Abrams Associates
TRAFFIC ENGINEERING, INC.

October 21, 2014

Mina Patel
Leisure Hospitality Management, Inc.
150 Aquarium Drive
Jenks, OK 74037

Re: Trip Generation and Parking Analysis for the Proposed Fairfield Inn and Suites Hotel Project in the City of Alameda

This report presents the results of the traffic and parking analysis of the proposed hotel project in the City Alameda. The proposed project will consist of a five story hotel building with up to 105 guest rooms. The project would be located in close proximity to the Oakland International Airport within the Harbor Bay Business Park.

PROJECT DESCRIPTION

As mentioned above, the project consists of a five story building with up to 105 hotel rooms. The project is proposing to provide a total of 72 off-street parking spaces. Vehicular access to the project will be from two driveways on the Harbor Bay Parkway.

PROJECT TRIP GENERATION

The vehicle trip generation for the project is shown in **Table 1**. The trip generation rates are based on the ITE rates for a Business Hotel (Land Use 312) taken from the 9th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

The site is currently vacant so as per **Table 1** the increase in traffic on the surrounding street system from the project is estimated to be 61 trips during the AM peak hour and 65 trips during the PM peak hour. Please note that ITE specifies that the hotel trip generation rates include all trips from the hotel and also supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms, limited recreational facilities (pool, fitness room), and/or other retail and service shops. Typically additional trip generation is not included for supporting facilities. Based on data provided by Marriott International's Architecture and Construction Division a hotel near an airport like the one being proposed would typically have about one third of their guests arriving by shuttle or taxi and about two thirds arriving via private auto.[1]

Table 1
Project Vehicle Trip Generation

Land Use	ITE Code	Size	ADT	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Trip Generation from the Proposed Project									
ITE Business Hotel Trip Rates	312		7.27	0.34	.024	0.58	0.37	0.25	0.62
Hotel Trip Generation		*105 rooms*	*763*	*36*	*25*	*61*	*39*	*26*	*65*

[1] *Phone Conversation with Tom Whitney of Marriott's Architecture and Construction Division*, Marriott International, Inc., Washington D.C., April 24, 2014.

PROJECT TRIP DISTRIBUTION

The distribution of vehicle trips was developed based on existing traffic patterns and data from other traffic studies in the Harbor Bay Business Park. There are two main directions for traffic to exit the business park and it is estimated that 69% of the project traffic would have origins and destinations requiring travel to the east on the Harbor Bay Parkway. The remaining 31% would be expected to arrive from the west (the direction of the Harbor Bay Ferry Terminal) mostly via Bay Edge Road.

Based on these assumptions and the trip generation in Table 1 the amount of traffic added during the PM peak hour at various intersections to the east along the Harbor Bay Parkway would be approximately 42 trips during the AM peak hour and 45 trips during the PM peak hour. The intersections where these trips would be added include: Harbor Bay Parkway at North Loop Road and South Loop Road, Harbor Bay Parkway at "A" Street, and Harbor Bay Parkway at "B" Street.

TRAFFIC OPERATIONS ASSESSMENT

Abrams Associates also reviewed the potential for the project trips to cause impacts to traffic operations at the project driveways and at other intersections along the Harbor Bay Parkway. Based on previous traffic studies conducted for the Business Park it was determined the intersection of the Harbor Bay Parkway at the project entrance and at North Loop Road/South Loop Road. All other intersections in the area are expected to continue to have acceptable operations with the addition of project generated traffic.

The intersection of the Harbor Bay Parkway with North Loop Road/South Loop Road was recently studied as part of another hotel project located on the Harbor Bay Parkway about 0.5 mile east of the proposed project site.[2] In addition, LOS calculations were prepared for AM and PM peak hour conditions for existing and existing plus project conditions. The detailed LOS calculations which also present queuing results are attached to this report. Based on the LOS analysis it was concluded the intersection of the Harbor Bay Parkway with North Loop Road/South Loop Road is currently operating at LOS "E" which is below the City's established standard of LOS "D". The unsignalized intersection of the Harbor Bay Parkway with the proposed main hotel entrance is forecast to operate at LOS A during both the AM and PM peak hours.

Since the North Loop Road/South Loop Road intersection is already operating below the City's LOS D standard the project is considered to have a significant impacts under City standard if it increases the traffic volumes by more than 3%. Based on the existing traffic volumes documented in the July 18, 2014 report referenced above, the proposed project would increase the AM peak hour volumes by 2.9% and would increase the PM peak hour volumes by 3.5%. Therefore according to City standards the project would be considered to have a significant impact on the intersection of North/South Loop Road and the Harbor Bay Parkway. This intersection is forecast to eventually warrant installation of a traffic signal. The City will make the determination on how the signal will be funded but it is expected that this project will ultimately be required to make a proportionate share contribution to the implementation of this traffic signal. LOS calculations assuming implementation of a traffic signal indicate this would significantly improve traffic operations. These LOS and queuing calculations are also attached.

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[2] Trip Generation Letter for the Hampton Inn & Suites, Kittleson and Associates, Oakland, CA, July 18, 2014.

PARKING

This section discusses the City of Alameda's zoning and estimated parking demand for the project. The project plans to provide 72 off-street spaces within the project for customers and employees. This amount of parking would be short of the City's requirements which specify the project requires 1.25 parking spaces per hotel room. For the proposed 105 room hotel project this equates to a minimum requirement of 131 off-street parking spaces.

Parking Demand Based on ITE Parking Generation Rates - To provide justification for the parking demand analysis, **Table 2** provides a summary of the parking demand results using the average ITE parking generation rates for a Business Hotel taken from the 4th Edition of the *ITE Parking Generation Manual*. As shown in **Table 2**, using the ITE rate results in an estimated weekday average peak parking demand of 69 parking spaces for the project. Please note that ITE data indicates that the weekday daytime parking demand would be about 60 percent of the peak parking demand, or about 42 parking spaces.

Table 2
Average Weekday Peak Parking Demand Using Parking Data from the Institute of Transportation Engineers

No.	Scenario	Data Source	Land Use	Size		Parking Ratio	Required Spaces
1	Proposed Project	ITE Parking Demand Rates	Business Hotel	105	rooms	0.66	69

Source: *ITE Parking Generation Manual, 4th Edition, Washington D.C., 2010.*

Please note that ITE specifies that the maximum peak parking demand for this use would occur on a Saturday when the demand would be about 69 parking spaces. During the middle of the day on weekdays the parking demand would typically be only about 50% of the maximum evening demand.

Parking Demand Based on Marriott Hotel Requirements - It should also be noted that Marriott Hotels typically requires one parking space per hotel room for new hotel projects. However, we contacted Marriott International's Architecture and Construction Division and confirmed that they will indeed allow as little as 0.65 spaces per unit for hotels near major airports. This is only possible when a hotel offers free 24 hour shuttle service to an adjacent airport, which would be the case with the proposed project. In this case it is assumed that up to a third of hotel customers would utilize the hotel's complimentary shuttle service while the other two thirds would be expected to arrive by private auto.

Summary of Findings on Parking - Based on these studies, it is our recommendation that the City consider making the findings that the proposed 69 space parking garage for the project meets City Code, and is reasonable and appropriate. The justifications for the requirements are as follows:

1) The project should have reduced parking demand due to its location in the Harbor Bay Business Park in close proximity to the Oakland International Airport.

2) The project is proposing to provide free 24 hour shuttle service for guests between Oakland International Airport and the hotel. The shuttle would also further reduce the

need for parking by providing free service to the South Shore Shopping Center, the Park Street Business District, and the Harbor Bay Ferry Terminal.

3) The hotel would be within walking distance of the Harbor Bay Ferry Terminal which offers direct service to San Francisco (just over a half mile away).

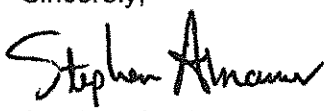
4) It is assumed the project would develop an agreement with one or more adjacent businesses to potentially accommodate overflow parking if there are ever periods of high parking demand.

It is important to note there are numerous businesses within a short walking distance of the project site that have low parking demand on evenings and weekends (when the hotel would have its peak parking demand). The hotel could potentially work out an arrangement to share parking with one of more of these businesses if the proposed hotel's demand was ever found to be exceeding its parking supply.

It also should be noted that the off-street parking provided would be consistent with many of the City policies. These include policies related to the goals of increasing the use of public transit, limiting increases in vehicular traffic, improving air quality, limiting fuel consumption, and the desire to improve conditions for pedestrians in the area. Each of these factors, goals, objectives is described in one form or another in the City's General Plan. These policies could provide additional support for making the findings to approve the parking for the project as proposed.

Please don't hesitate to contact me if you have any questions.

Sincerely,



Stephen C. Abrams
President, Abrams Associates
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Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	19	181	11	192	187	393	6	4	17	161	9	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	100	-	150	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	197	12	209	203	427	7	4	18	175	10	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	203	0	0	209	0	0	768	865	104	763	871	102
Stage 1	-	-	-	-	-	-	244	244	-	621	621	-
Stage 2	-	-	-	-	-	-	524	621	-	142	250	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1366	-	-	1359	-	-	291	290	931	294	288	933
Stage 1	-	-	-	-	-	-	738	703	-	442	477	-
Stage 2	-	-	-	-	-	-	504	477	-	846	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1366	-	-	1359	-	-	244	242	931	248	240	933
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	242	-	248	240	-
Stage 1	-	-	-	-	-	-	727	692	-	435	404	-
Stage 2	-	-	-	-	-	-	412	404	-	811	688	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	2	13.5	45
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	455	1366	-	-	1359	-	-	248	369
HCM Lane V/C Ratio	0.065	0.015	-	-	0.154	-	-	0.706	0.05
HCM Control Delay (s)	13.5	7.7	-	-	8.1	-	-	48.1	15.3
HCM Lane LOS	B	A	-	-	A	-	-	E	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.5	-	-	4.7	0.2

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	190	1	12	127	217	17	3	204	252	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	100	-	150	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	207	1	13	138	236	18	3	222	274	1	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	138	0	0	208	0	0	316	384	104	282	385	69
Stage 1	-	-	-	-	-	-	220	220	-	164	164	-
Stage 2	-	-	-	-	-	-	96	164	-	118	221	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1443	-	-	1360	-	-	613	548	931	648	547	980
Stage 1	-	-	-	-	-	-	762	720	-	822	761	-
Stage 2	-	-	-	-	-	-	900	761	-	874	719	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1443	-	-	1360	-	-	603	540	931	486	539	980
Mov Cap-2 Maneuver	-	-	-	-	-	-	603	540	-	486	539	-
Stage 1	-	-	-	-	-	-	758	717	-	818	754	-
Stage 2	-	-	-	-	-	-	887	754	-	660	716	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.3	10.6	21.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	886	1443	-	-	1360	-	-	486	814
HCM Lane V/C Ratio	0.275	0.005	-	-	0.01	-	-	0.564	0.005
HCM Control Delay (s)	10.6	7.5	-	-	7.7	-	-	21.5	9.4
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	1.1	0	-	-	0	-	-	3.4	0

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	19	198	11	192	211	393	6	4	17	161	9	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	100	-	150	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	215	12	209	229	427	7	4	18	175	10	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	229	0	0	227	0	0	800	910	114	798	915	115
Stage 1	-	-	-	-	-	-	263	263	-	647	647	-
Stage 2	-	-	-	-	-	-	537	647	-	151	268	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1336	-	-	1339	-	-	276	273	917	277	271	916
Stage 1	-	-	-	-	-	-	719	689	-	426	465	-
Stage 2	-	-	-	-	-	-	496	465	-	836	686	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1336	-	-	1339	-	-	230	227	917	233	225	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	230	227	-	233	225	-
Stage 1	-	-	-	-	-	-	708	678	-	419	392	-
Stage 2	-	-	-	-	-	-	404	392	-	801	675	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	2	13.9	52.1
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	434	1336	-	-	1339	-	-	233	349
HCM Lane V/C Ratio	0.068	0.015	-	-	0.156	-	-	0.751	0.053
HCM Control Delay (s)	13.9	7.7	-	-	8.2	-	-	55.9	15.9
HCM Lane LOS	B	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0.6	-	-	5.2	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	198	11	192	211	393	6	4	17	161	9	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	21	215	12	209	229	427	7	4	18	175	10	9
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	975	54	287	1510	676	174	74	174	473	157	141
Arrive On Green	0.02	0.29	0.29	0.16	0.43	0.43	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1774	3410	189	1774	3539	1583	189	425	1006	1384	905	814
Grp Volume(v), veh/h	21	111	116	209	229	427	29	0	0	175	0	19
Grp Sat Flow(s),veh/h/ln	1774	1770	1829	1774	1770	1583	1620	0	0	1384	0	1719
Q Serve(g_s), s	0.4	1.5	1.5	3.5	1.3	6.7	0.0	0.0	0.0	3.2	0.0	0.3
Cycle Q Clear(g_c), s	0.4	1.5	1.5	3.5	1.3	6.7	0.5	0.0	0.0	3.6	0.0	0.3
Prop In Lane	1.00		0.10	1.00		1.00	0.24		0.62	1.00		0.47
Lane Grp Cap(c), veh/h	38	506	523	287	1510	676	422	0	0	473	0	298
V/C Ratio(X)	0.56	0.22	0.22	0.73	0.15	0.63	0.07	0.00	0.00	0.37	0.00	0.06
Avail Cap(c_a), veh/h	392	1172	1212	1455	4466	1998	1679	0	0	1586	0	1681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	8.6	8.6	12.6	5.6	7.1	11.0	0.0	0.0	12.3	0.0	10.9
Incr Delay (d2), s/veh	12.1	0.2	0.2	3.5	0.0	1.0	0.1	0.0	0.0	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	0.8	2.0	0.6	3.0	0.2	0.0	0.0	1.5	0.0	0.1
LnGrp Delay(d),s/veh	27.5	8.8	8.8	16.1	5.6	8.1	11.1	0.0	0.0	12.8	0.0	11.0
LnGrp LOS	C	A	A	B	A	A	B			B		B
Approach Vol, veh/h		248			865			29			194	
Approach Delay, s/veh		10.4			9.4			11.1			12.6	
Approach LOS		B			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		9.5	9.1	13.1		9.5	4.7	17.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		31.0	26.0	21.0		31.0	7.0	40.0
Max Q Clear Time (g_c+I1), s		2.5	5.5	3.5		5.6	2.4	8.7
Green Ext Time (p_c), s		0.8	0.6	4.2		0.8	0.0	4.8

Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	211	11	24	201	8	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	Free	-	None
Storage Length	-	-	75	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	229	12	26	218	9	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	229	0	390	115
Stage 1	-	-	-	-	229	-
Stage 2	-	-	-	-	161	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	0	1336	-	586	916
Stage 1	-	0	-	-	787	-
Stage 2	-	0	-	-	851	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1336	-	575	916
Mov Cap-2 Maneuver	-	-	-	-	575	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	834	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	770	-	1336	-
HCM Lane V/C Ratio	0.035	-	0.02	-
HCM Control Delay (s)	9.8	-	7.7	-
HCM Lane LOS	A	-	A	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	208	1	12	154	217	17	3	204	252	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	100	-	150	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	226	1	13	167	236	18	3	222	274	1	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	167	0	0	227	0	0	350	433	114	321	433	84
Stage 1	-	-	-	-	-	-	240	240	-	193	193	-
Stage 2	-	-	-	-	-	-	110	193	-	128	240	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1408	-	-	1339	-	-	580	514	917	608	514	958
Stage 1	-	-	-	-	-	-	742	706	-	790	740	-
Stage 2	-	-	-	-	-	-	883	740	-	862	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1408	-	-	1339	-	-	571	506	917	454	506	958
Mov Cap-2 Maneuver	-	-	-	-	-	-	571	506	-	454	506	-
Stage 1	-	-	-	-	-	-	738	702	-	786	733	-
Stage 2	-	-	-	-	-	-	870	733	-	647	702	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	10.8	24.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	868	1408	-	-	1339	-	-	454	783
HCM Lane V/C Ratio	0.281	0.005	-	-	0.01	-	-	0.603	0.006
HCM Control Delay (s)	10.8	7.6	-	-	7.7	-	-	24.3	9.6
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	1.2	0	-	-	0	-	-	3.9	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	208	1	12	154	217	17	3	204	252	1	3
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1900	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	7	226	1	13	167	236	18	3	222	274	1	3
Adj No. of Lanes	1	2	0	1	2	1	0	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	13	997	4	24	999	447	155	23	404	660	114	343
Arrive On Green	0.01	0.28	0.28	0.01	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1774	3614	16	1774	3539	1583	56	82	1451	1151	411	1234
Grp Volume(v), veh/h	7	111	116	13	167	236	243	0	0	274	0	4
Grp Sat Flow(s),veh/h/ln	1774	1770	1860	1774	1770	1583	1589	0	0	1151	0	1645
Q Serve(g_s), s	0.1	1.3	1.3	0.2	1.0	3.5	0.0	0.0	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.1	1.3	1.3	0.2	1.0	3.5	3.6	0.0	0.0	3.7	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	0.07		0.91	1.00		0.75
Lane Grp Cap(c), veh/h	13	488	513	24	999	447	581	0	0	660	0	458
V/C Ratio(X)	0.52	0.23	0.23	0.53	0.17	0.53	0.42	0.00	0.00	0.42	0.00	0.01
Avail Cap(c_a), veh/h	255	1019	1071	255	2038	912	1049	0	0	1002	0	947
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.7	7.8	7.8	13.6	7.5	8.4	8.5	0.0	0.0	8.6	0.0	7.3
Incr Delay (d2), s/veh	27.9	0.2	0.2	16.9	0.1	1.0	0.5	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.7	0.7	0.2	0.5	1.6	1.6	0.0	0.0	1.8	0.0	0.0
LnGrp Delay(d),s/veh	41.6	8.0	8.0	30.5	7.6	9.4	9.0	0.0	0.0	9.0	0.0	7.3
LnGrp LOS	D	A	A	C	A	A	A			A		A
Approach Vol, veh/h		234			416			243			278	
Approach Delay, s/veh		9.0			9.3			9.0			9.0	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		11.7	4.4	11.7		11.7	4.2	11.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		16.0	4.0	16.0		16.0	4.0	16.0
Max Q Clear Time (g_c+I1), s		5.6	2.2	3.3		5.7	2.1	5.5
Green Ext Time (p_c), s		2.0	0.0	2.6		2.0	0.0	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	215	12	27	147	8	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	Free	-	None
Storage Length	-	-	75	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	234	13	29	160	9	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	234	0	373	117
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	139	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	0	1331	-	601	913
Stage 1	-	0	-	-	783	-
Stage 2	-	0	-	-	873	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1331	-	588	913
Mov Cap-2 Maneuver	-	-	-	-	588	-
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	854	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBL	WBT
Capacity (veh/h)	780	-	1331	-
HCM Lane V/C Ratio	0.036	-	0.022	-
HCM Control Delay (s)	9.8	-	7.8	-
HCM Lane LOS	A	-	A	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-