980	1.000	0.966
Flow Entry, veh/h	306	648	751	460
Cap Entry, veh/h	767	907	1009	458
V/C Ratio	0.399	0.714	0.744	1.002
Control Delay, s/veh	9.8	16.8	16.9	72.9
LOS	A	C	C	F
95th %tile Queue, veh	2	6	7	13

Intersection

Int Delay, s/veh 5.4

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	61	137	325	330	141	80
Future Vol, veh/h	61	137	325	330	141	80
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	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	1	2	0
Mvmt Flow	61	137	325	330	141	80

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	655	0	490
Stage 1	-	-	490
Stage 2	-	-	259
Critical Hdwy	4.1	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.2	-	3.518
Pot Cap-1 Maneuver	942	-	582
Stage 1	-	-	616
Stage 2	-	-	784
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	942	-	582
Mov Cap-2 Maneuver	-	-	582
Stage 1	-	-	573
Stage 2	-	-	784

Approach	EB	WB	SE
HCM Control Delay, s	2.8	0	23.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	942	-	-	-	411
HCM Lane V/C Ratio	0.065	-	-	-	0.538
HCM Control Delay (s)	9.1	0	-	-	23.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	3.1

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	5	207	339	52	14	1
Future Vol, veh/h	5	207	339	52	14	1
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	100	100	100	100	100	100
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	5	207	339	52	14	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	391	0	582
Stage 1	-	-	365
Stage 2	-	-	217
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1179	-	479
Stage 1	-	-	707
Stage 2	-	-	824
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1179	-	477
Mov Cap-2 Maneuver	-	-	477
Stage 1	-	-	703
Stage 2	-	-	824

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1179	-	-	-	487
HCM Lane V/C Ratio	0.004	-	-	-	0.031
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection

Int Delay, s/veh 8.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↘
Traffic Vol, veh/h	27	404	745	839	503	85
Future Vol, veh/h	27	404	745	839	503	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	1	3	1
Mvmt Flow	27	404	745	839	503	85

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2413	503	503
Stage 1	503	-	-
Stage 2	1910	-	-
Critical Hdwy	6.6	6.23	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.8	-	-
Follow-up Hdwy	3.5	3.319	2.2
Pot Cap-1 Maneuver	32	568	1072
Stage 1	612	-	-
Stage 2	104	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 10	568	1072
Mov Cap-2 Maneuver	231	-	-
Stage 1	187	-	-
Stage 2	104	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.2	7.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1072	-	231	568	-	-
HCM Lane V/C Ratio	0.695	-	0.117	0.711	-	-
HCM Control Delay (s)	15.6	-	22.6	25.4	-	-
HCM Lane LOS	C	-	C	D	-	-
HCM 95th %tile Q(veh)	6	-	0.4	5.8	-	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

TRAFFIC IMPACT ANALYSIS REPORT UPDATE

FOR THE PROPOSED

HOKUA PLACE



















KAPA`A, KAUAI, HAWAII

TAX MAP KEY: (4) 4-3-03: 01

APPENDIX D

CAPACITY ANALYSIS WORKSHEETS

PEAK HOUR TRAFFIC WITH PROJECT

												
Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	37	12	60	1	11	5	751	14	3	824	43
Future Volume (vph)	9	37	12	60	1	11	5	751	14	3	824	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1613	1501	1589	0	1632	1760	0	0	1798	0
Flt Permitted			0.962				0.328				0.998	
Satd. Flow (perm)	0	0	1574	1420	1526	0	560	1760	0	0	1795	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				60	330							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1113			697	
Travel Time (s)			9.5					25.3			15.8	
Confl. Peds. (#/hr)	2	4		7	4	4	4		7	4		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	15%	0%	4%	0%	6%	9%	4%	0%	0%	1%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	58	60	1	0	16	765	0	0	875	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4				5				6	
Permitted Phases	4	4		4	8	5	2	2		6		
Detector Phase	4	4	4	4	8	5	5	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	1.0	1.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	5.0	5.0	26.0		34.0	34.0	
Total Split (s)	30.0	30.0	30.0	30.0	30.0	6.0	6.0	180.0		174.0	174.0	
Total Split (%)	14.3%	14.3%	14.3%	14.3%	14.3%	2.9%	2.9%	85.7%		82.9%	82.9%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.0	1.0	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)			6.0	6.0	6.0		4.0	6.0			6.0	
Lead/Lag						Lead	Lead			Lag	Lag	
Lead-Lag Optimize?						Yes	Yes					
Recall Mode	None	None	None	None	None	None	None	C-Max		C-Max	C-Max	
Act Effct Green (s)			13.1	13.1	13.1		186.9	184.9			179.0	
Actuated g/C Ratio			0.06	0.06	0.06		0.89	0.88			0.85	
v/c Ratio			0.59	0.42	0.00		0.03	0.49			0.57	
Control Delay			118.9	26.1	0.0		1.8	4.1			7.0	
Queue Delay			0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay			118.9	26.1	0.0		1.8	4.1			7.0	
LOS			F	C	A		A	A			A	
Approach Delay			71.7					4.0			7.0	
Approach LOS			E					A			A	
Queue Length 50th (ft)			80	0	0		2	180			342	
Queue Length 95th (ft)			136	56	0		6	284			505	
Internal Link Dist (ft)			337					1033			617	
Turn Bay Length (ft)							60					



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	4
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	

Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)			179	215	466		527	1549				1529
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.32	0.28	0.00		0.03	0.49			0.57	

Intersection Summary

Area Type:	Other
Cycle Length:	210
Actuated Cycle Length:	210
Offset:	202 (96%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	10.0
Intersection LOS:	A
Intersection Capacity Utilization	70.9%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huluilii St

Ø2 (R)	Ø4
180 s	30 s
Ø6 (R)	Ø8
174 s	30 s



Lane Group	SBR2
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection

Int Delay, s/veh 2.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	151	388	19	51	136	9
Future Vol, veh/h	151	388	19	51	136	9
Conflicting Peds, #/hr	0	0	0	0	1	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	100	100	100	100	100	100
Heavy Vehicles, %	3	6	17	0	6	9
Mvmt Flow	151	388	19	51	136	9

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	539
Stage 1	-	-	345
Stage 2	-	-	90
Critical Hdwy	-	-	4.27
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	-	-	2.353
Pot Cap-1 Maneuver	-	-	958
Stage 1	-	-	708
Stage 2	-	-	924
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	958
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	694
Stage 2	-	-	923

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	13.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	565	-	-	958	-
HCM Lane V/C Ratio	0.257	-	-	0.02	-
HCM Control Delay (s)	13.6	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Intersection

Int Delay, s/veh 5.4

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	540	514	152	13	8	108
Future Vol, veh/h	540	514	152	13	8	108
Conflicting Peds, #/hr	7	0	0	7	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	100	100	100	100	100	100
Heavy Vehicles, %	1	5	20	0	0	8
Mvmt Flow	540	514	152	13	8	108

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	172	0	1760
Stage 1	-	-	166
Stage 2	-	-	1594
Critical Hdwy	4.11	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.209	-	3.5
Pot Cap-1 Maneuver	1411	-	94
Stage 1	-	-	868
Stage 2	-	-	185
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1402	-	43
Mov Cap-2 Maneuver	-	-	43
Stage 1	-	-	398
Stage 2	-	-	184

Approach	EB	WB	SW
HCM Control Delay, s	4.7	0	19
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	1402	-	-	-	372
HCM Lane V/C Ratio	0.385	-	-	-	0.312
HCM Control Delay (s)	9.2	0	-	-	19
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	1.8	-	-	-	1.3

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	15	1040	247	13	13	31
Future Vol, veh/h	15	1040	247	13	13	31
Conflicting Peds, #/hr	6	0	0	6	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	100	100	100	100	100	100
Heavy Vehicles, %	0	2	4	14	24	19
Mvmt Flow	15	1040	247	13	13	31

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	266	0	1330
Stage 1	-	-	260
Stage 2	-	-	1070
Critical Hdwy	4.1	-	6.64
Critical Hdwy Stg 1	-	-	5.64
Critical Hdwy Stg 2	-	-	5.64
Follow-up Hdwy	2.2	-	3.716
Pot Cap-1 Maneuver	1310	-	153
Stage 1	-	-	735
Stage 2	-	-	299
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1303	-	147
Mov Cap-2 Maneuver	-	-	147
Stage 1	-	-	711
Stage 2	-	-	298

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	17.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1303	-	-	-	337
HCM Lane V/C Ratio	0.012	-	-	-	0.131
HCM Control Delay (s)	7.8	0	-	-	17.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	516	2	18	760	864	105
Future Volume (Veh/h)	516	2	18	760	864	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	516	2	18	760	864	105
Pedestrians	8					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)					2	
Upstream signal (ft)				697		
pX, platoon unblocked	0.90					
vC, conflicting volume	1668	872	872			
vC1, stage 1 conf vol	872					
vC2, stage 2 conf vol	796					
vCu, unblocked vol	1686	872	872			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	99	98			
cM capacity (veh/h)	362	350	776			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	518	18	760	864	105	
Volume Left	516	18	0	0	0	
Volume Right	2	0	0	0	105	
cSH	362	776	1700	1700	1700	
Volume to Capacity	1.43	0.02	0.45	0.51	0.06	
Queue Length 95th (ft)	669	2	0	0	0	
Control Delay (s)	237.5	9.7	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	237.5	0.2		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay			54.4			
Intersection Capacity Utilization			80.8%	ICU Level of Service	D	
Analysis Period (min)			15			

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	1	0	1	0	5	118	848	23	8	802	5
Future Vol, veh/h	0	1	0	1	0	5	118	848	23	8	802	5
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	16	16	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	11	5	4	0	2	2	2
Mvmt Flow	0	1	0	1	0	5	118	848	23	8	802	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1922	1944	805	1933	1935	879	807	0	0	887	0	0
Stage 1	821	821	-	1112	1112	-	-	-	-	-	-	-
Stage 2	1101	1123	-	821	823	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.31	4.15	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.399	2.245	-	-	2.218	-	-
Pot Cap-1 Maneuver	51	66	386	50	67	334	805	-	-	763	-	-
Stage 1	371	391	-	256	287	-	-	-	-	-	-	-
Stage 2	259	283	-	371	391	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	44	55	386	43	56	328	805	-	-	752	-	-
Mov Cap-2 Maneuver	44	55	-	43	56	-	-	-	-	-	-	-
Stage 1	316	387	-	215	241	-	-	-	-	-	-	-
Stage 2	217	238	-	366	387	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	71.7			29			1.2			0.1		
HCM LOS	F			D								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	805	-	-	55	156	752	-	-				
HCM Lane V/C Ratio	0.147	-	-	0.018	0.038	0.011	-	-				
HCM Control Delay (s)	10.2	-	-	71.7	29	9.8	-	-				
HCM Lane LOS	B	-	-	F	D	A	-	-				
HCM 95th %tile Q(veh)	0.5	-	-	0.1	0.1	0	-	-				

Intersection

Int Delay, s/veh 2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	
Traffic Vol, veh/h	5	1	14	0	2	122	0	0	0	0	308	9
Future Vol, veh/h	5	1	14	0	2	122	0	0	0	0	308	9
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	0	0	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	5	0	0	0	0	4	17
Mvmt Flow	5	1	14	0	2	122	0	0	0	0	308	9

Major/Minor	Minor2			Minor1			Major2				
Conflicting Flow All	386	320	320	320	324	4			0	0	0
Stage 1	320	320	-	0	0	-			-	-	-
Stage 2	66	0	-	320	324	-			-	-	-
Critical Hdwy	7.1	6.5	6.37	7.1	6.5	6.25			4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	-	-	-			-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-			-	-	-
Follow-up Hdwy	3.5	4	3.453	3.5	4	3.345			2.2	-	-
Pot Cap-1 Maneuver	576	600	687	637	597	1071			-	-	-
Stage 1	696	656	-	-	-	-			-	-	-
Stage 2	-	-	-	696	653	-			-	-	-
Platoon blocked, %											
Mov Cap-1 Maneuver	504	596	683	623	593	1067			-	-	-
Mov Cap-2 Maneuver	504	596	-	623	593	-			-	-	-
Stage 1	696	652	-	-	-	-			-	-	-
Stage 2	-	-	-	681	649	-			-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	11	8.9	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	623	1053	-	-	-
HCM Lane V/C Ratio	0.032	0.118	-	-	-
HCM Control Delay (s)	11	8.9	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0.4	-	-	-

Intersection				
Intersection Delay, s/veh	31.9			
Intersection LOS	D			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	595	296	340	855
Demand Flow Rate, veh/h	611	327	349	866
Vehicles Circulating, veh/h	710	112	728	408
Vehicles Exiting, veh/h	564	965	593	31
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	42.1	5.7	14.5	40.7
Approach LOS	E	A	B	E
Lane	Left	Left	Left	Left
Designated Moves	LTR	LT	LTR	LTR
Assumed Moves	LTR	LT	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	611	327	349	866
Cap Entry Lane, veh/h	669	1231	657	910
Entry HV Adj Factor	0.973	0.906	0.974	0.988
Flow Entry, veh/h	595	296	340	855
Cap Entry, veh/h	651	1115	640	899
V/C Ratio	0.913	0.266	0.531	0.951
Control Delay, s/veh	42.1	5.7	14.5	40.7
LOS	E	A	B	E
95th %tile Queue, veh	12	1	3	15

Intersection			
Intersection Delay, s/veh	10.1		
Intersection LOS	B		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	176	569	516
Demand Flow Rate, veh/h	179	580	526
Vehicles Circulating, veh/h	224	56	504
Vehicles Exiting, veh/h	806	347	132
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.8	7.3	15.1
Approach LOS	A	A	C
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	179	580	526
Cap Entry Lane, veh/h	1098	1303	825
Entry HV Adj Factor	0.981	0.981	0.981
Flow Entry, veh/h	176	569	516
Cap Entry, veh/h	1077	1279	810
V/C Ratio	0.163	0.445	0.637
Control Delay, s/veh	4.8	7.3	15.1
LOS	A	A	C
95th %tile Queue, veh	1	2	5

Intersection

Int Delay, s/veh 1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	684	175	3	142	33	24
Future Vol, veh/h	684	175	3	142	33	24
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	684	175	3	142	33	24

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	859
Stage 1	-	-	772
Stage 2	-	-	148
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	782
Stage 1	-	-	456
Stage 2	-	-	880
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	782
Mov Cap-2 Maneuver	-	-	300
Stage 1	-	-	454
Stage 2	-	-	880

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	17.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	335	-	-	782	-
HCM Lane V/C Ratio	0.17	-	-	0.004	-
HCM Control Delay (s)	17.9	-	-	9.6	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Intersection

Int Delay, s/veh 35.5

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	80	506	52	122	353	20
Future Vol, veh/h	80	506	52	122	353	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	9	1	0	2	2	0
Mvmt Flow	80	506	52	122	353	20

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	174	0	779
Stage 1	-	-	113
Stage 2	-	-	666
Critical Hdwy	4.19	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.281	-	3.518
Pot Cap-1 Maneuver	1361	-	364
Stage 1	-	-	912
Stage 2	-	-	511
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1361	-	~ 334
Mov Cap-2 Maneuver	-	-	~ 334
Stage 1	-	-	837
Stage 2	-	-	511

Approach	EB	WB	SE
HCM Control Delay, s	1.1	0	106.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	1361	-	-	-	346
HCM Lane V/C Ratio	0.059	-	-	-	1.078
HCM Control Delay (s)	7.8	0	-	-	106.1
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	13.6

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	8	358	165	38	15	0
Future Vol, veh/h	8	358	165	38	15	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	2	11	0	0	0
Mvmt Flow	8	358	165	38	15	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	203	0	184
Stage 1	-	-	184
Stage 2	-	-	374
Critical Hdwy	4.1	-	6.2
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.3
Pot Cap-1 Maneuver	1381	-	864
Stage 1	-	-	852
Stage 2	-	-	700
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1381	-	864
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	846
Stage 2	-	-	700

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1381	-	-	-	491
HCM Lane V/C Ratio	0.006	-	-	-	0.031
HCM Control Delay (s)	7.6	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection

Int Delay, s/veh 0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	570	0	5	67	0	16
Future Vol, veh/h	570	0	5	67	0	16
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	570	0	5	67	0	16

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	570
Stage 1	-	-	570
Stage 2	-	-	77
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1002
Stage 1	-	-	566
Stage 2	-	-	946
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1002
Mov Cap-2 Maneuver	-	-	434
Stage 1	-	-	563
Stage 2	-	-	946

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	521	-	-	1002	-
HCM Lane V/C Ratio	0.031	-	-	0.005	-
HCM Control Delay (s)	12.1	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection



















Int Delay, s/veh 0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↗
Traffic Vol, veh/h	6	971	136	702	905	6
Future Vol, veh/h	6	971	136	702	905	6
Conflicting Peds, #/hr	1	0	0	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	3	2	3	3	0
Mvmt Flow	6	971	136	702	905	6

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1530	906	0
Stage 1	906	-	-
Stage 2	624	-	-
Critical Hdwy	6.9	4.13	-
Critical Hdwy Stg 1	5.7	-	-
Critical Hdwy Stg 2	6.1	-	-
Follow-up Hdwy	3.69	2.219	-
Pot Cap-1 Maneuver	103	749	-
Stage 1	357	-	-
Stage 2	459	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	84	748	-
Mov Cap-2 Maneuver	178	-	-
Stage 1	292	-	-
Stage 2	459	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.9	1.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	748	-	178	-	-	-
HCM Lane V/C Ratio	0.182	-	0.034	-	-	-
HCM Control Delay (s)	10.9	-	25.9	0	-	-
HCM Lane LOS	B	-	D	A	-	-
HCM 95th %tile Q(veh)	0.7	-	0.1	-	-	-

												
Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	34	11	48	9	74	63	620	18	3	656	42
Future Volume (vph)	18	34	11	48	9	74	63	620	18	3	656	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1763	1561	1589	0	1745	1821	0	0	1767	0
Flt Permitted			0.960				0.358				0.998	
Satd. Flow (perm)	0	0	1485	1324	1423	0	619	1821	0	0	1763	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				64	301							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1123			607	
Travel Time (s)			9.5					25.5			13.8	
Confl. Peds. (#/hr)	37	30		47	30	30	75		49	49		30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	63	48	9	0	137	638	0	0	733	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4				5				6	
Permitted Phases	4	4		4	8	5	2	2		6		
Detector Phase	4	4	4	4	8	5	5	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	4.0	4.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	8.0	8.0	26.0		34.0	34.0	
Total Split (s)	27.0	27.0	27.0	27.0	27.0	8.0	8.0	93.0		85.0	85.0	
Total Split (%)	22.5%	22.5%	22.5%	22.5%	22.5%	6.7%	6.7%	77.5%		70.8%	70.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.5	3.5	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	0.5	0.5	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)			6.0	6.0	6.0			4.0		6.0	6.0	
Lead/Lag						Lead	Lead			Lag	Lag	
Lead-Lag Optimize?						Yes	Yes					
Recall Mode	None	None	None	None	None	None	None	C-Max		C-Max	C-Max	
Act Effct Green (s)			10.6	10.6	10.6			102.0	101.2		88.7	
Actuated g/C Ratio			0.09	0.09	0.09			0.85	0.84		0.74	
v/c Ratio			0.48	0.27	0.02			0.23	0.42		0.56	
Control Delay			63.3	11.1	0.1			3.0	4.2		10.5	
Queue Delay			0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay			63.3	11.1	0.1			3.0	4.2		10.5	
LOS			E	B	A			A	A		B	
Approach Delay			40.7					4.0			10.5	
Approach LOS			D					A			B	
Queue Length 50th (ft)			47	0	0			15	112		241	
Queue Length 95th (ft)			92	25	0			33	198		413	
Internal Link Dist (ft)			337					1043			527	
Turn Bay Length (ft)							60					



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	32
Future Volume (vph)	32
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	35
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	



Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)			259	284	497		593	1535			1303	
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.24	0.17	0.02		0.23	0.42			0.56	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	9.4
Intersection LOS:	A
Intersection Capacity Utilization	104.3%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huluhili St





Lane Group	SBR2
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection

Int Delay, s/veh 22.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	151	410	14	68	485	38
Future Vol, veh/h	151	410	14	68	485	38
Conflicting Peds, #/hr	0	4	4	0	0	3
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	100	100	100	100	100	100
Heavy Vehicles, %	2	4	4	6	1	0
Mvmt Flow	151	410	14	68	485	38

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	565
Stage 1	-	-	360
Stage 2	-	-	96
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	5.41
Critical Hdwy Stg 2	-	-	5.41
Follow-up Hdwy	-	-	2.236
Pot Cap-1 Maneuver	-	-	997
Stage 1	-	-	708
Stage 2	-	-	930
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	994
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	695
Stage 2	-	-	930

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	49.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	562	-	-	994	-
HCM Lane V/C Ratio	0.931	-	-	0.014	-
HCM Control Delay (s)	49.9	-	-	8.7	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	11.8	-	-	0	-

Intersection

Int Delay, s/veh 160.2

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	455	327	534	99	56	343
Future Vol, veh/h	455	327	534	99	56	343
Conflicting Peds, #/hr	15	0	0	15	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	100	100	100	100	100	100
Heavy Vehicles, %	3	3	1	2	2	1
Mvmt Flow	455	327	534	99	56	343

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	648	0	1836
Stage 1	-	-	599
Stage 2	-	-	1237
Critical Hdwy	4.13	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.227	-	3.518
Pot Cap-1 Maneuver	933	-	83
Stage 1	-	-	549
Stage 2	-	-	274
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	921	-	~ 32
Mov Cap-2 Maneuver	-	-	~ 32
Stage 1	-	-	215
Stage 2	-	-	270

Approach	EB	WB	SW
HCM Control Delay, s	7.4	0	\$ 714
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	921	-	-	-	163
HCM Lane V/C Ratio	0.494	-	-	-	2.448
HCM Control Delay (s)	12.7	0	-	-	\$ 714
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	2.8	-	-	-	33.9

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	52	763	807	70	19	39
Future Vol, veh/h	52	763	807	70	19	39
Conflicting Peds, #/hr	2	0	0	2	0	58
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	100	100	100	100	100	100
Heavy Vehicles, %	13	3	1	0	0	6
Mvmt Flow	52	763	807	70	19	39

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	879	0	1711
Stage 1	-	-	844
Stage 2	-	-	867
Critical Hdwy	4.23	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.317	-	3.5
Pot Cap-1 Maneuver	724	-	101
Stage 1	-	-	425
Stage 2	-	-	415
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	723	-	88
Mov Cap-2 Maneuver	-	-	88
Stage 1	-	-	371
Stage 2	-	-	414

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	36.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	723	-	-	-	171
HCM Lane V/C Ratio	0.072	-	-	-	0.339
HCM Control Delay (s)	10.4	0	-	-	36.5
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0.2	-	-	-	1.4



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	402	3	22	718	736	236
Future Volume (Veh/h)	402	3	22	718	736	236
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	402	3	22	718	736	236
Pedestrians	19					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)					2	
Upstream signal (ft)				607		
pX, platoon unblocked	0.90					
vC, conflicting volume	1517	755	755			
vC1, stage 1 conf vol	755					
vC2, stage 2 conf vol	762					
vCu, unblocked vol	1519	755	755			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	99	97			
cM capacity (veh/h)	394	405	850			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	405	22	718	736	236	
Volume Left	402	22	0	0	0	
Volume Right	3	0	0	0	236	
cSH	394	850	1700	1700	1700	
Volume to Capacity	1.03	0.03	0.42	0.43	0.14	
Queue Length 95th (ft)	326	2	0	0	0	
Control Delay (s)	85.7	9.3	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	85.7	0.3		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay			16.5			
Intersection Capacity Utilization			67.9%	ICU Level of Service	C	
Analysis Period (min)			15			

Intersection

Int Delay, s/veh 4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	0	0	0	0	14	516	744	14	14	695	5
Future Vol, veh/h	1	0	0	0	0	14	516	744	14	14	695	5
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	7	7	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	11	5	4	0	2	2	2
Mvmt Flow	1	0	0	0	0	14	516	744	14	14	695	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2517	2523	698	2516	2518	759	700	0	0	765	0	0
Stage 1	726	726	-	1790	1790	-	-	-	-	-	-	-
Stage 2	1791	1797	-	726	728	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.31	4.15	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.399	2.245	-	-	2.218	-	-
Pot Cap-1 Maneuver	19	28	444	19	28	392	883	-	-	848	-	-
Stage 1	419	433	-	105	135	-	-	-	-	-	-	-
Stage 2	104	134	-	419	432	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	10	11	444	10	11	389	883	-	-	843	-	-
Mov Cap-2 Maneuver	10	11	-	10	11	-	-	-	-	-	-	-
Stage 1	174	426	-	43	56	-	-	-	-	-	-	-
Stage 2	42	55	-	412	425	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	\$ 401.7	14.6	5.9	0.2
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	883	-	-	10 389	843	-	-
HCM Lane V/C Ratio	0.584	-	-	0.1 0.036	0.017	-	-
HCM Control Delay (s)	14.6	-	-	\$ 401.7	14.6	9.3	-
HCM Lane LOS	B	-	-	F B	A	-	-
HCM 95th %tile Q(veh)	3.9	-	-	0.3 0.1	0.1	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕						↕	
Traffic Vol, veh/h	9	1	0	3	2	520	0	0	0	0	275	5
Future Vol, veh/h	9	1	0	3	2	520	0	0	0	0	275	5
Conflicting Peds, #/hr	13	0	0	0	0	13	0	0	0	7	0	16
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	5	0	0	0	0	4	17
Mvmt Flow	9	1	0	3	2	520	0	0	0	0	275	5

Major/Minor	Minor2			Minor1			Major2					
Conflicting Flow All	568	301	294	285	303	20				7	0	0
Stage 1	294	294	-	7	7	-				-	-	-
Stage 2	274	7	-	278	296	-				-	-	-
Critical Hdwy	7.1	6.5	6.37	7.1	6.5	6.25				4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.5	-				-	-	-
Follow-up Hdwy	3.5	4	3.453	3.5	4	3.345				2.2	-	-
Pot Cap-1 Maneuver	437	615	711	671	613	1049				1627	-	-
Stage 1	719	673	-	-	-	-				-	-	-
Stage 2	-	-	-	733	672	-				-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	211	603	701	666	601	1031				1617	-	-
Mov Cap-2 Maneuver	211	603	-	666	601	-				-	-	-
Stage 1	719	664	-	-	-	-				-	-	-
Stage 2	-	-	-	732	663	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	21.7	12.1	0
HCM LOS	C	B	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	226	1025	1617	-	-
HCM Lane V/C Ratio	0.044	0.512	-	-	-
HCM Control Delay (s)	21.7	12.1	0	-	-
HCM Lane LOS	C	B	A	-	-
HCM 95th %tile Q(veh)	0.1	3	0	-	-

Intersection				
Intersection Delay, s/veh	29.8			
Intersection LOS	D			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	242	823	650	510
Demand Flow Rate, veh/h	253	847	650	528
Vehicles Circulating, veh/h	734	151	317	992
Vehicles Exiting, veh/h	786	816	670	6
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.3	14.2	13.3	84.7
Approach LOS	B	B	B	F
Lane	Left	Left	Left	Left
Designated Moves	LTR	LT	LTR	LTR
Assumed Moves	LTR	LT	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	253	847	650	528
Cap Entry Lane, veh/h	653	1183	999	502
Entry HV Adj Factor	0.956	0.971	1.000	0.965
Flow Entry, veh/h	242	823	650	510
Cap Entry, veh/h	624	1149	999	484
V/C Ratio	0.388	0.716	0.651	1.052
Control Delay, s/veh	11.3	14.2	13.3	84.7
LOS	B	B	B	F
95th %tile Queue, veh	2	7	5	16

Intersection			
Intersection Delay, s/veh	14.8		
Intersection LOS	B		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	892	635	259
Demand Flow Rate, veh/h	910	648	264
Vehicles Circulating, veh/h	142	389	437
Vehicles Exiting, veh/h	559	663	600
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	16.0	16.1	7.4
Approach LOS	C	C	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	910	648	264
Cap Entry Lane, veh/h	1194	928	884
Entry HV Adj Factor	0.980	0.981	0.981
Flow Entry, veh/h	892	635	259
Cap Entry, veh/h	1170	910	867
V/C Ratio	0.762	0.698	0.299
Control Delay, s/veh	16.0	16.1	7.4
LOS	C	C	A
95th %tile Queue, veh	8	6	1

Intersection

Int Delay, s/veh 7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	207	78	11	423	245	7
Future Vol, veh/h	207	78	11	423	245	7
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	207	78	11	423	245	7

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	285
Stage 1	-	-	246
Stage 2	-	-	445
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1277
Stage 1	-	-	795
Stage 2	-	-	646
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1277
Mov Cap-2 Maneuver	-	-	405
Stage 1	-	-	786
Stage 2	-	-	646

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	26.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	411	-	-	1277	-
HCM Lane V/C Ratio	0.613	-	-	0.009	-
HCM Control Delay (s)	26.7	-	-	7.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	4	-	-	0	-

Intersection

Int Delay, s/veh 5.5

Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	61	144	338	330	141	80
Future Vol, veh/h	61	144	338	330	141	80
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	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	1	2	0
Mvmt Flow	61	144	338	330	141	80

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	668	0	769
Stage 1	-	-	503
Stage 2	-	-	266
Critical Hdwy	4.1	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.2	-	3.518
Pot Cap-1 Maneuver	931	-	369
Stage 1	-	-	607
Stage 2	-	-	779
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	931	-	343
Mov Cap-2 Maneuver	-	-	343
Stage 1	-	-	564
Stage 2	-	-	779

Approach	EB	WB	SE
HCM Control Delay, s	2.7	0	24.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1
Capacity (veh/h)	931	-	-	-	401
HCM Lane V/C Ratio	0.066	-	-	-	0.551
HCM Control Delay (s)	9.1	0	-	-	24.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	3.2

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	5	207	339	52	14	1
Future Vol, veh/h	5	207	339	52	14	1
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	100	100	100	100	100	100
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	5	207	339	52	14	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	391	0	582
Stage 1	-	-	365
Stage 2	-	-	217
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1179	-	479
Stage 1	-	-	707
Stage 2	-	-	824
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1179	-	477
Mov Cap-2 Maneuver	-	-	477
Stage 1	-	-	703
Stage 2	-	-	824

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1179	-	-	-	487
HCM Lane V/C Ratio	0.004	-	-	-	0.031
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection

Int Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	198	0	13	405	0	7
Future Vol, veh/h	198	0	13	405	0	7
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	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	198	0	13	405	0	7

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	198
Stage 1	-	-	198
Stage 2	-	-	431
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	1375	446
Stage 1	-	-	835
Stage 2	-	-	655
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1375	441
Mov Cap-2 Maneuver	-	-	441
Stage 1	-	-	825
Stage 2	-	-	655

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	843	-	-	1375	-
HCM Lane V/C Ratio	0.008	-	-	0.009	-
HCM Control Delay (s)	9.3	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection

Int Delay, s/veh 12

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↗
Traffic Vol, veh/h	30	447	872	839	503	99
Future Vol, veh/h	30	447	872	839	503	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	1	3	1
Mvmt Flow	30	447	872	839	503	99

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2667	503	503
Stage 1	503	-	-
Stage 2	2164	-	-
Critical Hdwy	6.6	6.23	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.8	-	-
Follow-up Hdwy	3.5	3.319	2.2
Pot Cap-1 Maneuver	~ 22	568	1072
Stage 1	612	-	-
Stage 2	75	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 4	568	1072
Mov Cap-2 Maneuver	120	-	-
Stage 1	114	-	-
Stage 2	75	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.7	10.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1072	-	120	568	-	-
HCM Lane V/C Ratio	0.813	-	0.25	0.787	-	-
HCM Control Delay (s)	21.1	-	44.7	30.8	-	-
HCM Lane LOS	C	-	E	D	-	-
HCM 95th %tile Q(veh)	9.5	-	0.9	7.4	-	-

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

TRAFFIC IMPACT ANALYSIS REPORT UPDATE

FOR THE PROPOSED

HOKUA PLACE

KAPA`A, KAUAI, HAWAII



















TAX MAP KEY: (4) 4-3-03: 01

APPENDIX E

CAPACITY ANALYSIS WORKSHEETS

PEAK HOUR TRAFFIC WITH PROJECT

WITH IMPROVEMENTS

												
Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	37	12	60	1	11	5	751	14	3	824	43
Future Volume (vph)	9	37	12	60	1	11	5	751	14	3	824	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1613	1501	1589	0	1632	1761	0	0	1800	0
Flt Permitted			0.962				0.347				0.998	
Satd. Flow (perm)	0	0	1598	1451	1545	0	594	1761	0	0	1797	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				60	198							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1113			697	
Travel Time (s)			9.5					25.3			15.8	
Confl. Peds. (#/hr)	2	4		7	4	4	4		7	4		4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	15%	0%	4%	0%	6%	9%	4%	0%	0%	1%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	58	60	1	0	16	765	0	0	875	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4								6	
Permitted Phases	4	4		4	8	2	2	2		6		
Detector Phase	4	4	4	4	8	2	2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	26.0	26.0	26.0		34.0	34.0	
Total Split (s)	27.0	27.0	27.0	27.0	27.0	53.0	53.0	53.0		53.0	53.0	
Total Split (%)	33.8%	33.8%	33.8%	33.8%	33.8%	66.3%	66.3%	66.3%		66.3%	66.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)			6.0	6.0	6.0			6.0	6.0		6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	Max	Max	Max		Max	Max	
Act Effct Green (s)			8.4	8.4	8.4		55.6	55.6			55.6	
Actuated g/C Ratio			0.12	0.12	0.12		0.77	0.77			0.77	
v/c Ratio			0.31	0.27	0.00		0.03	0.56			0.63	
Control Delay			32.8	11.4	0.0		3.8	7.0			8.2	
Queue Delay			0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay			32.8	11.4	0.0		3.8	7.0			8.2	
LOS			C	B	A		A	A			A	
Approach Delay			21.9					7.0			8.2	
Approach LOS			C					A			A	
Queue Length 50th (ft)			25	0	0		2	132			166	
Queue Length 95th (ft)			53	30	0		7	257			330	
Internal Link Dist (ft)			337					1033			617	
Turn Bay Length (ft)							60					



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	5
Future Volume (vph)	5
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	4
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	

Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)			468	467	592		458	1359			1387	
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.12	0.13	0.00		0.03	0.56			0.63	

Intersection Summary	
Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	72
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	8.6
Intersection LOS:	A
Intersection Capacity Utilization	70.9%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huluhili St





Lane Group	SBR2
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	516	2	18	760	864	105
Future Volume (Veh/h)	516	2	18	760	864	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	516	2	18	760	864	105
Pedestrians	8					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)					2	
Upstream signal (ft)				697		
pX, platoon unblocked	0.79					
vC, conflicting volume	1668	872	872			
vC1, stage 1 conf vol	872					
vC2, stage 2 conf vol	796					
vCu, unblocked vol	1713	872	872			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	99	98			
cM capacity (veh/h)	388	350	776			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	518	18	760	864	105	
Volume Left	516	18	0	0	0	
Volume Right	2	0	0	0	105	
cSH	387	776	1700	1700	1700	
Volume to Capacity	1.34	0.02	0.45	0.51	0.06	
Queue Length 95th (ft)	608	2	0	0	0	
Control Delay (s)	196.5	9.7	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	196.5	0.2		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay			45.0			
Intersection Capacity Utilization			80.8%	ICU Level of Service	D	
Analysis Period (min)			15			

Intersection					
Intersection Delay, s/veh	12.9				
Intersection LOS	B				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	2	2	2	2	
Adj Approach Flow, veh/h	595	296	340	855	
Demand Flow Rate, veh/h	611	327	349	866	
Vehicles Circulating, veh/h	710	112	728	408	
Vehicles Exiting, veh/h	306	965	593	31	
Ped Vol Crossing Leg, #/h	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	23.9	5.4	11.1	8.5	
Approach LOS	C	A	B	A	
Lane	Left	Left	Left	Left	Bypass
Designated Moves	LTR	LT	LTR	LT	R
Assumed Moves	LTR	LT	LTR	LT	R
RT Channelized					Free
Lane Util	1.000	1.000	1.000	1.000	
Follow-Up Headway, s	2.535	2.535	2.535	2.535	
Critical Headway, s	4.328	4.328	4.328	4.328	258
Entry Flow, veh/h	611	327	349	608	1919
Cap Entry Lane, veh/h	777	1291	765	1004	0.990
Entry HV Adj Factor	0.973	0.906	0.974	0.987	255
Flow Entry, veh/h	595	296	340	600	1900
Cap Entry, veh/h	756	1170	745	991	0.134
V/C Ratio	0.787	0.253	0.456	0.606	0.0
Control Delay, s/veh	23.9	5.4	11.1	12.1	A
LOS	C	A	B	B	0
95th %tile Queue, veh	8	1	2	4	

Intersection												
Int Delay, s/veh	19											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	339	16	52	113	9	52	28	506	14	1	0
Future Vol, veh/h	9	339	16	52	113	9	52	28	506	14	1	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	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	0	0	2	2	9	2	1	2	2	2
Mvmt Flow	9	339	16	52	113	9	52	28	506	14	1	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	122	0	0	339	0	0	587	591	347	593	579	118
Stage 1	-	-	-	-	-	-	365	365	-	222	222	-
Stage 2	-	-	-	-	-	-	222	226	-	371	357	-
Critical Hdwy	4.12	-	-	4.1	-	-	7.19	6.52	6.21	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.19	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.2	-	-	3.581	4.018	3.309	3.518	4.018	3.318
Pot Cap-1 Maneuver	1465	-	-	1231	-	-	411	420	698	417	426	934
Stage 1	-	-	-	-	-	-	640	623	-	780	720	-
Stage 2	-	-	-	-	-	-	765	717	-	649	628	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1465	-	-	1231	-	-	394	398	698	104	403	934
Mov Cap-2 Maneuver	-	-	-	-	-	-	394	398	-	104	403	-
Stage 1	-	-	-	-	-	-	635	618	-	774	688	-
Stage 2	-	-	-	-	-	-	730	685	-	169	623	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			2.4			34.9			43.2		
HCM LOS							D			E		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	676	1465	-	-	1231	-	-	109				
HCM Lane V/C Ratio	0.867	0.006	-	-	0.042	-	-	0.138				
HCM Control Delay (s)	34.9	7.5	0	-	8.1	0	-	43.2				
HCM Lane LOS	D	A	A	-	A	A	-	E				
HCM 95th %tile Q(veh)	10.2	0	-	-	0.1	-	-	0.5				

Intersection



















Int Delay, s/veh 0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↗
Traffic Vol, veh/h	6	971	136	702	905	6
Future Vol, veh/h	6	971	136	702	905	6
Conflicting Peds, #/hr	1	0	0	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	3	2	3	3	0
Mvmt Flow	6	971	136	702	905	6

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1530	906	0
Stage 1	906	-	-
Stage 2	624	-	-
Critical Hdwy	6.9	4.13	-
Critical Hdwy Stg 1	5.7	-	-
Critical Hdwy Stg 2	6.1	-	-
Follow-up Hdwy	3.69	2.219	-
Pot Cap-1 Maneuver	103	749	-
Stage 1	357	-	-
Stage 2	459	-	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	84	748	-
Mov Cap-2 Maneuver	220	-	-
Stage 1	292	-	-
Stage 2	459	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.8	1.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	748	-	220	-	-	-
HCM Lane V/C Ratio	0.182	-	0.027	-	-	-
HCM Control Delay (s)	10.9	-	21.8	0	-	-
HCM Lane LOS	B	-	C	A	-	-
HCM 95th %tile Q(veh)	0.7	-	0.1	-	-	-

												
Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	34	11	48	9	74	63	620	18	3	656	42
Future Volume (vph)	18	34	11	48	9	74	63	620	18	3	656	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0			60		0	0		0
Storage Lanes		0		1			1		0	0		0
Taper Length (ft)		100					100			100		
Satd. Flow (prot)	0	0	1763	1561	1589	0	1745	1824	0	0	1777	0
Flt Permitted			0.960				0.322				0.998	
Satd. Flow (perm)	0	0	1601	1410	1479	0	573	1824	0	0	1773	0
Right Turn on Red				Yes	Yes				No			
Satd. Flow (RTOR)				109	184							
Link Speed (mph)			30					30			30	
Link Distance (ft)			417					1123			607	
Travel Time (s)			9.5					25.5			13.8	
Confl. Peds. (#/hr)	37	30		47	30	30	75		49	49		30
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	63	48	9	0	137	638	0	0	733	0
Turn Type	Perm	Perm	NA	Perm	Perm	custom	custom	NA		Perm	NA	
Protected Phases			4				5				6	
Permitted Phases	4	4		4	8	5	2	2		6		
Detector Phase	4	4	4	4	8	5	5	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	4.0	4.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	8.0	8.0	26.0		34.0	34.0	
Total Split (s)	27.0	27.0	27.0	27.0	27.0	8.0	8.0	43.0		35.0	35.0	
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	11.4%	11.4%	61.4%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.5	3.5	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	0.5	0.5	2.0		2.0	2.0	
Lost Time Adjust (s)			0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)			6.0	6.0	6.0		4.0	6.0			6.0	
Lead/Lag						Lead	Lead			Lag	Lag	
Lead-Lag Optimize?						Yes	Yes					
Recall Mode	None	None	None	None	None	None	None	C-Max		C-Max	C-Max	
Act Effct Green (s)			8.5	8.5	8.5		54.1	53.3			44.1	
Actuated g/C Ratio			0.12	0.12	0.12		0.77	0.76			0.63	
v/c Ratio			0.32	0.18	0.03		0.24	0.46			0.66	
Control Delay			32.0	1.8	0.1		4.0	5.9			16.7	
Queue Delay			0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay			32.0	1.8	0.1		4.0	5.9			16.7	
LOS			C	A	A		A	A			B	
Approach Delay			18.9					5.5			16.7	
Approach LOS			B					A			B	
Queue Length 50th (ft)			26	0	0		13	96			218	
Queue Length 95th (ft)			57	3	0		31	187			#475	
Internal Link Dist (ft)			337					1043			527	
Turn Bay Length (ft)							60					



Lane Group	SBR2
Lane Configurations	
Traffic Volume (vph)	32
Future Volume (vph)	32
Ideal Flow (vphpl)	1900
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	35
Peak Hour Factor	1.00
Heavy Vehicles (%)	0%
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	

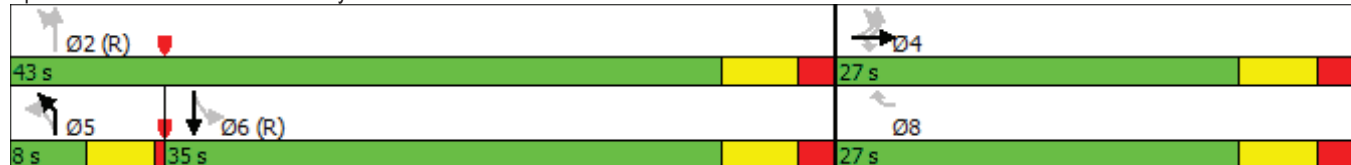


Lane Group	EBL2	EBL	EBT	EBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)			480	499	572		561	1387			1116	
Starvation Cap Reductn			0	0	0		0	0			0	
Spillback Cap Reductn			0	0	0		0	0			0	
Storage Cap Reductn			0	0	0		0	0			0	
Reduced v/c Ratio			0.13	0.10	0.02		0.24	0.46			0.66	

Intersection Summary












Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.4
 Intersection LOS: B
 Intersection Capacity Utilization 104.3%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Kuhio Hwy & Kukui St & Huluilui St





Lane Group	SBR2
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	402	3	22	718	736	236
Future Volume (Veh/h)	402	3	22	718	736	236
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	402	3	22	718	736	236
Pedestrians	19					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage (veh)					2	
Upstream signal (ft)				607		
pX, platoon unblocked	0.85					
vC, conflicting volume	1517	755	755			
vC1, stage 1 conf vol	755					
vC2, stage 2 conf vol	762					
vCu, unblocked vol	1520	755	755			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	5	99	97			
cM capacity (veh/h)	422	405	850			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	405	22	718	736	236	
Volume Left	402	22	0	0	0	
Volume Right	3	0	0	0	236	
cSH	422	850	1700	1700	1700	
Volume to Capacity	0.96	0.03	0.42	0.43	0.14	
Queue Length 95th (ft)	283	2	0	0	0	
Control Delay (s)	65.9	9.3	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	65.9	0.3		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay			12.7			
Intersection Capacity Utilization			67.9%	ICU Level of Service	C	
Analysis Period (min)			15			

Intersection					
Intersection Delay, s/veh	13.7				
Intersection LOS	B				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	2	2	2	2	
Adj Approach Flow, veh/h	242	823	650	510	
Demand Flow Rate, veh/h	253	847	650	528	
Vehicles Circulating, veh/h	734	151	317	992	
Vehicles Exiting, veh/h	699	816	670	6	
Ped Vol Crossing Leg, #/h	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	9.1	12.5	11.2	20.9	
Approach LOS	A	B	B	C	
Lane	Left	Left	Left	Left	Bypass
Designated Moves	LTR	LT	LTR	LT	R
Assumed Moves	LTR	LT	LTR	LT	R
RT Channelized					Free
Lane Util	1.000	1.000	1.000	1.000	
Follow-Up Headway, s	2.535	2.535	2.535	2.535	
Critical Headway, s	4.328	4.328	4.328	4.328	87
Entry Flow, veh/h	253	847	650	441	1976
Cap Entry Lane, veh/h	761	1249	1085	611	0.962
Entry HV Adj Factor	0.956	0.971	1.000	0.965	84
Flow Entry, veh/h	242	823	650	426	1900
Cap Entry, veh/h	727	1213	1085	590	0.044
V/C Ratio	0.333	0.678	0.599	0.722	0.0
Control Delay, s/veh	9.1	12.5	11.2	25.1	A
LOS	A	B	B	D	0
95th %tile Queue, veh	1	6	4	7	

Intersection

Int Delay, s/veh 7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	137	71	338	301	28	38	24	144	5	9	1
Future Vol, veh/h	5	137	71	338	301	28	38	24	144	5	9	1
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	-	-	Yield	-	-	None	-	-	Yield	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	0	0	1	2	0	2	2	2	2	2
Mvmt Flow	5	137	71	338	301	28	38	24	144	5	9	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	329	0	0	137	0	0	1179	1188	173	1150	1138	315
Stage 1	-	-	-	-	-	-	183	183	-	991	991	-
Stage 2	-	-	-	-	-	-	996	1005	-	159	147	-
Critical Hdwy	4.12	-	-	4.1	-	-	7.1	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.2	-	-	3.5	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1231	-	-	1459	-	-	169	188	871	175	201	725
Stage 1	-	-	-	-	-	-	823	748	-	296	324	-
Stage 2	-	-	-	-	-	-	297	319	-	843	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1231	-	-	1459	-	-	125	134	871	99	143	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	125	134	-	99	143	-
Stage 1	-	-	-	-	-	-	819	744	-	295	232	-
Stage 2	-	-	-	-	-	-	204	228	-	678	771	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	4.2	21.3	36
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	426	1231	-	-	1459	-	-	131
HCM Lane V/C Ratio	0.484	0.004	-	-	0.232	-	-	0.115
HCM Control Delay (s)	21.3	7.9	0	-	8.2	0	-	36
HCM Lane LOS	C	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	2.7	0	-	-	0.9	-	-	0.4

Intersection

Int Delay, s/veh 8.9

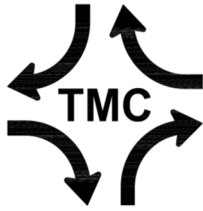
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↗
Traffic Vol, veh/h	30	447	872	839	503	99
Future Vol, veh/h	30	447	872	839	503	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	Yield
Storage Length	140	0	170	-	-	150
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	2	0	1	3	1
Mvmt Flow	30	447	872	839	503	99

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	2667	-	503
Stage 1	503	-	-
Stage 2	2164	-	-
Critical Hdwy	6.6	-	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.8	-	-
Follow-up Hdwy	3.5	-	2.2
Pot Cap-1 Maneuver	~ 22	0	1072
Stage 1	612	0	-
Stage 2	75	0	-
Platoon blocked, %			-
Mov Cap-1 Maneuver	~ 4	-	1072
Mov Cap-2 Maneuver	120	-	-
Stage 1	114	-	-
Stage 2	75	-	-

Approach	EB	NB	SB
HCM Control Delay, s	44.9	11.4	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1072	-	120	-	-	-
HCM Lane V/C Ratio	0.813	-	0.25	-	-	-
HCM Control Delay (s)	22.4	-	44.9	0	-	-
HCM Lane LOS	C	-	E	A	-	-
HCM 95th %tile Q(veh)	11.7	-	1	-	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon



THE TRAFFIC MANAGEMENT CONSULTANT

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TMC Job No. 201708

October 3, 2017

State of Hawaii
Department of Transportation
Highways Division-Kauai District
1720 Haleukana Street
Lihu'e, Kauai, Hawai'i 96766

Attn.: Mr. Larry Dill, P.E., District Engineer

Dear Mr. Dill:

Subject: Traffic Impact Analysis Report Update
For the Proposed Hokua Place
Tax Map Key: (4) 4-3-003: Portion of 001
Kapa'a, Kauai, Hawaii

Thank you for the review comments in your letter, dated September 29, 2017, on the subject traffic study. Our responses follow:

Comment No. 1

Noted.

Comment No. 2

Noted.

Comment No. 3

The AM and PM Peak Hour Traffic Without Project rows of Table 6 summarize the capacity analysis under existing roadway conditions. The AM and PM Peak Hour Traffic With Project rows of Table 6 summarize the capacity analysis with the recommended site access improvements under Section V.B. of the TIAR Update. The AM and PM Peak Hour Traffic With Project – Improved rows in Table 6 summarize the capacity analysis of the recommended traffic improvements under Section V.A. of the TIAR Update.

Comment No. 4

Noted.


Comment No. 5

Noted.

If you require clarification on any of the above material or have any other questions, please do not hesitate to call me.

Very truly yours,

The Traffic Management Consultant

By 

**Randall S. Okaneku, P. E.
Principal**



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
KAUAI DISTRICT
1720 HALEUKANA STREET
LIHUE, HAWAII 96766

IN REPLY REFER TO:

HWAY-K 4.170445

September 29, 2017

Randall S. Okaneku, P.E.
The Traffic Management Consultant
1188 Bishop Street, Suite 1907
Honolulu, Hawaii 96813

Dear Mr. Okaneku:

Subject: Traffic Impact Analysis Report Update
Hokua Place
Kapa'a, Kawaihau District, Island of Kaua'i
TMK: (4) 4-3-03: Por. 001

Thank you for submitting the updated Traffic Impact Analysis Report(TIAR) update that was transmitted via email on June 15, 2017. We have circulated the TIAR for comment through the Highways Division Planning Branch as well as the Traffic Branch. We have also reviewed the comments provided by the County of Kauai Department of Public Works Engineering Division on September 1, 2017.

The combined comments for the Hawaii Department of Transportation Highways Division are as follows:


1. The report discussed the projects that are proposed in the Kapaa Transportation Solutions Report dated August 2015. It should be noted that these projects may not be completed on schedule. Therefore, they should not be considered in this report.
2. It is understood that the proposed Road A will be funded and constructed by the developer.
3. Please clarify the scenarios in Table 7, Summary of Capacity Analysis. What assumed improvements are completed for AM/PM peak hour traffic without project, with project, and with project-improved.
4. Section V of the TIAR recommends traffic improvements without the project. Although these recommendations are appreciated, they are not a consideration for this development.
5. We concur with the comments provided by the County of Kauai Department of Engineering Division.

Mr. Randall Okaneku, P.E.
September 29, 2017
Page 2

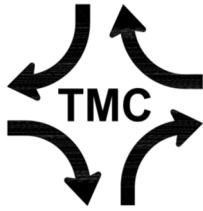
HWY-K 4.170445

Please contact Raymond McCormick at 808-241-3015 by telephone or by email at Raymond.j.mccormick@hawaii.gov if you have comments or questions regarding this letter.

Sincerely,



Larry Dill, P.E.
District Engineer
For



THE TRAFFIC MANAGEMENT CONSULTANT

Randall S. Okaneku, P.E., Principal * 1188 Bishop Street, Suite 1907 * Honolulu, Hawaii 96813
Telephone: (808) 536-0223 * Facsimile: (808) 537-2985 * Email: TMCHawaii@aol.com

TMC Job No. 201708

October 3, 2017

Department of Public Works

County of Kauai

4444 Rice Street, Suite 275

Lihu'e, Kauai, Hawai'i 96766

Attn.: Mr. Michael Moule, P.E., Chief, Engineering Division

Dear Mr. Moule:

Subject: Traffic Impact Analysis Report Update
For the Proposed Hokua Place
Tax Map Key: (4) 4-3-003: Portion of 001
Kapa'a, Kauai, Hawaii

Thank you for the thorough review comments in your letter, dated September 1, 2017, on the subject traffic study. Our responses follow:

Comment No. 1 – Introduction, Project Description

- a. Concur. The design of the intersection between the Phase 1 access road and Olohena Road, mauka of its intersection with Ka'apuni Road, will include the appropriate vertical and horizontal sight distances in accordance with the AASHTO A Policy on Geometric Design of Highways and Streets and the Hawaii Statewide Uniform Design Manual for Streets and Highways.

Comment No. 2 – Existing Roadways

- a. Concur. The stated speed limits are intended to provide guidance to the design of the intersection of Road A and the Kapa'a Bypass Road.
- b. Concur.
- c. Concur.

Comment No. 3 – Existing Peak Hour Traffic Volumes and Operation Conditions

- a. Noted. The traffic impact analysis is based upon the methodology presented in the Highway Capacity Manual (HCM). The HCM methodology consists of a series of mathematical calculations to determine roadway capacity, vehicle delay, vehicle queuing, etc. The LOS concept was defined in the HCM to translate the results of the complex calculations into a simplified "A" through "F" grading system.

- b. Corrected. The second sentence in the last paragraph on Page 10 should read “South of Ulu Street, Kuhio Highway carried over 1,700 vph...”.
- c. Corrected. The revised Figure 6 is attached. The PM peak hour of traffic from 3:45 PM to 4:45 PM on March 15, 2015 was selected for the intersection of Kuhio Highway and the Kapa`a Bypass Road because it corresponded with of the commuter PM peak hour traffic at the intersections in Kapa`a Town. The revised traffic data sheets for the intersection of Kuhio Highway and Kapa`a Bypass Road also are attached.
- d. LOS, by definition, is the result of a series of mathematical calculations. For the purpose of the traffic impact analysis, the HCM methodology provides a common basis for comparing future traffic conditions without the proposed project and future traffic conditions with the proposed project.

Comment No. 4 – Kapa`a Transportation Solutions

- a. Noted. The Kapa`a Transportation Solutions, cited in the TIAR Update, is dated August 2015. Please transmit the latest version of the Kapa`a traffic study.
- b. Noted.

Comment No. 5 – Trip Generation Characteristics

- a. Noted. The revised Table 6 is shown below:

Table 1. Hokua Place Trip Generation Characteristics							
Land Use (ITE Code)	Units	AM Peak Hour (vph)			PM Peak Hour (vph)		
		Enter	Exit	Total	Enter	Exit	Total
Single-Family Phase 1 (265)	16 DU	5	16	21	13	7	20
Single-Family Phase 2 (265)	100 DU	20	60	80	66	38	104
Condominium/ Townhouse (230)	700 DU	52	256	308	244	120	364
Retail Center (820)	8,000 SFGFA	21	13	34	53	57	110
	Pass-By	0	0	0	(-)45	(-)45	(-)90
Total External Trips		98	345	443	331	177	509

- b. The ITE Trip Generation Handbook cites a 9,000-square foot retail center, where 20 percent of the trip generation were primary trips. Comparing the retail center to smaller convenience markets, the Trip Generation Handbook listed sites where the primary trip percentages ranged from 8 percent to 28 percent of the PM peak period trip generation. The retail center is described in the DEIS as a neighborhood-oriented commercial center. Therefore, it is reasonable to assume that a significant portion of the retail trips will be generated from within the proposed project, which can be defined as “internal capture” or “diverted trips”.

Comment No. 6 – Site Access Improvements

- a. Noted. The AM and PM peak hour traffic demands at the Olohena Road intersections at the Phase 1 Driveway and at Road A do not meet the AASHTO left-turn lane guidelines. During the AM peak hour of traffic, the advancing (mauka bound) volumes on Olohena Road do not meet the AASHTO minimum requirements. The left-turn demands at Road A and at the Phase 1 Driveway do not meet the AASHTO minimum left-turn volumes, during the PM peak hour of traffic. The Olohena Road intersections at Road A and the Phase 1 Driveway are expected to operate at satisfactory LOS during the AM peak hour of traffic. The Phase 1 Driveway also is expected to operate at satisfactory LOS at Olohena Road, during the PM peak hour of traffic. Road A is expected to operate at LOS “D”, during the PM peak hour of traffic. However, the average delay of 26.7 seconds/vehicle on Road A is in the upper range of LOS “D”. Therefore, a median refuge lane at Road A was not recommended at this time. Furthermore, separate left-turn and right-turn lanes on Road A would not improve the LOS.

Comment No. 7 – Traffic Assignment

- a. The traffic assignment for the proposed project was primarily based upon the direction of peak hour traffic at the roundabout intersection of the Kapa`a Bypass Road and Olohena Road, where only about one third of Olohena Road traffic turns to/from the south leg of the Kapa`a Bypass Road. The Phase 2 development is concentrated on the makai half of the project site. Only the trips generated from the mauka-most portion of the site and the estimated AM peak hour school trips are expected to use the mauka access of Road A at Olohena Road.
- b. The peak hour trip destinations, mauka of the Ka`apuni Road/Olohena Road intersection, are virtually nil, as observed in mauka bound/makai bound directional splits on Olohena Road. The retail trips generated from the mauka neighboring communities are represented in the “pass-by” trips using Road A.

Comment No. 8 – Figures 11 through 14 (Traffic Assignment)

- a. The diverted peak hour trips on Road A are depicted on the attached Figures 12.1 and 14.1.
- b. The revised Figure 11 is attached.
- c. The revised Figure 13 is attached.
- d. The revised Figure 14 is attached.

Comment No. 9 – PM Peak Hour Traffic Analysis With Project

- a. The recommendation of extending the median refuge lane/two-way left-turn lane in Section V.A.7. of the TIAR Update is expected to mitigate the “bottle-neck” on Kuhio Highway, north of Lehua Street. Ultimately, the improvement of the north leg of the Kapa`a Bypass Road from a one-way roadway to a two-way bypass road is expected to improve traffic operations in Kapa`a Town.

Comment No. 10 – Recommendation of Traffic Improvements Without Project

- a. Noted.

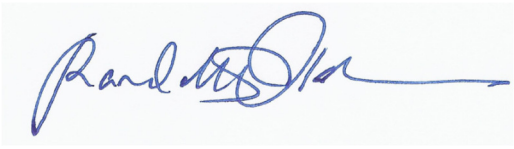
Comment No. 11 – Recommendation of Traffic Improvements With Project

- a. Noted. While the MUTCD does not provide warrants for roundabout intersections, it does advise that a roundabout intersection can be considered as an alternative to traffic signal control. Based upon the TIAR Update, the intersection of Olohena Road and Road A is not expected to warrant all-way stop controls or traffic signals. Therefore, a roundabout intersection was not considered. However, a reassessment of the traffic operations at the Road A intersection at Olohena Road may be considered after the project is fully built out and occupied. A roundabout intersection was considered at the intersection of Olohena Road, Ka`apuni Road, and Kaehulua Road. However, based upon a preliminary assessment of the horizontal and vertical alignments of the intersecting roadways, it was determined that a roundabout intersection would not be feasible. The realignment of Kaehulua Road to form a four-legged intersection with the Olohena Road and Ka`apuni Road was recommended in Section V.A.6.

If you require clarification on any of the above material or have any other questions, please do not hesitate to call me.

Very truly yours,

The Traffic Management Consultant

By 

**Randall S. Okaneku, P. E.
Principal**

Attachments:

- Figure 6-Revised
- Kuhio Hwy Kapa`a Bypass Rd Traffic Count Data-Revised
- Figure 12.1
- Figure 14.1
- Figure 11-Revised
- Figure 13-Revised
- Figure 14-Revised

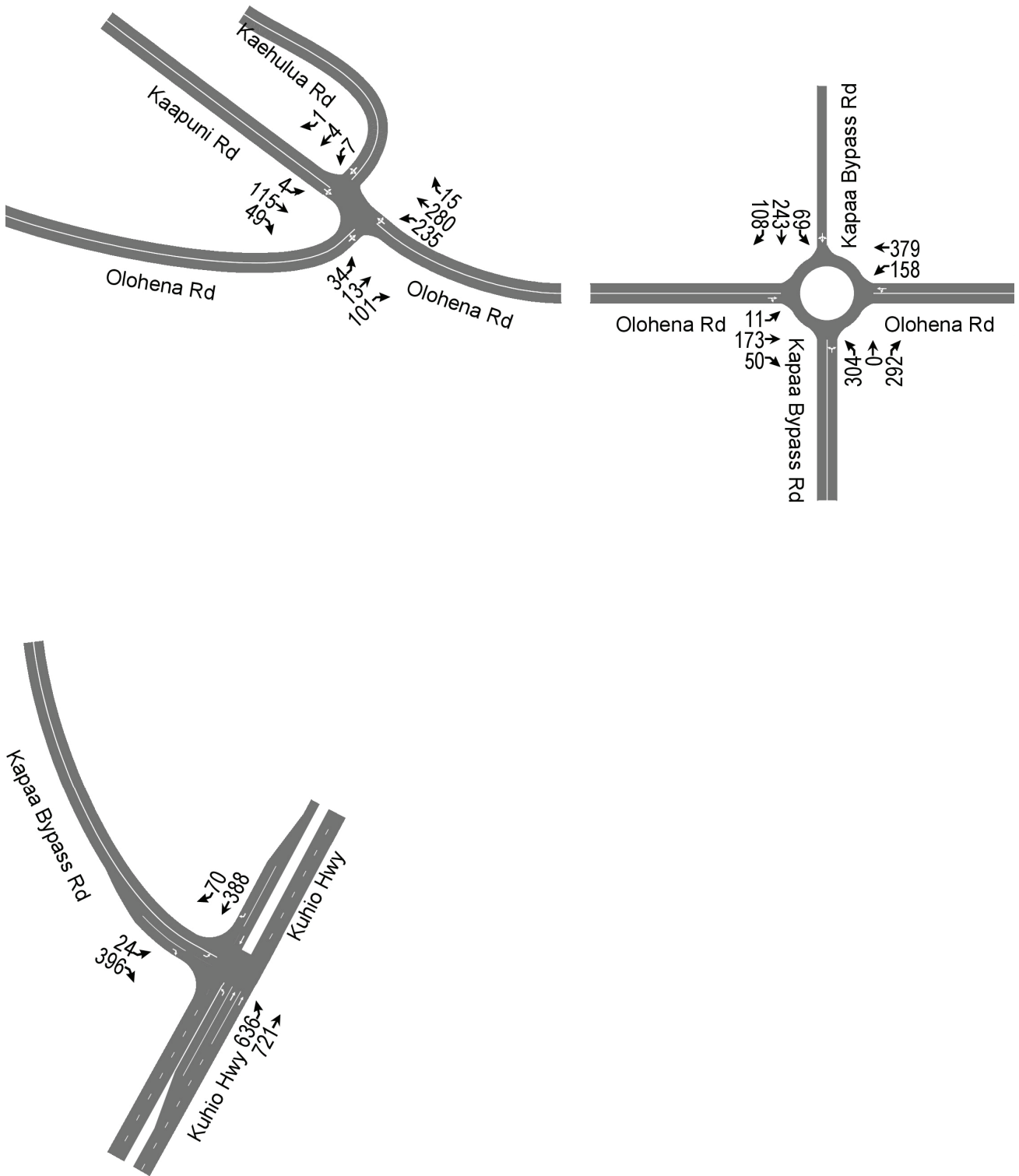
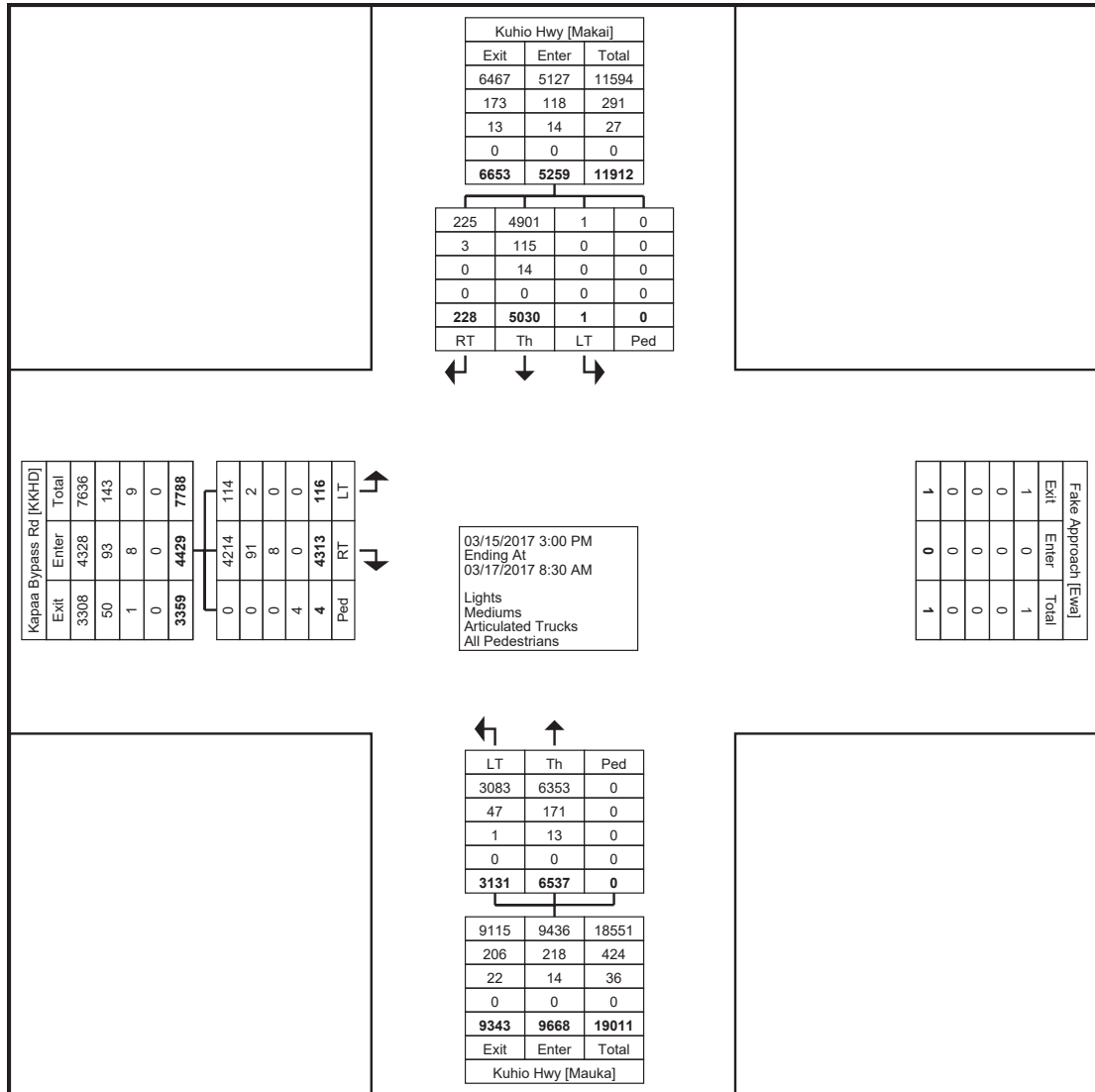


Figure 6. Existing PM Peak Hour Traffic (Cont'd.)

Turning Movement Data

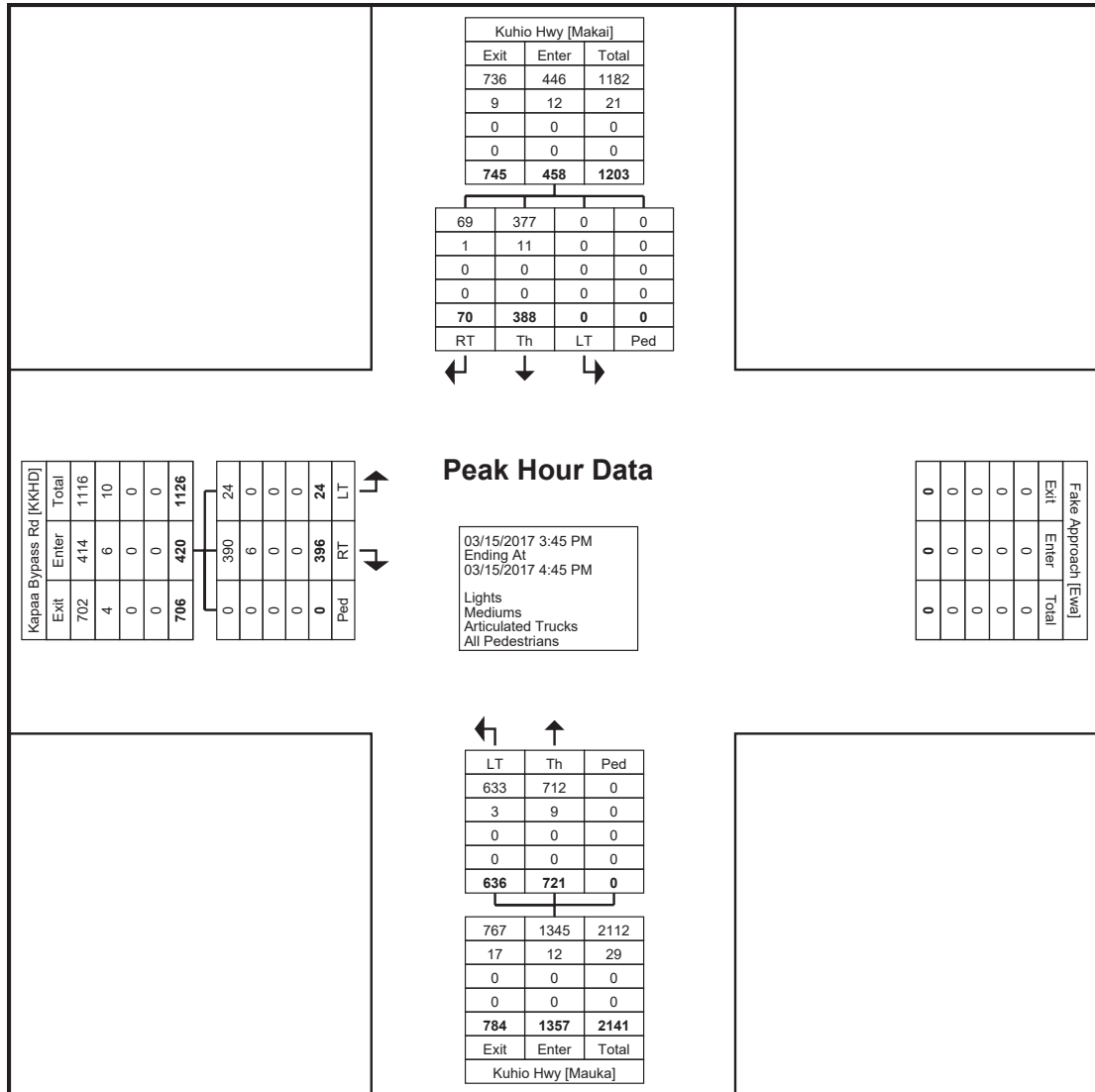
Start Time	Kapaa Bypass Rd Koko Head Bound				Kuhio Hwy Mauka Bound				Kuhio Hwy Makai Bound				Int. Total	
	Left-Turn	Right-Turn	Peds	App. Total	Left-Turn	Thru	Peds	App. Total	Left-Turn	Thru	Right-Turn	Peds		App. Total
3:00 PM	1	105	0	106	99	191	0	290	0	106	5	0	111	507
3:15 PM	3	100	0	103	122	210	0	332	0	88	7	0	95	530
3:30 PM	8	93	0	101	120	207	0	327	0	73	8	0	81	509
3:45 PM	8	104	0	112	148	201	0	349	0	88	21	0	109	570
Hourly Total	20	402	0	422	489	809	0	1298	0	355	41	0	396	2116
4:00 PM	1	108	0	109	168	161	0	329	0	91	16	0	107	545
4:15 PM	9	94	0	103	154	172	0	326	0	97	14	0	111	540
4:30 PM	6	90	0	96	166	187	0	353	0	112	19	0	131	580
4:45 PM	2	95	0	97	146	176	0	322	0	112	15	0	127	546
Hourly Total	18	387	0	405	634	696	0	1330	0	412	64	0	476	2211
5:00 PM	5	88	0	93	149	232	0	381	0	138	27	0	165	639
5:15 PM	2	91	0	93	149	192	0	341	0	152	25	0	177	611
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	7	179	0	186	298	424	0	722	0	290	52	0	342	1250
6:30 AM	0	78	0	78	14	124	0	138	0	203	0	0	203	419
6:45 AM	2	116	0	118	8	124	0	132	0	190	1	0	191	441
Hourly Total	2	194	0	196	22	248	0	270	0	393	1	0	394	860
7:00 AM	1	161	0	162	20	129	0	149	0	233	0	0	233	544
7:15 AM	1	184	0	185	25	155	0	180	0	200	1	0	201	566
7:30 AM	2	152	0	154	24	152	0	176	0	167	0	0	167	497
7:45 AM	1	155	1	156	33	180	0	213	0	135	0	0	135	504
Hourly Total	5	652	1	657	102	616	0	718	0	735	1	0	736	2111
8:00 AM	0	150	0	150	24	187	0	211	0	132	1	0	133	494
8:15 AM	3	131	0	134	21	177	0	198	0	165	0	0	165	497
8:30 AM	3	130	0	133	33	191	0	224	0	161	1	0	162	519
8:45 AM	1	108	0	109	25	209	0	234	0	189	0	0	189	532
Hourly Total	7	519	0	526	103	764	0	867	0	647	2	0	649	2042
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	5	103	0	108	97	217	0	314	0	96	6	0	102	524
3:15 PM	8	117	0	125	131	156	0	287	0	84	9	0	93	505
3:30 PM	6	83	0	89	138	227	0	365	1	76	8	0	85	539
3:45 PM	2	87	1	89	119	182	0	301	0	76	7	0	83	473
Hourly Total	21	390	1	411	485	782	0	1267	1	332	30	0	363	2041
4:00 PM	2	122	0	124	126	152	0	278	0	96	7	0	103	505
4:15 PM	6	109	1	115	136	158	0	294	0	95	6	0	101	510
4:30 PM	6	96	1	102	143	174	0	317	0	78	2	0	80	499
4:45 PM	5	93	0	98	138	181	0	319	0	83	6	0	89	506
Hourly Total	19	420	2	439	543	665	0	1208	0	352	21	0	373	2020
5:00 PM	2	98	0	100	146	204	0	350	0	85	3	0	88	538
5:15 PM	4	113	0	117	121	159	0	280	0	92	2	0	94	491
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	6	211	0	217	267	363	0	630	0	177	5	0	182	1029
6:30 AM	0	82	0	82	11	115	0	126	0	185	0	0	185	393
6:45 AM	0	89	0	89	10	126	0	136	0	164	3	0	167	392
Hourly Total	0	171	0	171	21	241	0	262	0	349	3	0	352	785
7:00 AM	1	131	0	132	17	133	0	150	0	219	1	0	220	502
7:15 AM	3	168	0	171	32	158	0	190	0	182	3	0	185	546
7:30 AM	1	125	0	126	40	146	0	186	0	166	2	0	168	480
7:45 AM	1	123	0	124	30	165	0	195	0	138	0	0	138	457
Hourly Total	6	547	0	553	119	602	0	721	0	705	6	0	711	1985
8:00 AM	4	116	0	120	20	169	0	189	0	150	0	0	150	459
8:15 AM	1	125	0	126	28	158	0	186	0	133	2	0	135	447
Grand Total	116	4313	4	4429	3131	6537	0	9668	1	5030	228	0	5259	19356
Approach %	2.6	97.4	-	-	32.4	67.6	-	-	0.0	95.6	4.3	-	-	-
Total %	0.6	22.3	-	22.9	16.2	33.8	-	49.9	0.0	26.0	1.2	-	27.2	-
Lights	114	4214	-	4328	3083	6353	-	9436	1	4901	225	-	5127	18891
% Lights	98.3	97.7	-	97.7	98.5	97.2	-	97.6	100.0	97.4	98.7	-	97.5	97.6
Mediums	2	91	-	93	47	171	-	218	0	115	3	-	118	429
% Mediums	1.7	2.1	-	2.1	1.5	2.6	-	2.3	0.0	2.3	1.3	-	2.2	2.2
Articulated Trucks	0	8	-	8	1	13	-	14	0	14	0	-	14	36
% Articulated Trucks	0.0	0.2	-	0.2	0.0	0.2	-	0.1	0.0	0.3	0.0	-	0.3	0.2
All Pedestrians	-	-	4	-	-	-	0	-	-	-	-	0	-	-
% All Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Data Plot

Turning Movement Peak Hour Data (3:45 PM)

Start Time	Kapaa Bypass Rd Koko Head Bound				Kuhio Hwy Mauka Bound				Kuhio Hwy Makai Bound					Int. Total
	Left-Turn	Right-Turn	Peds	App. Total	Left-Turn	Thru	Peds	App. Total	Left-Turn	Thru	Right-Turn	Peds	App. Total	
3:45 PM	8	104	0	112	148	201	0	349	0	88	21	0	109	570
4:00 PM	1	108	0	109	168	161	0	329	0	91	16	0	107	545
4:15 PM	9	94	0	103	154	172	0	326	0	97	14	0	111	540
4:30 PM	6	90	0	96	166	187	0	353	0	112	19	0	131	580
Total	24	396	0	420	636	721	0	1357	0	388	70	0	458	2235
Approach %	5.7	94.3	-	-	46.9	53.1	-	-	0.0	84.7	15.3	-	-	-
Total %	1.1	17.7	-	18.8	28.5	32.3	-	60.7	0.0	17.4	3.1	-	20.5	-
PHF	0.667	0.917	-	0.938	0.946	0.897	-	0.961	0.000	0.866	0.833	-	0.874	0.963
Lights	24	390	-	414	633	712	-	1345	0	377	69	-	446	2205
% Lights	100.0	98.5	-	98.6	99.5	98.8	-	99.1	-	97.2	98.6	-	97.4	98.7
Mediums	0	6	-	6	3	9	-	12	0	11	1	-	12	30
% Mediums	0.0	1.5	-	1.4	0.5	1.2	-	0.9	-	2.8	1.4	-	2.6	1.3
Articulated Trucks	0	0	-	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0
All Pedestrians	-	-	0	-	-	-	0	-	-	-	-	0	-	-
% All Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (3:45 PM)

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Kapaa Bypass Rd Koko Head Bound				Kuhio Hwy Mauka Bound				Kuhio Hwy Makai Bound					Int. Total
	Left-Turn	Right-Turn	Peds	App. Total	Left-Turn	Thru	Peds	App. Total	Left-Turn	Thru	Right-Turn	Peds	App. Total	
7:00 AM	1	161	0	162	20	129	0	149	0	233	0	0	233	544
7:15 AM	1	184	0	185	25	155	0	180	0	200	1	0	201	566
7:30 AM	2	152	0	154	24	152	0	176	0	167	0	0	167	497
7:45 AM	1	155	1	156	33	180	0	213	0	135	0	0	135	504
Total	5	652	1	657	102	616	0	718	0	735	1	0	736	2111
Approach %	0.8	99.2	-	-	14.2	85.8	-	-	0.0	99.9	0.1	-	-	-
Total %	0.2	30.9	-	31.1	4.8	29.2	-	34.0	0.0	34.8	0.0	-	34.9	-
PHF	0.625	0.886	-	0.888	0.773	0.856	-	0.843	0.000	0.789	0.250	-	0.790	0.932
Lights	4	635	-	639	100	600	-	700	0	711	1	-	712	2051
% Lights	80.0	97.4	-	97.3	98.0	97.4	-	97.5	-	96.7	100.0	-	96.7	97.2
Mediums	1	14	-	15	2	16	-	18	0	23	0	-	23	56
% Mediums	20.0	2.1	-	2.3	2.0	2.6	-	2.5	-	3.1	0.0	-	3.1	2.7
Articulated Trucks	0	3	-	3	0	0	-	0	0	1	0	-	1	4
% Articulated Trucks	0.0	0.5	-	0.5	0.0	0.0	-	0.0	-	0.1	0.0	-	0.1	0.2
All Pedestrians	-	-	1	-	-	-	0	-	-	-	-	0	-	-
% All Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Kapaa Bypass Rd Koko Head Bound				Kuhio Hwy Mauka Bound				Kuhio Hwy Makai Bound				Int. Total	
	Left-Turn	Right-Turn	Peds	App. Total	Left-Turn	Thru	Peds	App. Total	Left-Turn	Thru	Right-Turn	Peds		App. Total
4:15 PM	6	109	1	115	136	158	0	294	0	95	6	0	101	510
4:30 PM	6	96	1	102	143	174	0	317	0	78	2	0	80	499
4:45 PM	5	93	0	98	138	181	0	319	0	83	6	0	89	506
5:00 PM	2	98	0	100	146	204	0	350	0	85	3	0	88	538
Total	19	396	2	415	563	717	0	1280	0	341	17	0	358	2053
Approach %	4.6	95.4	-	-	44.0	56.0	-	-	0.0	95.3	4.7	-	-	-
Total %	0.9	19.3	-	20.2	27.4	34.9	-	62.3	0.0	16.6	0.8	-	17.4	-
PHF	0.792	0.908	-	0.902	0.964	0.879	-	0.914	0.000	0.897	0.708	-	0.886	0.954
Lights	19	385	-	404	558	710	-	1268	0	337	17	-	354	2026
% Lights	100.0	97.2	-	97.3	99.1	99.0	-	99.1	-	98.8	100.0	-	98.9	98.7
Mediums	0	11	-	11	5	7	-	12	0	4	0	-	4	27
% Mediums	0.0	2.8	-	2.7	0.9	1.0	-	0.9	-	1.2	0.0	-	1.1	1.3
Articulated Trucks	0	0	-	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0
All Pedestrians	-	-	2	-	-	-	0	-	-	-	-	0	-	-
% All Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-

Turning Movement Peak Hour Data (7:00 AM)

Start Time	Kapaa Bypass Rd Koko Head Bound				Kuhio Hwy Mauka Bound				Kuhio Hwy Makai Bound					Int. Total
	Left-Turn	Right-Turn	Peds	App. Total	Left-Turn	Thru	Peds	App. Total	Left-Turn	Thru	Right-Turn	Peds	App. Total	
7:00 AM	1	131	0	132	17	133	0	150	0	219	1	0	220	502
7:15 AM	3	168	0	171	32	158	0	190	0	182	3	0	185	546
7:30 AM	1	125	0	126	40	146	0	186	0	166	2	0	168	480
7:45 AM	1	123	0	124	30	165	0	195	0	138	0	0	138	457
Total	6	547	0	553	119	602	0	721	0	705	6	0	711	1985
Approach %	1.1	98.9	-	-	16.5	83.5	-	-	0.0	99.2	0.8	-	-	-
Total %	0.3	27.6	-	27.9	6.0	30.3	-	36.3	0.0	35.5	0.3	-	35.8	-
PHF	0.500	0.814	-	0.808	0.744	0.912	-	0.924	0.000	0.805	0.500	-	0.808	0.909
Lights	5	535	-	540	113	569	-	682	0	688	6	-	694	1916
% Lights	83.3	97.8	-	97.6	95.0	94.5	-	94.6	-	97.6	100.0	-	97.6	96.5
Mediums	1	10	-	11	5	29	-	34	0	15	0	-	15	60
% Mediums	16.7	1.8	-	2.0	4.2	4.8	-	4.7	-	2.1	0.0	-	2.1	3.0
Articulated Trucks	0	2	-	2	1	4	-	5	0	2	0	-	2	9
% Articulated Trucks	0.0	0.4	-	0.4	0.8	0.7	-	0.7	-	0.3	0.0	-	0.3	0.5
All Pedestrians	-	-	0	-	-	-	0	-	-	-	-	0	-	-
% All Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-

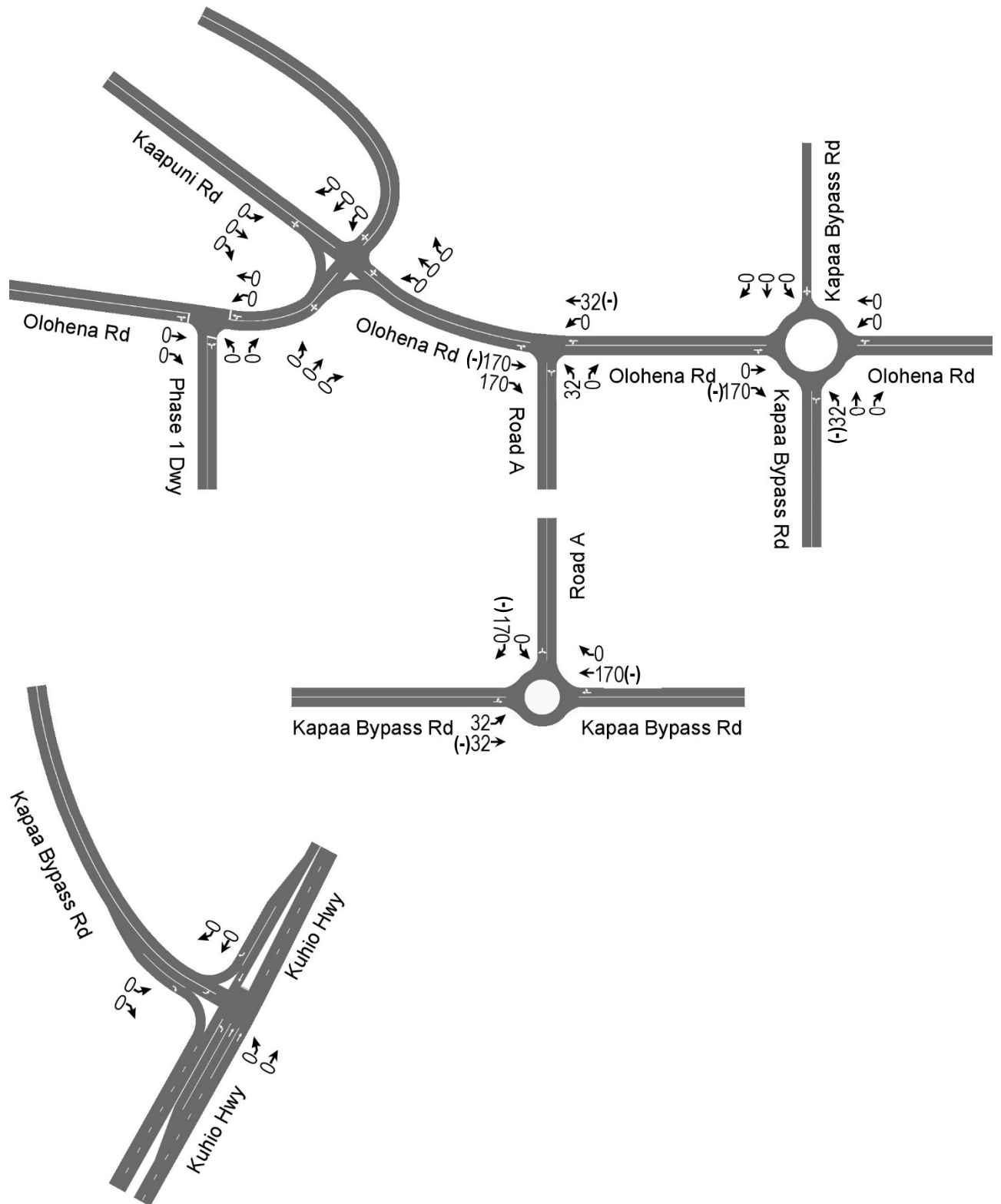
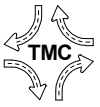


Figure 12.1 AM Peak Hour Diverted Traffic Assignment

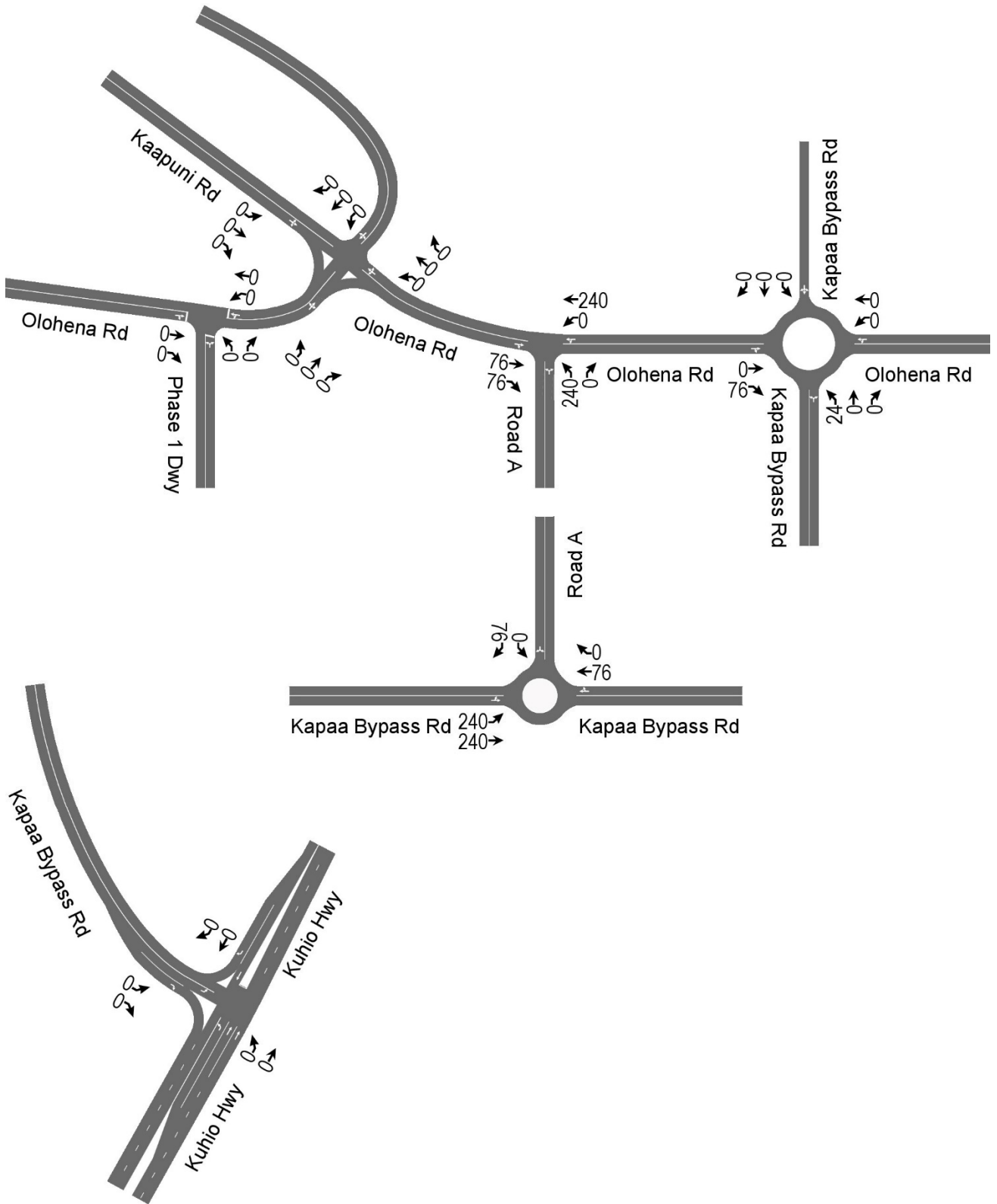
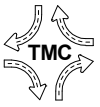


Figure 14.1 PM Peak Hour Diverted Traffic Assignment

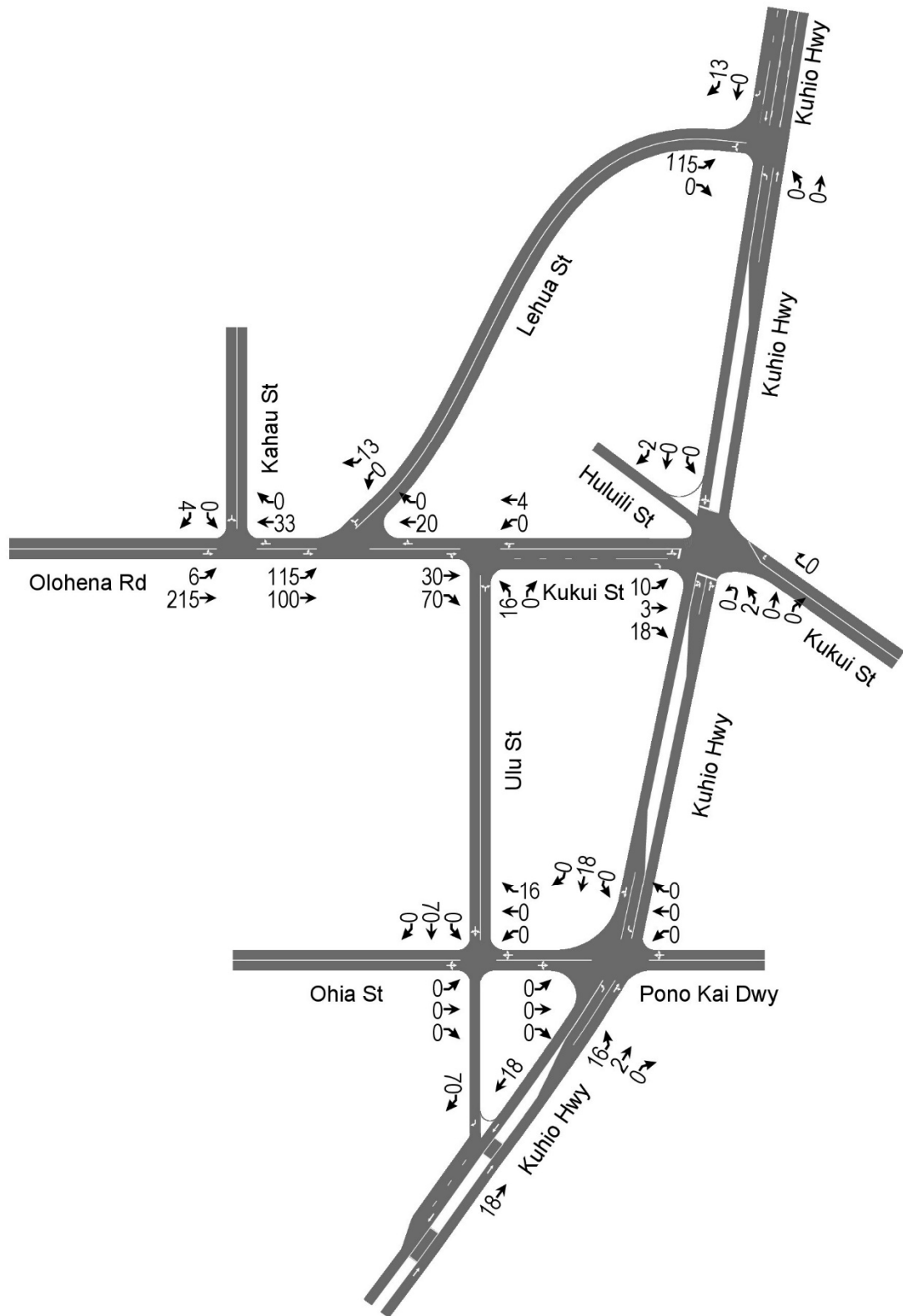
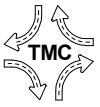


Figure 11. AM Peak Hour Site Traffic Assignment

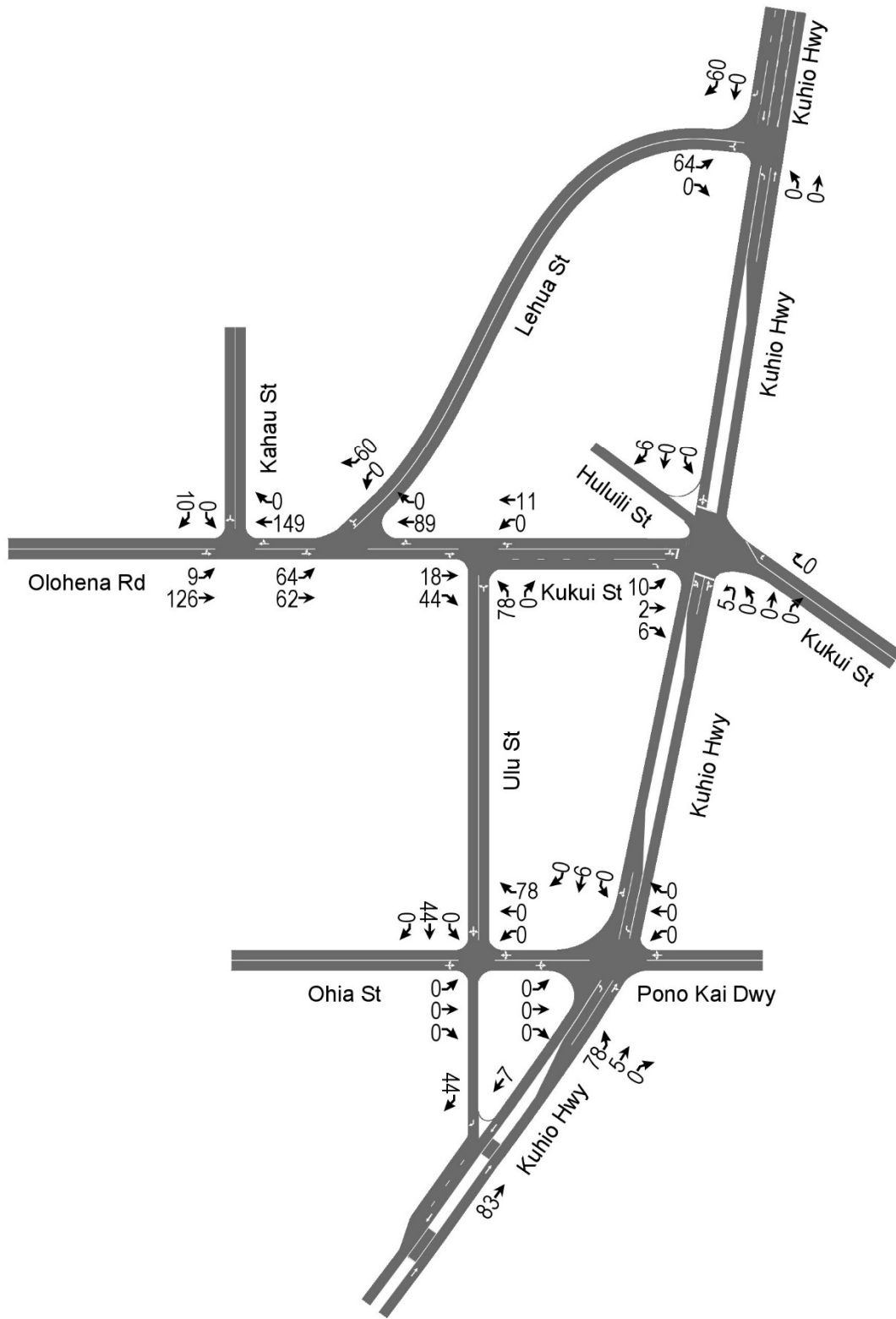


Figure 13. PM Peak Hour Site Traffic Assignment

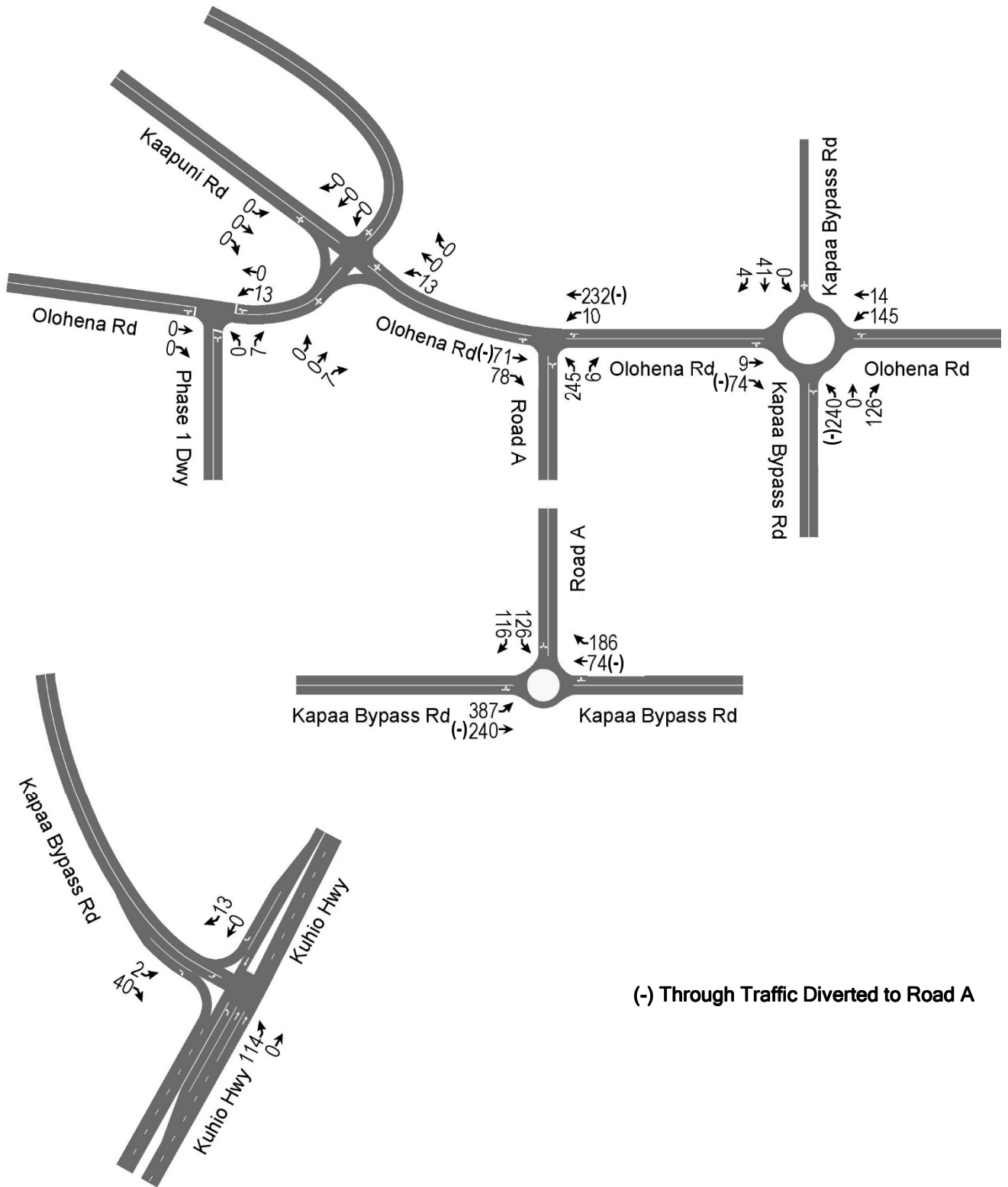
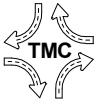


Figure 14. PM Peak Hour Site Traffic Assignment (Cont'd.)

Bernard P. Carvalho, Jr.
Mayor



Lyle Tabata
Acting County Engineer

Wallace G. Rezentes, Jr.
Managing Director

DEPARTMENT OF PUBLIC WORKS

County of Kaua'i, State of Hawai'i

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September 1, 2017

Randall S. Okaneku, P. E.
The Traffic Management Consultant
1188 Bishop Street, Suite 1907
Honolulu, Hawaii 96813

SUBJECT: Traffic Impact Analysis Report Update
For the Proposed Hokua Place
Kapa`a, Kawaihau District, Island of Kaua'i
TMK: (4) 4-3-03: Por. 001

Dear Mr. Okaneku:

The Engineering Division of the Department of Public Works received the subject Traffic Impact Analysis Report (TIAR) Update that was transmitted via email on June 15, 2017. We appreciate the opportunity to review the TIAR and offer the following comments on the TIAR:

1. Introduction, Project Description:

- a. The TIAR indicates that the driveway for phase 1 is proposed to be located on Olohena Road mauka of its intersection with Ka'apuni Road. We have concerns with a proposed intersection at this location, including the proximity to the intersection of Ka'apuni Road as well as concerns about intersection sight distance due to nearby horizontal and vertical curves. Prior to approval of a driveway at this location, additional information will need to be provided about this driveway location, to show that appropriate sight lines can be achieved and that no safety or other problems will be created by the proximity to the intersection of Olohena Road and Ka'apuni Road.

2. Existing Conditions, Roadways:

- a. The report states that the Kapa'a Bypass Road speed limit is reduced to 25 mph south of the proposed intersection with Road A. The report should also mention that further south the speed limit is again increased to 35 mph.
- b. The report incorrectly indicates that the posted speed limit for Olohena Road is reduced to 15 mph as it approaches Kapa'a Middle School. The correct statement should be that there is a 15 mph school zone within the vicinity of Kapa'a Middle School during school hours.
- c. Kukui Street and Ulu Street should both be described as collector streets.

3. Existing Conditions, Existing Peak Hour Traffic Volumes and Operating Conditions:

- a. The language throughout this segment of the TIAR indicates that intersections “operated at LOS...” However, if we understand correctly, the LOS values given are based on the analysis of the traffic conditions, not actual empirical observations of delay for vehicles at these intersections. The TIAR should instead use language such as “calculated to operate at LOS” This is an important distinction given that observations of Kūhiō Highway during peak hours of traffic appear to show LOS along the highway worse than the LOS A for movements along Kūhiō Highway as reported in the TIAR, potentially due to other factors than the control delay at the intersections.
- b. Check the traffic volume of 1,500 shown on page 10 for Kūhiō Highway south of Ulu Street in the PM Peak. The volumes shown in Figure 6 do not match.
- c. Figure 6 (Existing PM Peak Hour Traffic) has an error for the southbound through movement on Kūhiō Highway at the Kapa‘a Bypass Road. The figure shows an hourly volume of 38, which is way too low for this through movement. The data shown for this intersection in figure 6 does not appear to match either of the two PM peak hour traffic count plots (or their average) in the appendix.
- d. Related to comment “a” above recommending different language for the calculated LOS values, we recommend that the TIAR include some statements comparing the observed traffic conditions with the calculated delays and level of service, ideally offering explanations for the difference in observed level of service and calculated level of service.

4. Future Traffic Conditions, Kapa‘a Transportation Solutions:

- a. Page 17 of the TIAR refers to removal of on-street parking on Kūhiō Highway. The Kapa‘a Transportation Solutions study rejected any potential solutions that removed parking on Kūhiō Highway, since such a change would be detrimental to the economic vitality, multimodal, and safety goals of the study. Removal of parking should not be discussed in the TIAR, as HDOT is not considering removal of parking to add travel lanes or turn lanes.
- b. With respect to a new connector road in the approximate location of Road A, page 18 of the TIAR states, “The construction cost of the connector road was estimated at \$25,824,000.” The costs in the Kapa‘a Transportation Solutions report include right-of-way costs as well as construction cost; therefore it is misleading to state that the full cost shown in the study is the estimated construction cost.

5. Traffic Impact Analysis, Trip Generation Characteristics:

- a. The project description in the TIAR’s introduction states that there are 700 multi-family dwelling units, but the trip generation calculations are based on 800 multi-family dwelling units. This discrepancy must be corrected, and the accurate trip generation should be reflected in the study.
- b. The pass-by trip percentage of 81.2% is too high, especially given the relatively small amount of traffic traveling through the development on Road A. The diverted volume of 45 vehicles represents approximately 15% of the estimated through vehicles on Road A during the PM Peak Hour. The 8,000 square feet of the Hokua Place shopping center is outside of the sample size in the pass-by trip

chart for shopping centers in the ITE Trip Generation Handbook. A pass-by trip percentage of approximately 30% or 40% would be more reasonable, given the data available in the Trip Generation Handbook. It would also be reasonable for the TIAR to include a calculation of an internal capture rate for trips between the retail portion and the residential portion of the Hokua Place development. However, the combination of the traffic reduction for internal capture and pass-by trips should still be less than 81%.

6. Traffic Impact Analysis, Site Access Improvements:

- a. The recommendations for the stop controlled Tee-intersections of Olohena Road with Road A and the phase 1 driveway do not include any statements regarding the recommended lane assignments for these new intersections. The methodologies section of the report describes the use of AASHTO Left-Turn Lane Guidelines, but no such analyses are included in the TIAR for left turn lanes on Olohena Road at these intersections. We believe that at a minimum, a left turn lane would be necessary on Olohena Road at Road A, but analyses must be provided for both intersections. A median refuge lane should also be included on Olohena Road to facilitate the left-turn movement from Road A to Olohena Road. In addition, we believe that Road A should have two approach lanes at Olohena Road, one for right turn movements and one for left turn movements.

7. Traffic Impact Analysis, Traffic Assignment:

- a. In the previous TIAR for this project, no traffic was assigned to the left turn movement from southbound Road A to eastbound Kapa‘a Bypass (and likewise for the right turn from the Kapa‘a Bypass to Road A). In our earlier comments, we recommended that some traffic be assigned to these movements. In almost a complete reversal, the current TIAR assigned nearly all of the traffic to these movements. In the current TIAR, only about 5% to 10% of the project traffic that goes through the existing Kapa‘a Bypass roundabout is assigned to go through the intersection of Road A and Olohena Road. A more equitable distribution of traffic should be made, to accurately represent the traffic impact on Olohena Road.
- b. The TIAR assigns no traffic between the project and Olohena Road or Ka‘apuni Road north of the project (Wailua Homesteads and Upper Kapahi area). There are relatively few destinations on those roads for the residential traffic from the project, but a small amount of residential traffic is likely to travel to those areas. In addition, much of the traffic generated by the retail portion of the development would have its origin or destination in the residential areas of Wailua Homesteads and Upper Kapahi area. A reasonable (albeit small) amount of traffic must be assigned to those areas.

8. Figures 11 Through 14 (Traffic Assignment)

- a. For clarity, the TIAR must show the reassignment of existing traffic on separate figures from the figures for traffic assignment from this project.
- b. On Figure 11, the 989 vehicles shown for northbound Kūhiō Highway at Ulu Street is incorrect. It appears that this volume should be 20.
- c. On Figure 13, the 1,274 vehicles shown for northbound Kūhiō Highway at Ulu Street is incorrect. It appears that this volume should be 92.
- d. On Figure 14, the 30 vehicles shown for the Kapa‘a Bypass Road left turn and the

447 vehicles for the Kapa‘a Bypass Road right turn appear to be incorrect.

9. Traffic Impact Analysis, PM Peak Hour Traffic Analysis With Project:

- a. We recommend that the TIAR further analyze and discuss the impact of the project on the intersection of Kūhiō Highway and Lehua Street and recommend measures to mitigate this impact. The TIAR states that “Makai bound Lehua Street is expected to continue at LOS F at Kūhiō Highway during the PM peak hour of traffic with the proposed project.” However, Table 7 shows the PM peak hour of traffic without the project to be LOS E. Additionally, while the AM peak hour of traffic with the project continues to be LOS F, the delay increases significantly.

10. Recommendations and Conclusions, Recommended Traffic Improvements Without Project:

- a. Item number 3 recommends restricting parking along Kūhiō Highway within Kapa‘a Town in order to provide additional through lanes or left turn lanes on Kūhiō Highway. This should not be recommended in the TIAR, because HDOT is not considering removal of parking to add travel lanes. Removal of parking has been determined to be detrimental to businesses and the economic vitality of Kapa‘a Town. Discussion of parking removal on Kūhiō Highway in Kapa‘a Town should also be removed from other sections of the report, including the conclusions.

11. Recommendations and Conclusions, Recommended Traffic Improvements With Project:

- a. Our comments above include several concerns about the intersection of Road A and Olohena Road, including the possibility that additional traffic should be assigned to this intersection. We are concerned that the one-way stop control Tee-intersection proposed will not be sufficient to address traffic operations and safety at intersection. The installation of a roundabout at this intersection shall be evaluated as part of the TIAR, including traffic operations analysis for a roundabout as well as a safety comparison of a roundabout and a one-way stop control intersection. The federal Manual on Uniform Traffic Control Devices (MUTCD) does not include traffic warrants for roundabouts. However, evaluation of the MUTCD’s multi-way stop control warrants and/or signal warrants would be instructive with respect to evaluating whether a one-way stop control intersection would be sufficient or if a roundabout is needed instead.

Alternatively, we may also accept an evaluation of the need for a roundabout based on roundabout evaluation guidelines from another jurisdiction or research document.

Consideration should also be given to the construction of a roundabout that combines the intersections of Olohena Road with Ka‘apuni Road and Road A (with Kaehulua Road designed as a T intersection with either Ka‘apuni Road or Olohena Road). Traffic operations analysis of a roundabout that combines these intersections shall be included in the TIAR.

The comments in this letter should not be construed to be inclusive of all County of Kaua‘i recommendations for road improvements required to be constructed as part of the Hokua Place

Mr. Randall Okaneku
September 1, 2017
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project. Recommendations and requirements for road improvements will be included as part of future review phases for the project, such as zoning amendments, subdivision applications, and construction plan review. If you have any questions or need additional information, please contact me at (808) 241-4891 or Stanford Iwamoto at (808) 241-4896.

Very truly yours,



MICHAEL MOULE, P.E.
Chief, Engineering Division

MM/SI

Copies to: DPW-Design & Permitting
Lyle Tabata, Acting County Engineer
Larry Dill, HDOT Kaua'i District Engineer