

May 2, 2017



Sam Stein
Mid-Rail Real Estate, LLC
C/O SSS-Steel
6000 Jensen Drive
Houston, TX 77025

Re: Addendum to the Traffic Impact Study for the Intsel Irondale Industrial Project – Commerce City, Colorado
JR Engineering Project Number 15855.00

Dear Mr. Stein:

This addendum has been prepared at your request to address the traffic impacts of the proposed Irondale Industrial project along with the proposed closure of Ulster Street at the railroad spur. The Irondale Industrial project and its associated traffic impacts were addressed in the *Irondale Industrial Traffic Impact Study* by JR Engineering, dated February 2016. The *Irondale Industrial Traffic Impact Study* will be referred to as the “2016 TIS” in this letter.

A railroad spur is planned to be constructed, which would connect into the Burlington Northern Santa Fe Railroad (BNSF). To avoid an at-grade crossing of the railroad spur, the property owner has proposed to close Ulster Street, and the street would terminate with a cul-de-sac. The railroad spur would then cross 84th Avenue, and the new public at-grade crossing would require a separate approval process through Commerce City, BNSF and the Public Utilities Commission. The at-grade crossing of 84th Avenue will be documented under a separate study and will not be discussed in this addendum.

Phase 1 of the Irondale Industrial project consisted of Lot 1, which started construction in 2016. The access will be constructed on the west side of Ulster Street. Phase 2 of the project is planned to consist of three industrial lots (Lots 2-4). The roadway network from the 2016 TIS and the revised roadway network for this addendum are shown in the attached Figure 1 and Figure 2, respectively. No revisions were made to the project site access locations. The planned cul-de-sac locations are also shown in Figure 2.

The remainder of this addendum presents our findings concerning the traffic impacts of the proposed Irondale Industrial project and the proposed closure of Ulster Street at the railroad spur. The Year 2035 will be evaluated in this addendum.

Revised Year 2035 Background Traffic

With the proposed 83rd Avenue and Ulster Street closure at the railroad spur, it is expected that the Year 2035 background traffic will utilize 84th Avenue to commute around the closures. It is expected that the eastbound background traffic entering 83rd Avenue will reroute north to 84th Avenue to access Ulster Street. Based on the existing properties off of 83rd Avenue and south of the Ulster Street/84th Avenue intersection, it is expected that minimal traffic will still travel east on 83rd Avenue and south along Ulster Street. It is also expected that the westbound background traffic entering 83rd Avenue will instead use 84th Avenue to access Rosemary Street. The revised Year 2035 Background Traffic is shown in the attached Figure 3.

Revised Project Trip Assignment and Year 2035 Total Traffic

The revised project trip assignment for Phase 1 and Phase 2 is shown in the Figure 4. The revised total traffic for Year 2035 is shown in the attached Figure 5. No revisions were made to the trip generation or trip distribution.

Revised Traffic Operations and Project Impacts – Year 2035 Background Traffic

For this letter, the study intersections remained the same as the 2016 TIS. Traffic analyses of the Year 2035 Background Traffic conditions of the study intersections were performed using the 2010 HCM methodologies and the Synchro software. Operational analyses were conducted in the AM and PM peak hours to determine the levels of service. The values were input, and the minor lane/major movement LOS results are summarized in the attached Table 1. The detailed Level of Service (LOS) reports are also attached to this letter. As shown in Table 1, the LOS is expected to remain the same as the 2016 TIS.

Revised Traffic Operations and Project Impacts – Year 2035 Total Traffic

Commerce City would require that adjacent developments construct half the proposed road cross section along the limits of the development's property lines. Therefore, the Irondale Industrial project would need to construct a half cross section along Ulster Street, 84th Avenue, and 83rd Avenue.

The City requested that 84th Avenue and Ulster Street be designed as the major through streets and be classified as Minor Collectors. The Minor Collector cross section consists of one travel lane in each direction separated by a double yellow stripe. Minor Collector Roadways are designed to handle traffic volumes generally less than 7000 vehicles per day. These streets collect and distribute traffic between arterials and local streets and serve as main connectors within communities. The recommended improvements and responsible party were detailed in the 2016 TIS and are summarized below.



Recommended Improvements Summary

Improvement Description	Responsible Party			
	Background Committed	Planned	Applicant Committed	Mitigated
Year 2035				
Construct half of Minor Collector cross section along Phase 2 property lines			Irondale Industrial	
Widen Rosemary Street to Major Collector cross section		Commerce City		
Widen 88 th Avenue to Minor Arterial cross section		Commerce City		
Widen SH 2 to four travel lanes	Commerce City			

An Alternative 1 scenario was analyzed in the 2016 TIS. Alternative 1 included the planned and background committed improvements shown above. The following lane geometry improvements were also included:

- 88th and Rosemary: Added separate EBR with SB acceleration lane
- 88th and Rosemary: Added dual NBL and separate NBR
- 84th and Rosemary: Added separate SBL and WBL

The Alternative 1 scenario was analyzed for this letter. Traffic analyses of the Year 2035 Total Traffic conditions of the study intersections were performed using the 2010 HCM methodologies and the Synchro software. Operational analyses were conducted in the AM and PM peak hours to determine the levels of service. The values were input, and the minor lane/major movement LOS results are summarized in the attached Table 2. The detailed LOS reports are also attached. As shown in Table 2, the LOS is expected to remain the same as the 2016 TIS.

It is likely that the signal timing at SH 2 and Quebec/Rosemary would need to be optimized when the City widens SH 2 from two to four travel lanes. The City would likely need to retime the SH 2 corridor with the widening project, which would include optimizing at SH 2 and Quebec/Rosemary.

It should be noted that the 84th and Ulster intersection was analyzed as all-way stop controlled. It should also be noted that no traffic analyses were completed for the at-grade railroad



crossings of 88th/UPRR, Rosemary/BNSF, and the 84th Avenue/BNSF crossing with the proposed railroad spur.

Recommendations

The traffic impacts of the Irondale Industrial project and the proposed closures of 83rd Avenue and Ulster Street can be accommodated by the adjacent roadway network. The findings and recommendations of the original 2016 TIS are still valid, and JR Engineering is also recommending the following with this addendum:

- If Commerce City requires a traffic signal to be installed at the 88th Avenue and Ulster Street intersection, separate NBL and NBR turn lanes should be constructed. Deceleration lanes should include a minimum of 50 feet of storage to accommodate for truck traffic.

Please feel free to contact me at efarney@jrengineering.com or 303-267-6183 if you have any questions or comments.

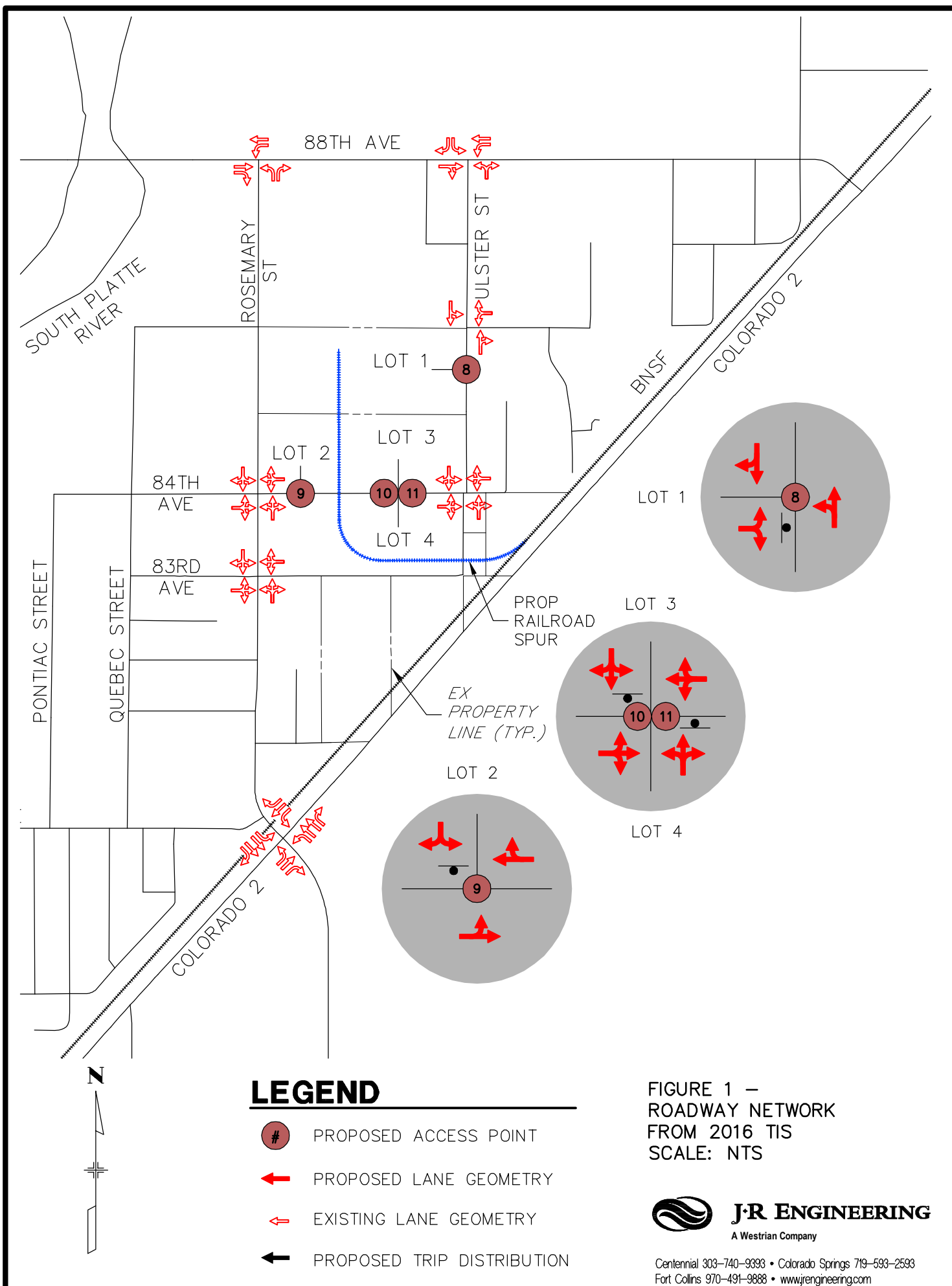
Sincerely,
JR Engineering, LLC

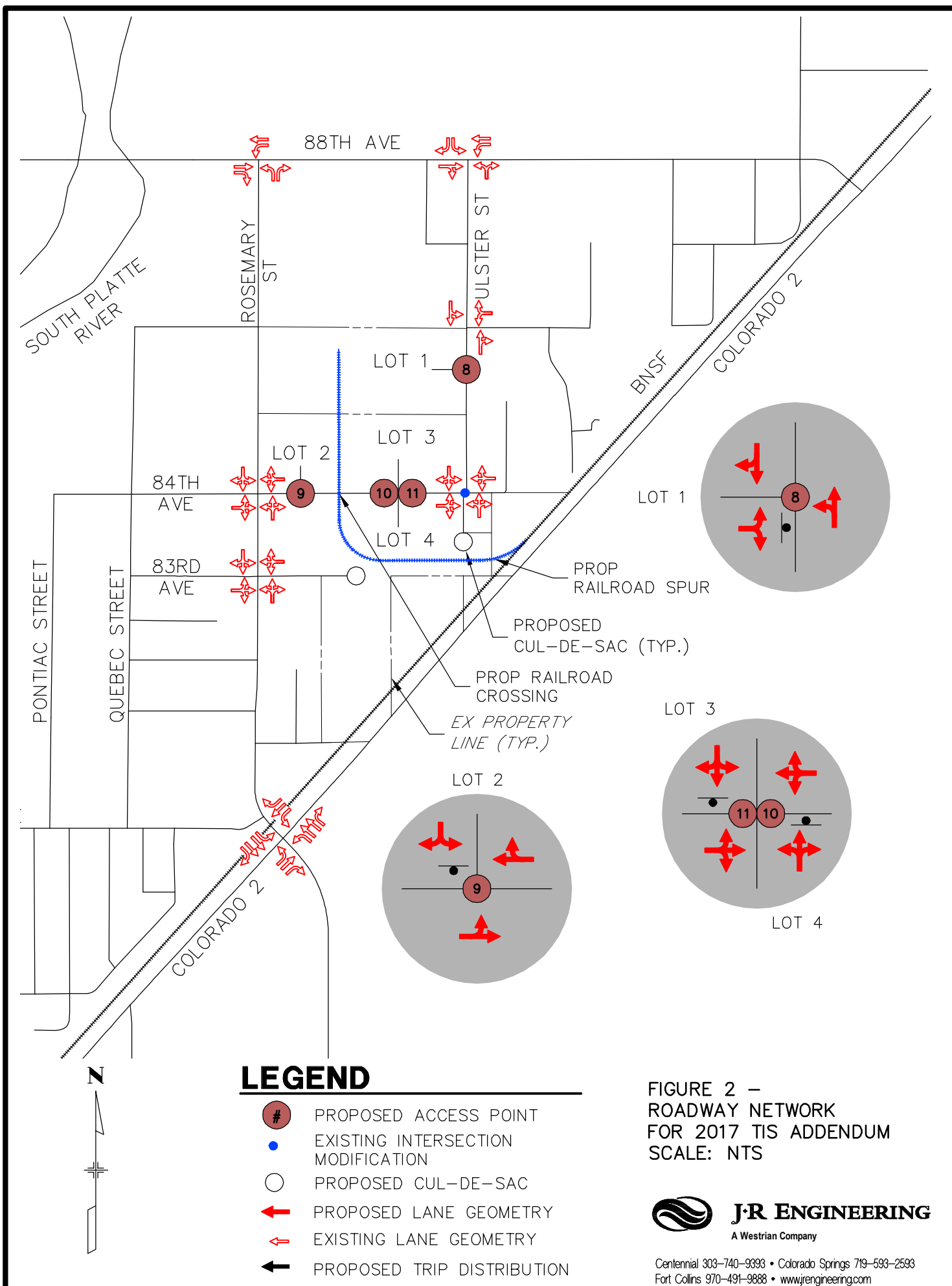

Eli Farney, PE, PTOE
Project Manager – Transportation and Traffic

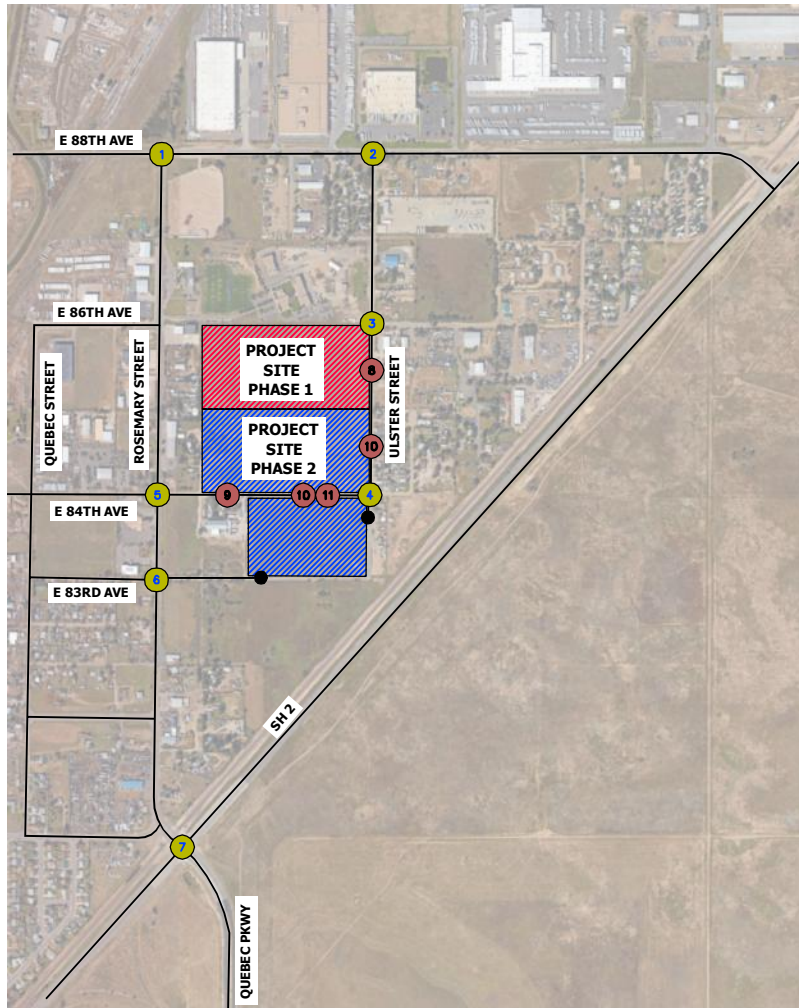


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Attachments: Figure 1 – Roadway Network from 2016 TIS
Figure 2 – Roadway Network for 2017 TIS Addendum
Figure 3 – Revised Year 2035 Background Traffic
Figure 4 – Revised Assignment of Site Generated Traffic
Figure 5 – Revised Year 2035 Total Traffic
Table 1 – LOS for Year 2035 Background Traffic
Table 2 – LOS for Year 2035 Total Traffic
HCM 2010 LOS Reports







LEGEND

- STUDY INTERSECTION
- SITE ACCESS POINT*
- XX (XX) AM (PM) PEAK VOLUME, VPH
- SIGNAL CONTROL
- STOP SIGN CONTROL

* SITE ACCESSES ARE CONCEPTUAL AT TIME OF ANALYSIS

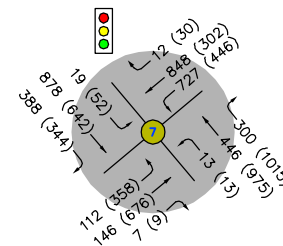
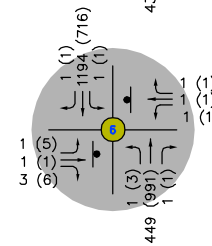
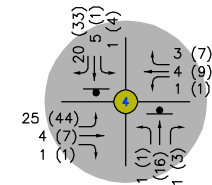
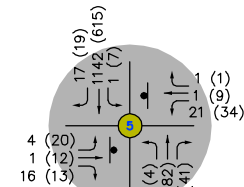
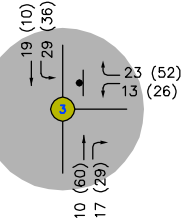
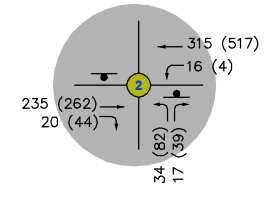
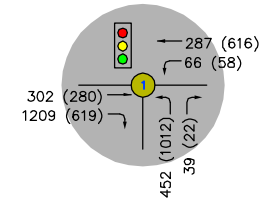
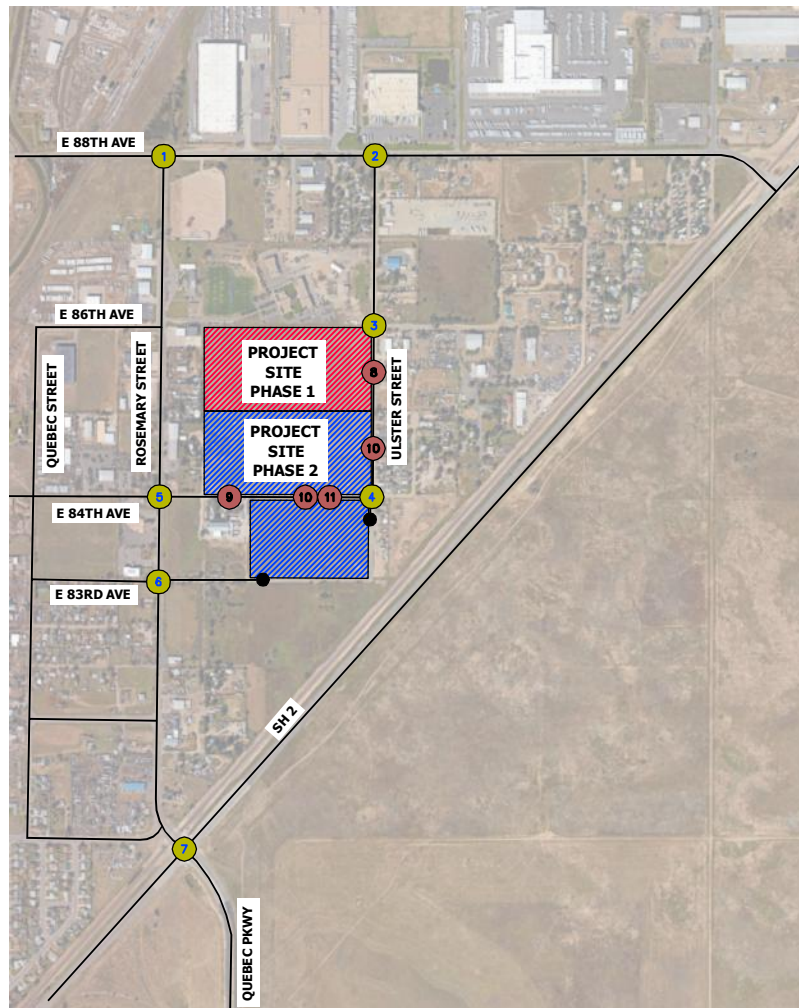


FIGURE 3 –
REVISED YEAR 2035
BACKGROUND TRAFFIC



LEGEND

- STUDY INTERSECTION
- SITE ACCESS POINT*
- XX (XX) AM (PM) PEAK VOLUME, VPH
- SIGNAL CONTROL
- STOP SIGN CONTROL

* SITE ACCESSES ARE CONCEPTUAL AT TIME OF ANALYSIS

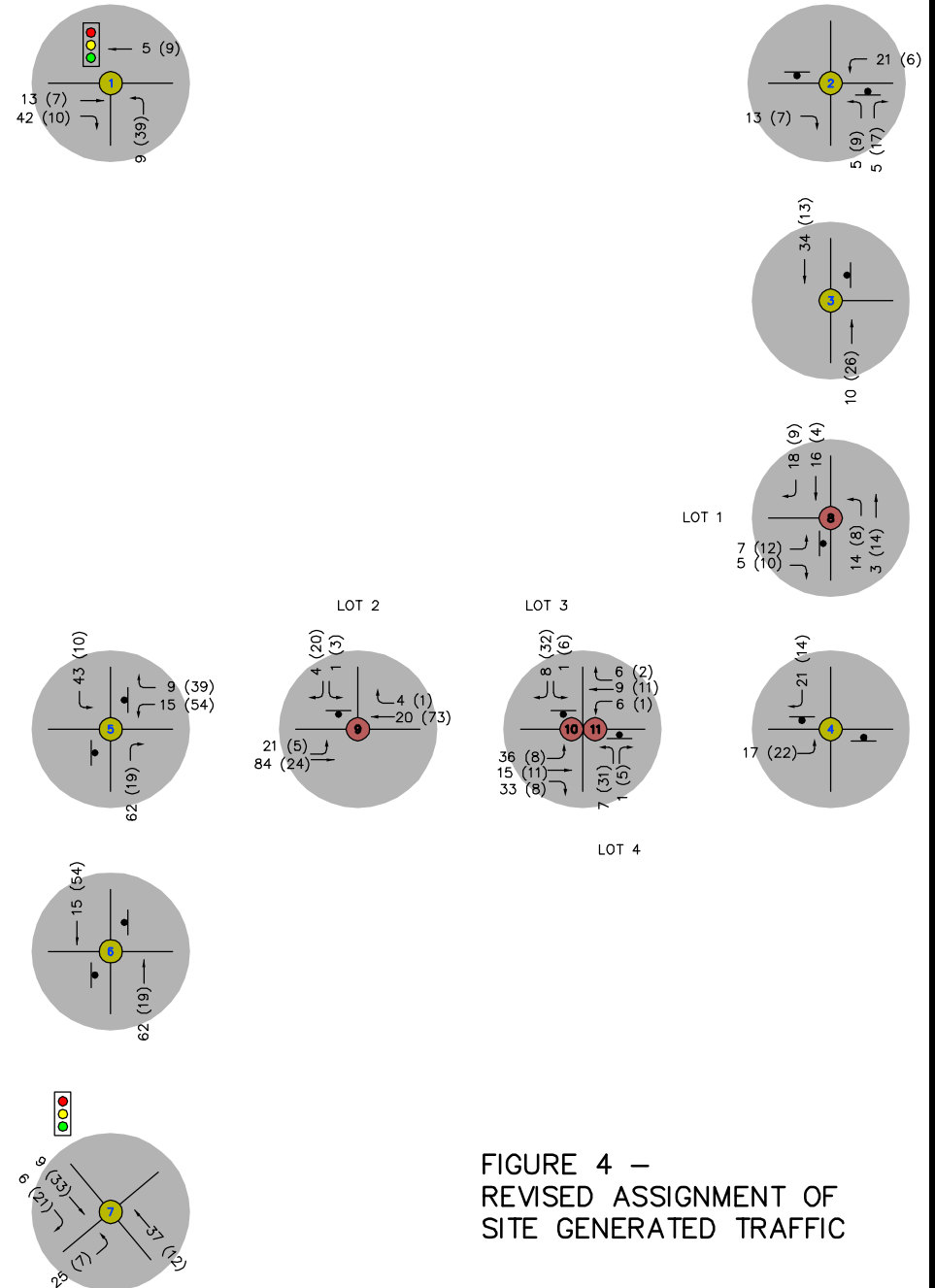
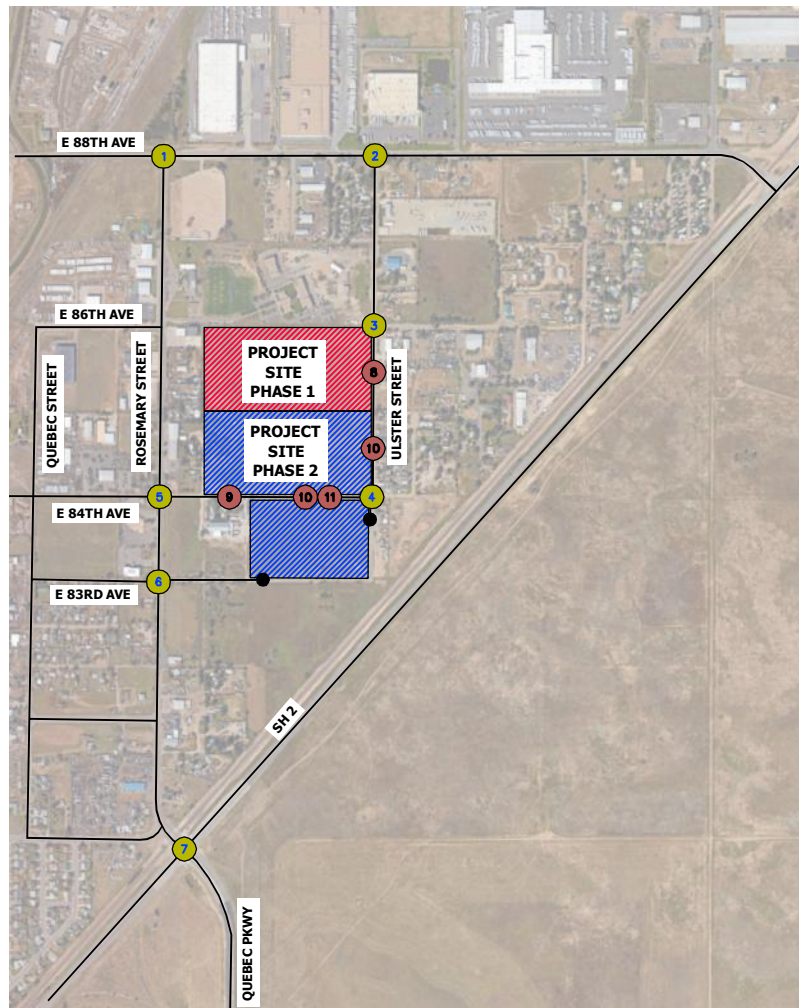


FIGURE 4 –
REVISED ASSIGNMENT OF
SITE GENERATED TRAFFIC



LEGEND

- STUDY INTERSECTION
- SITE ACCESS POINT*
- XX (XX) AM (PM) PEAK VOLUME, VPH
- SIGNAL CONTROL
- STOP SIGN CONTROL

* SITE ACCESSES ARE CONCEPTUAL AT TIME OF ANALYSIS

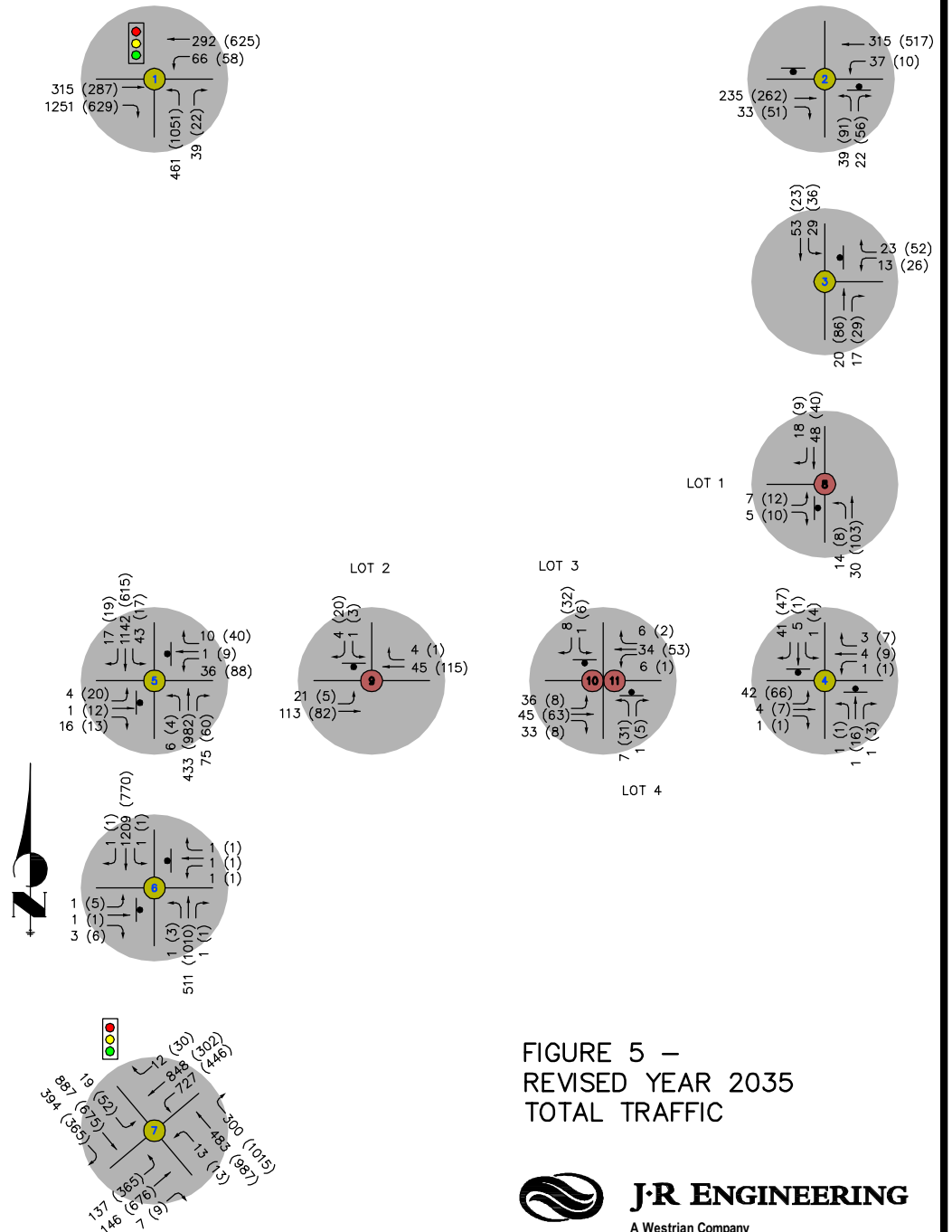


FIGURE 5 –
REVISED YEAR 2035
TOTAL TRAFFIC

J.R ENGINEERING
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

Table 1 – LOS for Year 2035 Background Traffic

Signalized Intersection	Minor Lane / Major Movement	2016 TIS		2017 Addendum	
		AM Peak Hour LOS	PM Peak Hour LOS	AM Peak Hour LOS	PM Peak Hour LOS
E 88th Ave and Rosemary St	EBT	B	C	B	C
	EBR	F	F	F	F
	WBL	A	C	A	C
	WBT	A	F	A	F
	NBL	F	F	F	F
	NBR	B	B	B	B
Rosemary St/Quebec Pkwy and SH 2	EBL	C	B	C	B
	EBT	B	D	B	D
	EBR	N/A	N/A	N/A	N/A
	WBL	D	F	D	F
	WBT	D	B	D	B
	WBR	N/A	N/A	N/A	N/A
	NBL	D	D	D	D
	NBT	D	F	D	F
	NBR	N/A	N/A	N/A	N/A
	SBL	D	D	D	D
	SBT	F	F	F	F
	SBR	N/A	N/A	N/A	N/A
TWSC Intersection					
Ulster St and E 88th Ave	NB	B	C	B	C
	WBL	A	A	A	A
Rosemary St and E 84th Ave	NBL	B	A	B	A
	EB	E	F	E	F
	WB	F	F	F	F
	SBL	A	B	A	B
Rosemary St and E 83rd Ave	NBL	B	A	B	A
	EB	E	E	E	E
	WB	F	F	E	F
	SBL	A	B	A	B
Ulster St and E 86th Ave	WB	A	A	A	A
	SBL	A	A	A	A
	SBT	A	A	A	A
AWSC Intersection					
Ulster St and E 84th Ave	NB	A	A	A	A
	EB	A	A	A	A
	WB	A	A	A	A
	SB	A	A	A	A

Notes:

1. NB=Northbound, SB=Southbound, EB=Eastbound, WB=Westbound, N/A=Not Applicable
2. L=Left, R=Right, T=Through
3. Yellow highlight exceeds Established Threshold of LOS D

Table 2 – LOS for Year 2035 Total Traffic

Signalized Intersection	Minor Lane / Major Movement	2016 TIS - Alternative 1		2017 Addendum	
		AM Peak Hour LOS	PM Peak Hour LOS	AM Peak Hour LOS	PM Peak Hour LOS
E 88th Ave and Rosemary St	EBT	B	C	B	C
	EBR	N/A	N/A	N/A	N/A
	WBL	A	B	A	B
	WBT	A	B	A	B
	NBL	C	B	C	B
	NBR	B	B	B	B
Rosemary St/Quebec Pkwy and SH 2	EBL	B	B	B	B
	EBT	B	C	B	C
	EBR	N/A	N/A	N/A	N/A
	WBL	F	E	F	E
	WBT	B	B	B	B
	WBR	N/A	N/A	N/A	N/A
	NBL	C	C	C	C
	NBT	D	F	C	F
	NBR	N/A	N/A	N/A	N/A
	SBL	C	C	C	C
	SBT	F	E	F	E
	SBR	N/A	N/A	N/A	N/A
TWSC Intersection					
Ulster St and E 88th Ave	NB	B	C	B	C
	WBL	A	A	A	A
Rosemary St and E 84th Ave	NBL	B	A	B	A
	EB	E	F	E	F
	WBL	F	F	F	F
	WBT/R	C	E	C	E
	SBL	A	B	A	B
Rosemary St and E 83rd Ave	NBL	B	A	B	A
	EB	E	F	E	F
Ulster St and E 86th Ave	WB	A	A	A	A
	SBL	A	A	A	A
	SBT	A	A	A	A
Ulster St and Lot 1 Access	NBL	A	A	A	A
	NBT	A	A	A	A
	EB	A	A	A	A
E 84th Ave and Lot 2 Access	EBL	A	A	A	A
	EBT	A	A	A	A
	SB	A	A	A	A
Lot 4 Access/Lot3 Access and E 84th Ave	NB	B	B	A	A
	EBL	A	A	A	A
	EBT	A	A	A	A
	WBL	A	A	A	A
	WBT	A	A	A	A
	SB	A	A	A	A
AWSC Intersection					
Ulster St and E 84th Ave	NB	A	B	A	B
	EB	A	A	A	A
	WB	A	A	A	A
	SB	A	A	A	A

Notes:

1. NB=Northbound, SB=Southbound, EB=Eastbound, WB=Westbound, N/A=Not Applicable
2. L=Left, R=Right, T=Through
3. Yellow highlight exceeds Established Threshold of LOS D
4. Analysis includes Alternative 1 improvements

Lanes, Volumes, Timings
1: Rosemary St & E 88th Ave

JR Engineering - ECF

05/02/2017

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	302	1209	66	287	452	39
Future Volume (vph)	302	1209	66	287	452	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		90	165		0	80
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1610	1369	1467	1545	1671	1495
Flt Permitted			0.407		0.950	
Satd. Flow (perm)	1610	1369	629	1545	1671	1495
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1001				32
Link Speed (mph)	40			40	35	
Link Distance (ft)	1013			1650	440	
Travel Time (s)	17.3			28.1	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	23%	23%	8%	8%
Adj. Flow (vph)	328	1314	72	312	491	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	328	1314	72	312	491	42
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (ft)	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Detector Phase	6	6	5	2	4	4
Switch Phase						
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0	6.0
Minimum Split (s)	12.0	12.0	10.0	12.0	12.0	12.0

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Split (s)	25.0	25.0	10.0	35.0	15.0	15.0
Total Split (%)	50.0%	50.0%	20.0%	70.0%	30.0%	30.0%
Maximum Green (s)	19.0	19.0	4.0	29.0	9.0	9.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	5.0	5.0	2.5	5.0	5.0	5.0
Recall Mode	Min	Min	Min	Min	None	None
Act Effect Green (s)	19.0	19.0	29.0	29.0	9.0	9.0
Actuated g/C Ratio	0.38	0.38	0.58	0.58	0.18	0.18
v/c Ratio	0.54	1.15	0.17	0.35	1.64	0.14
Control Delay	16.1	88.8	5.6	6.9	323.5	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	88.8	5.6	6.9	323.5	10.5
LOS	B	F	A	A	F	B
Approach Delay	74.3			6.7	298.9	
Approach LOS	E			A	F	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Natural Cycle: 140

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.64

Intersection Signal Delay: 110.9

Intersection LOS: F

Intersection Capacity Utilization 88.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Rosemary St & E 88th Ave

			
35 s		15 s	
			
10 s	25 s		

HCM 2010 Signalized Intersection Summary
1: Rosemary St & E 88th Ave

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05/02/2017

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Traffic Volume (veh/h)	302	1209	66	287	452	39		
Future Volume (veh/h)	302	1209	66	287	452	39		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1610	1610	1545	1545	1759	1759		
Adj Flow Rate, veh/h	328	1314	72	312	491	42		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	18	18	23	23	8	8		
Cap, veh/h	612	520	317	896	302	269		
Arrive On Green	0.38	0.38	0.08	0.58	0.18	0.18		
Sat Flow, veh/h	1610	1369	1471	1545	1675	1495		
Grp Volume(v), veh/h	328	1314	72	312	491	42		
Grp Sat Flow(s),veh/h/ln	1610	1369	1471	1545	1675	1495		
Q Serve(g_s), s	7.9	19.0	1.3	5.3	9.0	1.2		
Cycle Q Clear(g_c), s	7.9	19.0	1.3	5.3	9.0	1.2		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	612	520	317	896	302	269		
V/C Ratio(X)	0.54	2.53	0.23	0.35	1.63	0.16		
Avail Cap(c_a), veh/h	612	520	317	896	302	269		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	12.1	15.5	8.0	5.5	20.5	17.3		
Incr Delay (d2), s/veh	1.7	692.6	0.3	0.5	297.3	0.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.7	107.1	0.5	2.4	29.0	1.1		
LnGrp Delay(d),s/veh	13.8	708.1	8.2	6.0	317.8	17.9		
LnGrp LOS	B	F	A	A	F	B		
Approach Vol, veh/h	1642			384	533			
Approach Delay, s/veh	569.4			6.4	294.2			
Approach LOS	F			A	F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		35.0		15.0	10.0	25.0		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		29.0		9.0	4.0	19.0		
Max Q Clear Time (g_c+I1), s		7.3		11.0	3.3	21.0		
Green Ext Time (p_c), s		19.4		0.0	0.0	0.0		
Intersection Summary								
HCM 2010 Ctrl Delay			427.6					
HCM 2010 LOS			F					

Lanes, Volumes, Timings
3: Ulster St & E 88th Ave

JR Engineering - ECF
05/02/2017

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	235	20	16	315	34	17
Future Volume (vph)	235	20	16	315	34	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989				0.956	
Flt Protected			0.950		0.967	
Satd. Flow (prot)	1528	0	1467	1545	1541	0
Flt Permitted			0.950		0.967	
Satd. Flow (perm)	1528	0	1467	1545	1541	0
Link Speed (mph)	40			40	25	
Link Distance (ft)	1650			1000	1334	
Travel Time (s)	28.1			17.0	36.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	23%	14%	14%
Adj. Flow (vph)	255	22	17	342	37	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	17	342	55	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	26.6%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	235	20	16	315	34	17
Future Vol, veh/h	235	20	16	315	34	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	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	23	23	23	14	14
Mvmt Flow	255	22	17	342	37	18
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	277	0	643	266
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	377	-
Critical Hdwy	-	-	4.33	-	7.24	6.34
Critical Hdwy Stg 1	-	-	-	-	6.24	-
Critical Hdwy Stg 2	-	-	-	-	6.24	-
Follow-up Hdwy	-	-	2.407	-	3.626	3.426
Pot Cap-1 Maneuver	-	-	1174	-	370	745
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	621	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1174	-	366	745
Mov Cap-2 Maneuver	-	-	-	-	366	-
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	612	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.4		14.3	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	441	-	-	1174	-	
HCM Lane V/C Ratio	0.126	-	-	0.015	-	
HCM Control Delay (s)	14.3	-	-	8.1	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0	-	

Lanes, Volumes, Timings
6: Rosemary St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	1	16	21	1	1	6	433	13	1	1142	17
Future Volume (vph)	4	1	16	21	1	1	6	433	13	1	1142	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.896			0.995			0.996			0.998	
Flt Protected		0.991			0.956			0.999				
Satd. Flow (prot)	0	1592	0	0	1705	0	0	1750	0	0	1756	0
Flt Permitted		0.991			0.956			0.999				
Satd. Flow (perm)	0	1592	0	0	1705	0	0	1750	0	0	1756	0
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1013			1650			665			2213	
Travel Time (s)		27.6			45.0			13.0			43.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	8%	8%	8%	8%	8%	8%
Adj. Flow (vph)	4	1	17	23	1	1	7	471	14	1	1241	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	0	0	25	0	0	492	0	0	1260	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	73.0%						ICU Level of Service C					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1	16	21	1	1	6	433	13	1	1142	17
Future Vol, veh/h	4	1	16	21	1	1	6	433	13	1	1142	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	8	8	8	8	8	8
Mvmt Flow	4	1	17	23	1	1	7	471	14	1	1241	18
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1745	1751	1251	1753	1753	478	1260	0	0	485	0	0
Stage 1	1253	1253	-	491	491	-	-	-	-	-	-	-
Stage 2	492	498	-	1262	1262	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.18	-	-	4.18	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.272	-	-	2.272	-	-
Pot Cap-1 Maneuver	66	84	206	65	83	579	532	-	-	1047	-	-
Stage 1	207	239	-	552	542	-	-	-	-	-	-	-
Stage 2	551	538	-	204	237	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	64	82	206	58	81	579	532	-	-	1047	-	-
Mov Cap-2 Maneuver	64	82	-	58	81	-	-	-	-	-	-	-
Stage 1	203	238	-	542	532	-	-	-	-	-	-	-
Stage 2	539	528	-	185	236	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	36.2			100.1			0.2			0		
HCM LOS	E			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	532	-	-	138	61	1047	-	-				
HCM Lane V/C Ratio	0.012	-	-	0.165	0.41	0.001	-	-				
HCM Control Delay (s)	11.9	0	-	36.2	100.1	8.4	0	-				
HCM Lane LOS	B	A	-	E	F	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.6	1.6	0	-	-				

Lanes, Volumes, Timings
7: Ulster St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	4	1	1	4	3	1	1	1	1	5	20
Future Volume (vph)	25	4	1	1	4	3	1	1	1	1	5	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.996			0.949			0.955			0.894	
Flt Protected		0.960			0.994			0.984			0.998	
Satd. Flow (prot)	0	1714	0	0	1691	0	0	1684	0	0	1558	0
Flt Permitted		0.960			0.994			0.984			0.998	
Satd. Flow (perm)	0	1714	0	0	1691	0	0	1684	0	0	1558	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1650			478			500			993	
Travel Time (s)		45.0			13.0			13.6			27.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	19%	19%	6%
Adj. Flow (vph)	27	4	1	1	4	3	1	1	1	1	5	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	8	0	0	3	0	0	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	17.4%											
Analysis Period (min)	15											
ICU Level of Service A												

Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	4	1	1	4	3	1	1	1	1	5	20
Future Vol, veh/h	25	4	1	1	4	3	1	1	1	1	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
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, %	6	6	6	6	6	6	6	6	6	19	19	6
Mvmt Flow	27	4	1	1	4	3	1	1	1	1	5	22
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	8	0	0	5	0	0	81	69	5	68	68	6
Stage 1	-	-	-	-	-	-	59	59	-	8	8	-
Stage 2	-	-	-	-	-	-	22	10	-	60	60	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.29	6.69	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.671	4.171	3.354
Pot Cap-1 Maneuver	1586	-	-	1590	-	-	897	814	1067	884	791	1065
Stage 1	-	-	-	-	-	-	943	838	-	971	856	-
Stage 2	-	-	-	-	-	-	986	879	-	910	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1586	-	-	1590	-	-	862	799	1067	870	777	1065
Mov Cap-2 Maneuver	-	-	-	-	-	-	862	799	-	870	777	-
Stage 1	-	-	-	-	-	-	927	824	-	954	855	-
Stage 2	-	-	-	-	-	-	959	878	-	892	799	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	6.1			0.9			9			8.8		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	896	1586	-	-	1590	-	-	986				
HCM Lane V/C Ratio	0.004	0.017	-	-	0.001	-	-	0.029				
HCM Control Delay (s)	9	7.3	0	-	7.3	0	-	8.8				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.1				

Lanes, Volumes, Timings
9: E 83rd Ave & Rosemary St

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	3	1	1	1	1	449	1	1	1194	1
Future Volume (vph)	1	1	3	1	1	1	1	449	1	1	1194	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	140		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.919			0.955							
Flt Protected		0.990			0.984							
Satd. Flow (prot)	0	1631	0	0	1684	0	0	1792	0	0	1759	0
Flt Permitted		0.990			0.984							
Satd. Flow (perm)	0	1631	0	0	1684	0	0	1792	0	0	1759	0
Link Speed (mph)		25			25			30			35	
Link Distance (ft)		1013			1000			1037			665	
Travel Time (s)		27.6			27.3			23.6			13.0	
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
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	8%	8%
Adj. Flow (vph)	1	1	3	1	1	1	1	488	1	1	1298	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	3	0	0	490	0	0	1300	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	73.6%				ICU Level of Service D							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	1	1	1	1	449	1	1	1194	1
Future Vol, veh/h	1	1	3	1	1	1	1	449	1	1	1194	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	8	8
Mvmt Flow	1	1	3	1	1	1	1	488	1	1	1298	1
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1793	1792	1298	1794	1792	489	1299	0	0	489	0	0
Stage 1	1301	1301	-	491	491	-	-	-	-	-	-	-
Stage 2	492	491	-	1303	1301	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.254	-	-	2.254	-	-
Pot Cap-1 Maneuver	61	79	194	61	79	571	520	-	-	1054	-	-
Stage 1	194	227	-	552	542	-	-	-	-	-	-	-
Stage 2	551	542	-	194	227	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	60	79	194	59	79	571	520	-	-	1054	-	-
Mov Cap-2 Maneuver	60	79	-	59	79	-	-	-	-	-	-	-
Stage 1	193	226	-	550	540	-	-	-	-	-	-	-
Stage 2	547	540	-	189	226	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	38.8			43.8			0			0		
HCM LOS	E			E								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	520	-	-	112	96	1054	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.049	0.034	0.001	-	-				
HCM Control Delay (s)	11.9	0	-	38.8	43.8	8.4	0	-				
HCM Lane LOS	B	A	-	E	E	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-				

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF

05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	146	7	727	848	12	13	446	300	19	878	388
Future Volume (vph)	112	146	7	727	848	12	13	446	300	19	878	388
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	575		265	900		320	600		350	150		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1703	1792	1524	1703	3406	1524	1703	3406	1524
Flt Permitted	0.076			0.600			0.199			0.235		
Satd. Flow (perm)	136	1792	1524	1075	1792	1524	357	3406	1524	421	3406	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105			105			326			202
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1013			1650			1000			998	
Travel Time (s)		15.3			25.0			22.7			22.7	
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
Adj. Flow (vph)	122	159	8	790	922	13	14	485	326	21	954	422
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	159	8	790	922	13	14	485	326	21	954	422
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left					Right				Left		Right
Leading Detector (ft)	40	40	40	40	40	40	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	3.0	15.0	15.0	3.0	15.0	15.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	21.0	21.0	8.0	21.0	21.0	8.0	15.0	15.0	8.0	15.0	15.0
Total Split (s)	15.0	65.0	65.0	20.0	65.0	65.0	15.0	25.0	25.0	15.0	25.0	25.0

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	12.0%	52.0%	52.0%	16.0%	52.0%	52.0%	12.0%	20.0%	20.0%	12.0%	20.0%	20.0%
Maximum Green (s)	10.0	59.0	59.0	15.0	59.0	59.0	10.0	20.0	20.0	10.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	7.0	7.0	1.5	7.0	7.0	1.5	2.0	2.0	1.5	2.0	2.0
Minimum Gap (s)	1.5	4.9	4.9	1.5	4.9	4.9	1.5	2.0	2.0	1.5	2.0	2.0
Time Before Reduce (s)	0.0	25.0	25.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	15.0	15.0	0.0	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	62.7	52.9	52.9	74.0	59.2	59.2	22.2	20.1	20.1	22.6	20.3	20.3
Actuated g/C Ratio	0.58	0.49	0.49	0.68	0.55	0.55	0.20	0.19	0.19	0.21	0.19	0.19
v/c Ratio	0.60	0.18	0.01	0.96	0.94	0.01	0.11	0.77	0.59	0.14	1.50	0.94
Control Delay	30.5	17.1	0.0	39.3	42.8	0.0	34.0	52.1	9.6	34.6	264.2	53.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	17.1	0.0	39.3	42.8	0.0	34.0	52.1	9.6	34.6	264.2	53.7
LOS	C	B	A	D	D	A	C	D	A	C	F	D
Approach Delay	22.3			40.9			35.0			197.1		
Approach LOS	C			D			C			F		

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 108.3

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.50

Intersection Signal Delay: 90.0

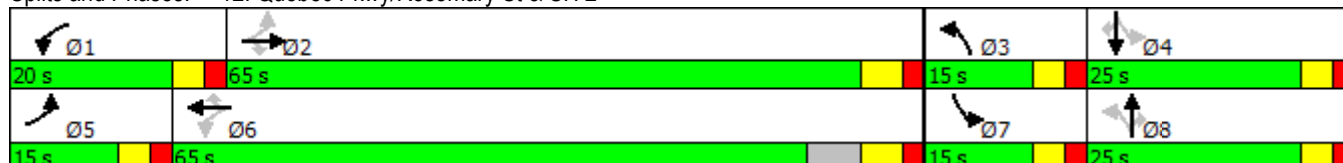
Intersection LOS: F

Intersection Capacity Utilization 90.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 12: Quebec Pkwy/Rosemary St & SH 2



HCM 2010 Signalized Intersection Summary
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF
05/02/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	112	146	7	727	848	12	13	446	300	19	878	388
Future Volume (veh/h)	112	146	7	727	848	12	13	446	300	19	878	388
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792
Adj Flow Rate, veh/h	122	159	0	790	922	0	14	485	0	21	954	0
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	202	827	703	791	982	835	84	631	282	134	644	288
Arrive On Green	0.05	0.46	0.00	0.14	0.55	0.00	0.01	0.19	0.00	0.01	0.19	0.00
Sat Flow, veh/h	1707	1792	1524	1707	1792	1524	1707	3406	1524	1707	3406	1524
Grp Volume(v), veh/h	122	159	0	790	922	0	14	485	0	21	954	0
Grp Sat Flow(s),veh/h/ln	1707	1792	1524	1707	1792	1524	1707	1703	1524	1707	1703	1524
Q Serve(g_s), s	3.9	5.5	0.0	15.0	50.7	0.0	0.7	14.3	0.0	1.1	20.0	0.0
Cycle Q Clear(g_c), s	3.9	5.5	0.0	15.0	50.7	0.0	0.7	14.3	0.0	1.1	20.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	827	703	791	982	835	84	631	282	134	644	288
V/C Ratio(X)	0.60	0.19	0.00	1.00	0.94	0.00	0.17	0.77	0.00	0.16	1.48	0.00
Avail Cap(c_a), veh/h	270	999	849	791	999	849	229	644	288	273	644	288
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.4	16.9	0.0	21.9	22.3	0.0	36.4	41.0	0.0	35.4	42.9	0.0
Incr Delay (d2), s/veh	1.1	0.5	0.0	31.7	17.2	0.0	0.3	5.0	0.0	0.2	225.3	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	1.9	2.9	0.0	22.9	29.5	0.0	0.3	7.2	0.0	0.5	29.4	0.0
LnGrp Delay(d),s/veh	24.5	17.4	0.0	53.6	39.5	0.0	36.7	45.9	0.0	35.6	268.2	0.0
LnGrp LOS	C	B		D	D		D	D		D	F	
Approach Vol, veh/h		281			1712			499			975	
Approach Delay, s/veh		20.4			46.0			45.7			263.2	
Approach LOS		C			D			D			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	54.8	6.0	25.0	10.8	64.0	6.4	24.6				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	59.0	10.0	20.0	10.0	59.0	10.0	20.0				
Max Q Clear Time (g_c+I1), s	17.0	7.5	2.7	22.0	5.9	52.7	3.1	16.3				
Green Ext Time (p_c), s	0.0	28.3	0.0	0.0	0.0	5.3	0.0	1.7				
Intersection Summary												
HCM 2010 Ctrl Delay				105.0								
HCM 2010 LOS				F								

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	23	10	17	29	19
Future Volume (vph)	13	23	10	17	29	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913		0.916			
Flt Protected	0.982					0.971
Satd. Flow (prot)	1607	0	1463	0	0	1618
Flt Permitted	0.982					0.971
Satd. Flow (perm)	1607	0	1463	0	0	1618
Link Speed (mph)	25		25			25
Link Distance (ft)	1000		326			1334
Travel Time (s)	27.3		8.9			36.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	19%	19%	14%	14%
Adj. Flow (vph)	14	25	11	18	32	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	0	29	0	0	53
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.3%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	4.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	23	10	17	29	19
Future Vol, veh/h	13	23	10	17	29	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	19	19	14	14
Mvmt Flow	14	25	11	18	32	21
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	104	20	0	0	29	0
Stage 1	20	-	-	-	-	-
Stage 2	84	-	-	-	-	-
Critical Hdwy	6.46	6.26	-	-	4.24	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.326	-
Pot Cap-1 Maneuver	884	1046	-	-	1510	-
Stage 1	992	-	-	-	-	-
Stage 2	929	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	865	1046	-	-	1510	-
Mov Cap-2 Maneuver	865	-	-	-	-	-
Stage 1	992	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	8.9		0		4.5	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	973	1510	-	
HCM Lane V/C Ratio	-	-	0.04	0.021	-	
HCM Control Delay (s)	-	-	8.9	7.4	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-	

Lanes, Volumes, Timings
1: Rosemary St & E 88th Ave

JR Engineering - ECF

05/02/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	280	619	58	616	1012	22
Future Volume (vph)	280	619	58	616	1012	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		90	165		0	80
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1610	1369	1467	1545	1671	1495
Flt Permitted			0.337		0.950	
Satd. Flow (perm)	1610	1369	521	1545	1671	1495
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		601				7
Link Speed (mph)	40			40	35	
Link Distance (ft)	1013			1650	440	
Travel Time (s)	17.3			28.1	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	23%	23%	8%	8%
Adj. Flow (vph)	304	673	63	670	1100	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	304	673	63	670	1100	24
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (ft)	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Detector Phase	6	6	5	2	4	4
Switch Phase						
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0	6.0
Minimum Split (s)	12.0	12.0	10.0	12.0	12.0	12.0

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Split (s)	30.0	30.0	10.0	40.0	45.0	45.0
Total Split (%)	35.3%	35.3%	11.8%	47.1%	52.9%	52.9%
Maximum Green (s)	24.0	24.0	4.0	34.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	5.0	5.0	2.5	5.0	5.0	5.0
Recall Mode	Min	Min	Min	Min	None	None
Act Effect Green (s)	24.0	24.0	34.0	34.0	39.0	39.0
Actuated g/C Ratio	0.28	0.28	0.40	0.40	0.46	0.46
v/c Ratio	0.67	0.82	0.25	1.08	1.44	0.03
Control Delay	35.4	14.3	18.8	88.4	227.5	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	14.3	18.8	88.4	227.5	10.3
LOS	D	B	B	F	F	B
Approach Delay	20.9			82.4	222.9	
Approach LOS	C			F	F	

Intersection Summary

Area Type: Other

Cycle Length: 85

Actuated Cycle Length: 85

Natural Cycle: 120

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.44

Intersection Signal Delay: 116.9

Intersection LOS: F

Intersection Capacity Utilization 98.5%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Rosemary St & E 88th Ave

 Ø2 40 s	 Ø4 45 s
 Ø5 10 s	 Ø6 30 s

HCM 2010 Signalized Intersection Summary
1: Rosemary St & E 88th Ave

JR Engineering - ECF
05/02/2017

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Traffic Volume (veh/h)	280	619	58	616	1012	22		
Future Volume (veh/h)	280	619	58	616	1012	22		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1610	1610	1545	1545	1759	1759		
Adj Flow Rate, veh/h	304	673	63	670	1100	24		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	18	18	23	23	8	8		
Cap, veh/h	455	386	209	618	769	686		
Arrive On Green	0.28	0.28	0.05	0.40	0.46	0.46		
Sat Flow, veh/h	1610	1369	1471	1545	1675	1495		
Grp Volume(v), veh/h	304	673	63	670	1100	24		
Grp Sat Flow(s),veh/h/ln	1610	1369	1471	1545	1675	1495		
Q Serve(g_s), s	14.2	24.0	2.5	34.0	39.0	0.8		
Cycle Q Clear(g_c), s	14.2	24.0	2.5	34.0	39.0	0.8		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	455	386	209	618	769	686		
V/C Ratio(X)	0.67	1.74	0.30	1.08	1.43	0.03		
Avail Cap(c_a), veh/h	455	386	209	618	769	686		
HCM Platoon Ratio	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		
Uniform Delay (d), s/veh	27.0	30.5	20.4	25.5	23.0	12.7		
Incr Delay (d2), s/veh	5.0	344.3	0.6	61.2	201.4	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	6.9	46.0	1.0	24.9	60.9	0.9		
LnGrp Delay(d),s/veh	32.0	374.8	21.0	86.7	224.4	12.7		
LnGrp LOS	C	F	C	F	F	B		
Approach Vol, veh/h	977			733	1124			
Approach Delay, s/veh	268.1			81.0	219.9			
Approach LOS	F			F	F			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		40.0		45.0	10.0	30.0		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		34.0		39.0	4.0	24.0		
Max Q Clear Time (g_c+I1), s		36.0		41.0	4.5	26.0		
Green Ext Time (p_c), s		0.0		0.0	0.0	0.0		
Intersection Summary								
HCM 2010 Ctrl Delay			200.6					
HCM 2010 LOS			F					

Lanes, Volumes, Timings
3: Ulster St & E 88th Ave

JR Engineering - ECF
05/02/2017

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	262	44	4	517	82	39
Future Volume (vph)	262	44	4	517	82	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.981				0.957	
Flt Protected			0.950		0.967	
Satd. Flow (prot)	1515	0	1467	1545	1542	0
Flt Permitted			0.950		0.967	
Satd. Flow (perm)	1515	0	1467	1545	1542	0
Link Speed (mph)	40			40	25	
Link Distance (ft)	1650			1000	1334	
Travel Time (s)	28.1			17.0	36.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	23%	14%	14%
Adj. Flow (vph)	285	48	4	562	89	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	333	0	4	562	131	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.8%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	2.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	262	44	4	517	82	39
Future Vol, veh/h	262	44	4	517	82	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	23	23	23	14	14
Mvmt Flow	285	48	4	562	89	42
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	333	0	880	309
Stage 1	-	-	-	-	309	-
Stage 2	-	-	-	-	571	-
Critical Hdwy	-	-	4.33	-	6.54	6.34
Critical Hdwy Stg 1	-	-	-	-	5.54	-
Critical Hdwy Stg 2	-	-	-	-	5.54	-
Follow-up Hdwy	-	-	2.407	-	3.626	3.426
Pot Cap-1 Maneuver	-	-	1118	-	303	704
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	542	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1118	-	302	704
Mov Cap-2 Maneuver	-	-	-	-	302	-
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	540	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		20	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	370	-	-	1118	-	
HCM Lane V/C Ratio	0.355	-	-	0.004	-	
HCM Control Delay (s)	20	-	-	8.2	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	1.6	-	-	0	-	

Lanes, Volumes, Timings
6: Rosemary St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	12	13	34	9	1	4	982	41	7	615	19
Future Volume (vph)	20	12	13	34	9	1	4	982	41	7	615	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.961			0.997			0.995			0.996	
Flt Protected		0.978			0.963						0.999	
Satd. Flow (prot)	0	1685	0	0	1658	0	0	1750	0	0	1750	0
Flt Permitted		0.978			0.963						0.999	
Satd. Flow (perm)	0	1685	0	0	1658	0	0	1750	0	0	1750	0
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1013			1650			665			2213	
Travel Time (s)		27.6			45.0			13.0			43.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	10%	10%	10%	8%	8%	8%	8%	8%	8%
Adj. Flow (vph)	22	13	14	37	10	1	4	1067	45	8	668	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	49	0	0	48	0	0	1116	0	0	697	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 67.3%	ICU Level of Service C											
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	12	13	34	9	1	4	982	41	7	615	19
Future Vol, veh/h	20	12	13	34	9	1	4	982	41	7	615	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	10	10	10	8	8	8	8	8	8
Mvmt Flow	22	13	14	37	10	1	4	1067	45	8	668	21
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1798	1815	679	1806	1802	1090	689	0	0	1112	0	0
Stage 1	694	694	-	1098	1098	-	-	-	-	-	-	-
Stage 2	1104	1121	-	708	704	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.2	6.6	6.3	4.18	-	-	4.18	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.59	4.09	3.39	2.272	-	-	2.272	-	-
Pot Cap-1 Maneuver	61	76	445	58	76	252	878	-	-	606	-	-
Stage 1	427	438	-	249	279	-	-	-	-	-	-	-
Stage 2	252	277	-	413	428	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	53	74	445	47	74	252	878	-	-	606	-	-
Mov Cap-2 Maneuver	53	74	-	47	74	-	-	-	-	-	-	-
Stage 1	422	429	-	246	276	-	-	-	-	-	-	-
Stage 2	239	274	-	380	419	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	106.4			226.4			0			0.1		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	878	-	-	79	52	606	-	-				
HCM Lane V/C Ratio	0.005	-	-	0.619	0.92	0.013	-	-				
HCM Control Delay (s)	9.1	0	-	106.4	226.4	11	0	-				
HCM Lane LOS	A	A	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	2.8	4	0	-	-				

Lanes, Volumes, Timings
7: Ulster St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	7	1	1	9	7	1	16	3	4	1	33
Future Volume (vph)	44	7	1	1	9	7	1	16	3	4	1	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.998			0.943			0.981			0.881	
Flt Protected		0.960			0.997			0.998			0.995	
Satd. Flow (prot)	0	1717	0	0	1685	0	0	1755	0	0	1548	0
Flt Permitted		0.960			0.997			0.998			0.995	
Satd. Flow (perm)	0	1717	0	0	1685	0	0	1755	0	0	1548	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1650			478			500			993	
Travel Time (s)		45.0			13.0			13.6			27.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	19%	19%	6%
Adj. Flow (vph)	48	8	1	1	10	8	1	17	3	4	1	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	19	0	0	21	0	0	41	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.9%											
Analysis Period (min)	15											
	ICU Level of Service A											

Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	7	1	1	9	7	1	16	3	4	1	33
Future Vol, veh/h	44	7	1	1	9	7	1	16	3	4	1	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	19	19	6
Mvmt Flow	48	8	1	1	10	8	1	17	3	4	1	36
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	17	0	0	9	0	0	138	124	8	130	120	14
Stage 1	-	-	-	-	-	-	104	104	-	16	16	-
Stage 2	-	-	-	-	-	-	34	20	-	114	104	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.29	6.69	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.671	4.171	3.354
Pot Cap-1 Maneuver	1574	-	-	1585	-	-	823	759	1062	805	740	1054
Stage 1	-	-	-	-	-	-	892	801	-	961	849	-
Stage 2	-	-	-	-	-	-	972	871	-	851	777	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1574	-	-	1585	-	-	775	735	1062	769	716	1054
Mov Cap-2 Maneuver	-	-	-	-	-	-	775	735	-	769	716	-
Stage 1	-	-	-	-	-	-	864	776	-	931	848	-
Stage 2	-	-	-	-	-	-	937	870	-	804	753	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	6.2			0.4			9.8			8.7		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	773	1574	-	-	1585	-	-	1002				
HCM Lane V/C Ratio	0.028	0.03	-	-	0.001	-	-	0.041				
HCM Control Delay (s)	9.8	7.4	0	-	7.3	0	-	8.7				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1				

Lanes, Volumes, Timings
9: E 83rd Ave & Rosemary St

JR Engineering - ECF

05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	6	1	1	1	3	991	1	1	716	1
Future Volume (vph)	5	1	6	1	1	1	3	991	1	1	716	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	140		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.927			0.955							
Flt Protected		0.981			0.984							
Satd. Flow (prot)	0	1630	0	0	1684	0	0	1792	0	0	1759	0
Flt Permitted		0.981			0.984							
Satd. Flow (perm)	0	1630	0	0	1684	0	0	1792	0	0	1759	0
Link Speed (mph)		25			25			30			35	
Link Distance (ft)		1013			1000			1037			665	
Travel Time (s)		27.6			27.3			23.6			13.0	
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
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	8%	8%
Adj. Flow (vph)	5	1	7	1	1	1	3	1077	1	1	778	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	3	0	0	1081	0	0	780	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	64.5%				ICU Level of Service C							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	1	6	1	1	1	3	991	1	1	716	1
Future Vol, veh/h	5	1	6	1	1	1	3	991	1	1	716	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	8	8
Mvmt Flow	5	1	7	1	1	1	3	1077	1	1	778	1
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1866	1866	779	1869	1866	1078	779	0	0	1078	0	0
Stage 1	781	781	-	1084	1084	-	-	-	-	-	-	-
Stage 2	1085	1085	-	785	782	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.254	-	-	2.254	-	-
Pot Cap-1 Maneuver	54	71	390	54	71	261	820	-	-	632	-	-
Stage 1	382	400	-	258	288	-	-	-	-	-	-	-
Stage 2	258	288	-	380	399	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	53	70	390	52	70	261	820	-	-	632	-	-
Mov Cap-2 Maneuver	53	70	-	52	70	-	-	-	-	-	-	-
Stage 1	379	399	-	256	285	-	-	-	-	-	-	-
Stage 2	254	285	-	372	398	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	47.8			51.9			0			0		
HCM LOS	E			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	820	-	-	97	80	632	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.134	0.041	0.002	-	-				
HCM Control Delay (s)	9.4	0	-	47.8	51.9	10.7	0	-				
HCM Lane LOS	A	A	-	E	F	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0	-	-				

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF

05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	358	676	9	446	302	30	13	975	1015	52	642	344
Future Volume (vph)	358	676	9	446	302	30	13	975	1015	52	642	344
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	575		265	900		320	600		350	150		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1792	1524	1703	1792	1524	1703	3406	1524	1703	3406	1524
Flt Permitted	0.539			0.093			0.179			0.153		
Satd. Flow (perm)	966	1792	1524	167	1792	1524	321	3406	1524	274	3406	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105			105			312			245
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1013			1650			1000			998	
Travel Time (s)		15.3			25.0			22.7			22.7	
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
Adj. Flow (vph)	389	735	10	485	328	33	14	1060	1103	57	698	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	389	735	10	485	328	33	14	1060	1103	57	698	374
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left					Right				Left		Right
Leading Detector (ft)	40	40	40	40	40	40	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	3.0	15.0	15.0	3.0	15.0	15.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	21.0	21.0	8.0	21.0	21.0	8.0	15.0	15.0	8.0	15.0	15.0
Total Split (s)	15.0	65.0	65.0	20.0	65.0	65.0	15.0	25.0	25.0	15.0	25.0	25.0

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	12.0%	52.0%	52.0%	16.0%	52.0%	52.0%	12.0%	20.0%	20.0%	12.0%	20.0%	20.0%
Maximum Green (s)	10.0	59.0	59.0	15.0	59.0	59.0	10.0	20.0	20.0	10.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	7.0	7.0	1.5	7.0	7.0	1.5	2.0	2.0	1.5	2.0	2.0
Minimum Gap (s)	1.5	4.9	4.9	1.5	4.9	4.9	1.5	2.0	2.0	1.5	2.0	2.0
Time Before Reduce (s)	0.0	25.0	25.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	15.0	15.0	0.0	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	63.7	52.5	52.5	73.9	57.6	57.6	24.2	20.4	20.4	29.6	26.2	26.2
Actuated g/C Ratio	0.56	0.46	0.46	0.65	0.50	0.50	0.21	0.18	0.18	0.26	0.23	0.23
v/c Ratio	0.64	0.89	0.01	1.55	0.36	0.04	0.11	1.75	2.09	0.36	0.89	0.70
Control Delay	18.2	43.4	0.0	287.5	18.8	0.1	35.2	372.1	516.4	40.1	59.0	23.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	43.4	0.0	287.5	18.8	0.1	35.2	372.1	516.4	40.1	59.0	23.1
LOS	B	D	A	F	B	A	D	F	F	D	E	C
Approach Delay	34.4			172.2			443.1			46.1		
Approach LOS	C			F			F			D		

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 114.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 2.09

Intersection Signal Delay: 227.2

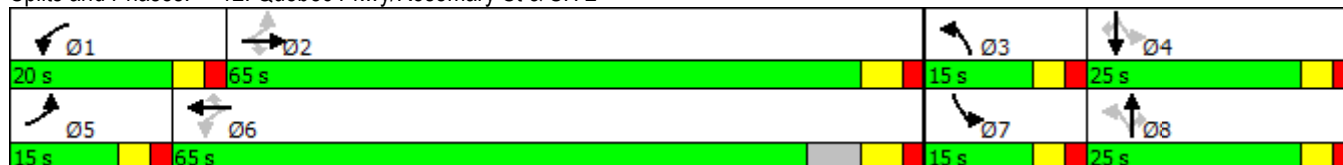
Intersection LOS: F

Intersection Capacity Utilization 115.1%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 12: Quebec Pkwy/Rosemary St & SH 2



HCM 2010 Signalized Intersection Summary
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF
05/02/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	358	676	9	446	302	30	13	975	1015	52	642	344
Future Volume (veh/h)	358	676	9	446	302	30	13	975	1015	52	642	344
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792
Adj Flow Rate, veh/h	389	735	0	485	328	0	14	1060	0	57	698	0
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	625	852	724	362	930	790	79	593	265	127	688	308
Arrive On Green	0.09	0.48	0.00	0.13	0.52	0.00	0.01	0.17	0.00	0.04	0.20	0.00
Sat Flow, veh/h	1707	1792	1524	1707	1792	1524	1707	3406	1524	1707	3406	1524
Grp Volume(v), veh/h	389	735	0	485	328	0	14	1060	0	57	698	0
Grp Sat Flow(s),veh/h/ln	1707	1792	1524	1707	1792	1524	1707	1703	1524	1707	1703	1524
Q Serve(g_s), s	10.0	41.9	0.0	15.0	12.4	0.0	0.8	20.0	0.0	3.1	23.2	0.0
Cycle Q Clear(g_c), s	10.0	41.9	0.0	15.0	12.4	0.0	0.8	20.0	0.0	3.1	23.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	625	852	724	362	930	790	79	593	265	127	688	308
V/C Ratio(X)	0.62	0.86	0.00	1.34	0.35	0.00	0.18	1.79	0.00	0.45	1.01	0.00
Avail Cap(c_a), veh/h	625	920	782	362	930	790	211	593	265	211	688	308
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.8	26.8	0.0	29.1	16.3	0.0	40.4	47.5	0.0	38.5	45.8	0.0
Incr Delay (d2), s/veh	1.4	11.3	0.0	170.6	1.1	0.0	0.4	361.4	0.0	0.9	37.8	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	4.3	23.3	0.0	28.6	6.4	0.0	0.4	39.1	0.0	1.5	14.4	0.0
LnGrp Delay(d),s/veh	18.2	38.1	0.0	199.7	17.3	0.0	40.8	408.9	0.0	39.5	83.7	0.0
LnGrp LOS	B	D		F	B		D	F		D	F	
Approach Vol, veh/h	1124				813				1074			
Approach Delay, s/veh	31.2				126.2				404.1			
Approach LOS	C				F				F			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	60.6	6.1	28.2	15.0	65.6	9.3	25.0				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	59.0	10.0	20.0	10.0	59.0	10.0	20.0				
Max Q Clear Time (g_c+I1), s	17.0	43.9	2.8	25.2	12.0	14.4	5.1	22.0				
Green Ext Time (p_c), s	0.0	10.7	0.0	0.0	0.0	23.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	167.9											
HCM 2010 LOS	F											

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	52	60	29	36	10
Future Volume (vph)	26	52	60	29	36	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.909		0.955			
Flt Protected	0.984					0.962
Satd. Flow (prot)	1603	0	1525	0	0	1603
Flt Permitted	0.984					0.962
Satd. Flow (perm)	1603	0	1525	0	0	1603
Link Speed (mph)	25		25			25
Link Distance (ft)	1000		326			1334
Travel Time (s)	27.3		8.9			36.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	19%	19%	14%	14%
Adj. Flow (vph)	28	57	65	32	39	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	0	97	0	0	50
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	20.5%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection

Int Delay, s/veh 4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	52	60	29	36	10
Future Vol, veh/h	26	52	60	29	36	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	19	19	14	14
Mvmt Flow	28	57	65	32	39	11

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	170	81	0	0	97	0
Stage 1	81	-	-	-	-	-
Stage 2	89	-	-	-	-	-
Critical Hdwy	6.46	6.26	-	-	4.24	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.326	-
Pot Cap-1 Maneuver	811	968	-	-	1424	-
Stage 1	932	-	-	-	-	-
Stage 2	924	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	788	968	-	-	1424	-
Mov Cap-2 Maneuver	788	-	-	-	-	-
Stage 1	932	-	-	-	-	-
Stage 2	898	-	-	-	-	-

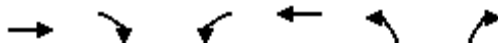
Approach	WB		NB		SB
HCM Control Delay, s	9.4		0		5.9
HCM LOS	A				

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	- 900	1424	-
HCM Lane V/C Ratio	-	- 0.094	0.027	-
HCM Control Delay (s)	-	- 9.4	7.6	0
HCM Lane LOS	-	- A	A	A
HCM 95th %tile Q(veh)	-	- 0.3	0.1	-

Lanes, Volumes, Timings
1: Rosemary St & E 88th Ave

JR Engineering - ECF
05/02/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Volume (vph)	315	1251	66	292	461	39
Future Volume (vph)	315	1251	66	292	461	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		90	165		150	80
Storage Lanes		1	1		2	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3059	1369	1467	2935	3242	1495
Flt Permitted			0.415		0.950	
Satd. Flow (perm)	3059	1369	641	2935	3242	1495
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1002				42
Link Speed (mph)	40			40	35	
Link Distance (ft)	1013			1650	440	
Travel Time (s)	17.3			28.1	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	23%	23%	8%	8%
Adj. Flow (vph)	342	1360	72	317	501	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	342	1360	72	317	501	42
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (ft)	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Detector Phase	6	6	5	2	4	4
Switch Phase						
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0	6.0
Minimum Split (s)	12.0	12.0	10.0	12.0	12.0	12.0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Split (s)	25.0	25.0	10.0	35.0	15.0	15.0
Total Split (%)	50.0%	50.0%	20.0%	70.0%	30.0%	30.0%
Maximum Green (s)	19.0	19.0	4.0	29.0	9.0	9.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	5.0	5.0	2.5	5.0	5.0	5.0
Recall Mode	Min	Min	Min	Min	None	None
Act Effect Green (s)	19.0	19.0	29.0	29.0	9.0	9.0
Actuated g/C Ratio	0.38	0.38	0.58	0.58	0.18	0.18
v/c Ratio	0.29	1.19	0.16	0.19	0.86	0.14
Control Delay	11.7	105.8	5.6	5.3	37.9	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	105.8	5.6	5.3	37.9	8.2
LOS	B	F	A	A	D	A
Approach Delay	86.9			5.4	35.6	
Approach LOS	F			A	D	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Natural Cycle: 150

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 64.3

Intersection LOS: E

Intersection Capacity Utilization 91.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Rosemary St & E 88th Ave



HCM 2010 Signalized Intersection Summary
1: Rosemary St & E 88th Ave

JR Engineering - ECF
05/02/2017

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↗	↖	↑↑	↖↗	↗		
Traffic Volume (veh/h)	315	1251	66	292	461	39		
Future Volume (veh/h)	315	1251	66	292	461	39		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1610	1610	1545	1545	1759	1759		
Adj Flow Rate, veh/h	342	0	72	317	501	42		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	18	18	23	23	8	8		
Cap, veh/h	774	346	458	1465	668	308		
Arrive On Green	0.25	0.00	0.10	0.50	0.21	0.21		
Sat Flow, veh/h	3140	1369	1471	3012	3250	1495		
Grp Volume(v), veh/h	342	0	72	317	501	42		
Grp Sat Flow(s),veh/h/ln	1530	1369	1471	1467	1625	1495		
Q Serve(g_s), s	3.8	0.0	1.3	2.5	5.9	0.9		
Cycle Q Clear(g_c), s	3.8	0.0	1.3	2.5	5.9	0.9		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	774	346	458	1465	668	308		
V/C Ratio(X)	0.44	0.00	0.16	0.22	0.75	0.14		
Avail Cap(c_a), veh/h	1430	640	458	2094	720	331		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	12.8	0.0	8.1	5.7	15.2	13.2		
Incr Delay (d2), s/veh	0.8	0.0	0.1	0.2	5.2	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.5	1.0	3.1	0.9		
LnGrp Delay(d),s/veh	13.6	0.0	8.2	5.9	20.3	13.6		
LnGrp LOS	B		A	A	C	B		
Approach Vol, veh/h	342			389	543			
Approach Delay, s/veh	13.6			6.3	19.8			
Approach LOS	B			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		26.3		14.4	10.0	16.3		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		29.0		9.0	4.0	19.0		
Max Q Clear Time (g_c+I1), s		4.5		7.9	3.3	5.8		
Green Ext Time (p_c), s		6.0		0.5	0.0	4.5		
Intersection Summary								
HCM 2010 Ctrl Delay			14.0					
HCM 2010 LOS			B					

Lanes, Volumes, Timings
3: Ulster St & E 88th Ave

JR Engineering - ECF
05/02/2017

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	235	33	37	315	39	22
Future Volume (vph)	235	33	37	315	39	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.981				0.951	
Flt Protected			0.950		0.969	
Satd. Flow (prot)	2879	0	1467	2935	1536	0
Flt Permitted			0.950		0.969	
Satd. Flow (perm)	2879	0	1467	2935	1536	0
Link Speed (mph)	40			40	25	
Link Distance (ft)	1650			1000	1334	
Travel Time (s)	28.1			17.0	36.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	23%	14%	14%
Adj. Flow (vph)	255	36	40	342	42	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	291	0	40	342	66	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	24.4%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑	↑↑	↑	
Traffic Vol, veh/h	235	33	37	315	39	22
Future Vol, veh/h	235	33	37	315	39	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	23	23	23	14	14
Mvmt Flow	255	36	40	342	42	24
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	291	0	525	146
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	252	-
Critical Hdwy	-	-	4.56	-	7.08	7.18
Critical Hdwy Stg 1	-	-	-	-	6.08	-
Critical Hdwy Stg 2	-	-	-	-	6.08	-
Follow-up Hdwy	-	-	2.43	-	3.64	3.44
Pot Cap-1 Maneuver	-	-	1129	-	454	838
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	732	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1129	-	438	838
Mov Cap-2 Maneuver	-	-	-	-	438	-
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	706	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.9		12.8	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	529	-	-	1129	-	
HCM Lane V/C Ratio	0.125	-	-	0.036	-	
HCM Control Delay (s)	12.8	-	-	8.3	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

Lanes, Volumes, Timings
6: Rosemary St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	1	16	36	1	10	6	433	75	43	1142	17
Future Volume (vph)	4	1	16	36	1	10	6	433	75	43	1142	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	140		0	0		0	140		0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.896			0.862			0.980			0.998	
Flt Protected		0.991		0.950				0.999		0.950		
Satd. Flow (prot)	0	1592	0	1703	1545	0	0	1722	0	1671	1756	0
Flt Permitted		0.991		0.950				0.999		0.950		
Satd. Flow (perm)	0	1592	0	1703	1545	0	0	1722	0	1671	1756	0
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1013			867			665			2213	
Travel Time (s)		27.6			23.6			13.0			43.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	8%	8%	8%	8%	8%	8%
Adj. Flow (vph)	4	1	17	39	1	11	7	471	82	47	1241	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	0	39	12	0	0	560	0	47	1259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	75.6%						ICU Level of Service D					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1	16	36	1	10	6	433	75	43	1142	17
Future Vol, veh/h	4	1	16	36	1	10	6	433	75	43	1142	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	140	-	-	-	-	-	140	-	-
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, %	6	6	6	6	6	6	8	8	8	8	8	8
Mvmt Flow	4	1	17	39	1	11	7	471	82	47	1241	18
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1874	1909	1251	1877	1877	511	1260	0	0	552	0	0
Stage 1	1344	1344	-	524	524	-	-	-	-	-	-	-
Stage 2	530	565	-	1353	1353	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.18	-	-	4.18	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.272	-	-	2.272	-	-
Pot Cap-1 Maneuver	54	67	206	53	70	555	532	-	-	989	-	-
Stage 1	183	216	-	529	523	-	-	-	-	-	-	-
Stage 2	525	502	-	181	214	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	50	63	206	45	65	555	532	-	-	989	-	-
Mov Cap-2 Maneuver	50	63	-	45	65	-	-	-	-	-	-	-
Stage 1	180	206	-	519	513	-	-	-	-	-	-	-
Stage 2	504	492	-	157	204	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	41.5			183.8			0.1			0.3		
HCM LOS	E			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	532	-	-	121	45	329	989	-	-			
HCM Lane V/C Ratio	0.012	-	-	0.189	0.87	0.036	0.047	-	-			
HCM Control Delay (s)	11.9	0	-	41.5	235	16.4	8.8	-	-			
HCM Lane LOS	B	A	-	E	F	C	A	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.7	3.5	0.1	0.1	-	-			

Lanes, Volumes, Timings
7: Ulster St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	4	1	1	4	3	1	1	1	1	5	41
Future Volume (vph)	42	4	1	1	4	3	1	1	1	1	5	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.997			0.949			0.955			0.881	
Flt Protected		0.957			0.994			0.984			0.999	
Satd. Flow (prot)	0	1710	0	0	1691	0	0	1684	0	0	1555	0
Flt Permitted		0.957			0.994			0.984			0.999	
Satd. Flow (perm)	0	1710	0	0	1691	0	0	1684	0	0	1555	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		380			478			500			993	
Travel Time (s)		10.4			13.0			13.6			27.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	19%	19%	6%
Adj. Flow (vph)	46	4	1	1	4	3	1	1	1	1	5	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	8	0	0	3	0	0	51	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.3%				ICU Level of Service A							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	7.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	4	1	1	4	3	1	1	1	1	5	41
Future Vol, veh/h	42	4	1	1	4	3	1	1	1	1	5	41
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	19	19	6
Mvmt Flow	46	4	1	1	4	3	1	1	1	1	5	45
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	8	0	0	5	0	0	129	106	5	105	105	6
Stage 1	-	-	-	-	-	-	96	96	-	8	8	-
Stage 2	-	-	-	-	-	-	33	10	-	97	97	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.29	6.69	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.671	4.171	3.354
Pot Cap-1 Maneuver	1586	-	-	1590	-	-	835	777	1067	836	754	1065
Stage 1	-	-	-	-	-	-	901	808	-	971	856	-
Stage 2	-	-	-	-	-	-	973	879	-	869	783	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1586	-	-	1590	-	-	777	754	1067	815	731	1065
Mov Cap-2 Maneuver	-	-	-	-	-	-	777	754	-	815	731	-
Stage 1	-	-	-	-	-	-	875	785	-	943	855	-
Stage 2	-	-	-	-	-	-	925	878	-	842	760	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	6.6			0.9			9.3			8.8		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	845	1586	-	-	1590	-	-	1009				
HCM Lane V/C Ratio	0.004	0.029	-	-	0.001	-	-	0.051				
HCM Control Delay (s)	9.3	7.3	0	-	7.3	0	-	8.8				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2				

Lanes, Volumes, Timings
9: E 83rd Ave & Rosemary St

JR Engineering - ECF

05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	3	1	1	1	1	511	1	1	1209	1
Future Volume (vph)	1	1	3	1	1	1	1	511	1	1	1209	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	140		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.919			0.955							
Flt Protected		0.990			0.984							
Satd. Flow (prot)	0	1631	0	0	1684	0	0	1792	0	0	1759	0
Flt Permitted		0.990			0.984							
Satd. Flow (perm)	0	1631	0	0	1684	0	0	1792	0	0	1759	0
Link Speed (mph)		25			25			30			35	
Link Distance (ft)		1013			1000			1037			665	
Travel Time (s)		27.6			27.3			23.6			13.0	
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
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	8%	8%
Adj. Flow (vph)	1	1	3	1	1	1	1	555	1	1	1314	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	3	0	0	557	0	0	1316	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	74.4%				ICU Level of Service D							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	1	1	1	1	511	1	1	1209	1
Future Vol, veh/h	1	1	3	1	1	1	1	511	1	1	1209	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	8	8
Mvmt Flow	1	1	3	1	1	1	1	555	1	1	1314	1
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1876	1876	1315	1877	1875	556	1315	0	0	557	0	0
Stage 1	1317	1317	-	558	558	-	-	-	-	-	-	-
Stage 2	559	559	-	1319	1317	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.254	-	-	2.254	-	-
Pot Cap-1 Maneuver	53	70	189	53	70	523	513	-	-	994	-	-
Stage 1	190	223	-	507	505	-	-	-	-	-	-	-
Stage 2	506	505	-	190	223	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	52	70	189	51	70	523	513	-	-	994	-	-
Mov Cap-2 Maneuver	52	70	-	51	70	-	-	-	-	-	-	-
Stage 1	189	222	-	505	503	-	-	-	-	-	-	-
Stage 2	502	503	-	185	222	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	42.7			49.6			0			0		
HCM LOS	E			E								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	513	-	-	101	84	994	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.054	0.039	0.001	-	-				
HCM Control Delay (s)	12	0	-	42.7	49.6	8.6	0	-				
HCM Lane LOS	B	A	-	E	E	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-				

Lanes, Volumes, Timings
10: Lot 4 Access/Lot 3 Access & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	45	33	6	34	6	7	0	1	1	0	8
Future Volume (vph)	36	45	33	6	34	6	7	0	1	1	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.961			0.981			0.985			0.878	
Flt Protected		0.985			0.993			0.957			0.995	
Satd. Flow (prot)	0	1697	0	0	1746	0	0	1690	0	0	1566	0
Flt Permitted		0.985			0.993			0.957			0.995	
Satd. Flow (perm)	0	1697	0	0	1746	0	0	1690	0	0	1566	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		403			380			302			298	
Travel Time (s)		11.0			10.4			6.9			6.8	
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
Adj. Flow (vph)	39	49	36	7	37	7	8	0	1	1	0	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	124	0	0	51	0	0	9	0	0	10	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 22.7%	ICU Level of Service A											
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	36	45	33	6	34	6	7	0	1	1	0	8
Future Vol, veh/h	36	45	33	6	34	6	7	0	1	1	0	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	-	-	-	-	-	-	-	-	-	-	-	-
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, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	39	49	36	7	37	7	8	0	1	1	0	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	43	0	0	85	0	0	203	202	67	199	216	40
Stage 1	-	-	-	-	-	-	145	145	-	53	53	-
Stage 2	-	-	-	-	-	-	58	57	-	146	163	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.554	4.054	3.354
Pot Cap-1 Maneuver	1540	-	-	1487	-	-	747	687	985	751	675	1020
Stage 1	-	-	-	-	-	-	848	769	-	950	843	-
Stage 2	-	-	-	-	-	-	944	840	-	847	756	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1540	-	-	1487	-	-	723	665	985	732	653	1020
Mov Cap-2 Maneuver	-	-	-	-	-	-	723	665	-	732	653	-
Stage 1	-	-	-	-	-	-	825	748	-	924	839	-
Stage 2	-	-	-	-	-	-	931	836	-	823	736	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.3			1			9.9			8.7		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	748	1540	-	-	1487	-	-	977				
HCM Lane V/C Ratio	0.012	0.025	-	-	0.004	-	-	0.01				
HCM Control Delay (s)	9.9	7.4	0	-	7.4	0	-	8.7				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0				

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF

05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	146	7	727	848	12	13	483	300	19	887	394
Future Volume (vph)	137	146	7	727	848	12	13	483	300	19	887	394
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	575		265	900		320	600		350	150		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3406	1524	1703	3406	1524	1703	3406	1524	1703	3406	1524
Flt Permitted	0.242			0.554			0.187			0.290		
Satd. Flow (perm)	434	3406	1524	993	3406	1524	335	3406	1524	520	3406	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105			105			326			203
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1013			1650			1000			998	
Travel Time (s)		15.3			25.0			22.7			22.7	
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
Adj. Flow (vph)	149	159	8	790	922	13	14	525	326	21	964	428
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	159	8	790	922	13	14	525	326	21	964	428
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left					Right				Left		Right
Leading Detector (ft)	40	40	40	40	40	40	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	3.0	15.0	15.0	3.0	15.0	15.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	21.0	21.0	8.0	21.0	21.0	8.0	15.0	15.0	8.0	15.0	15.0
Total Split (s)	15.0	65.0	65.0	20.0	65.0	65.0	15.0	25.0	25.0	15.0	25.0	25.0

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	12.0%	52.0%	52.0%	16.0%	52.0%	52.0%	12.0%	20.0%	20.0%	12.0%	20.0%	20.0%
Maximum Green (s)	10.0	59.0	59.0	15.0	59.0	59.0	10.0	20.0	20.0	10.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	7.0	7.0	1.5	7.0	7.0	1.5	2.0	2.0	1.5	2.0	2.0
Minimum Gap (s)	1.5	4.9	4.9	1.5	4.9	4.9	1.5	2.0	2.0	1.5	2.0	2.0
Time Before Reduce (s)	0.0	25.0	25.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	15.0	15.0	0.0	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	37.7	28.5	28.5	50.0	35.7	35.7	22.3	20.5	20.5	23.5	22.5	22.5
Actuated g/C Ratio	0.45	0.34	0.34	0.59	0.42	0.42	0.26	0.24	0.24	0.28	0.27	0.27
v/c Ratio	0.47	0.14	0.01	1.10	0.64	0.02	0.09	0.64	0.53	0.10	1.06	0.77
Control Delay	14.5	19.6	0.0	83.3	22.2	0.1	25.5	35.5	7.6	25.2	80.8	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	19.6	0.0	83.3	22.2	0.1	25.5	35.5	7.6	25.2	80.8	27.4
LOS	B	B	A	F	C	A	C	D	A	C	F	C
Approach Delay	16.7			50.0			24.8			63.8		
Approach LOS	B			D			C			E		

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 84.5

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 47.0

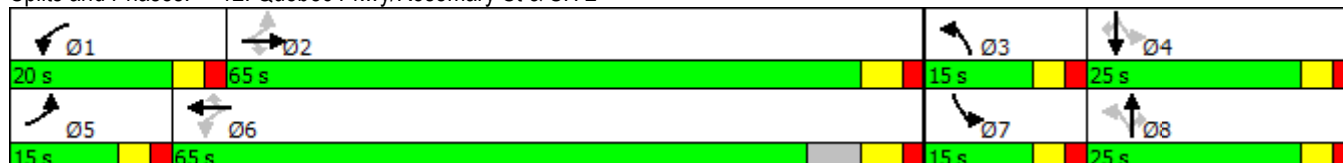
Intersection LOS: D

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 12: Quebec Pkwy/Rosemary St & SH 2



HCM 2010 Signalized Intersection Summary
12: Quebec Pkwy/Rosemary St & SH 2

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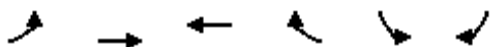
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	146	7	727	848	12	13	483	300	19	887	394
Future Volume (veh/h)	137	146	7	727	848	12	13	483	300	19	887	394
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike 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	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792
Adj Flow Rate, veh/h	149	159	0	790	922	0	14	525	0	21	964	0
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	357	1246	557	760	1562	699	97	746	334	168	759	340
Arrive On Green	0.07	0.37	0.00	0.17	0.46	0.00	0.01	0.22	0.00	0.01	0.22	0.00
Sat Flow, veh/h	1707	3406	1524	1707	3406	1524	1707	3406	1524	1707	3406	1524
Grp Volume(v), veh/h	149	159	0	790	922	0	14	525	0	21	964	0
Grp Sat Flow(s),veh/h/ln	1707	1703	1524	1707	1703	1524	1707	1703	1524	1707	1703	1524
Q Serve(g_s), s	4.8	2.8	0.0	15.0	18.0	0.0	0.6	12.8	0.0	0.9	20.0	0.0
Cycle Q Clear(g_c), s	4.8	2.8	0.0	15.0	18.0	0.0	0.6	12.8	0.0	0.9	20.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	357	1246	557	760	1562	699	97	746	334	168	759	340
V/C Ratio(X)	0.42	0.13	0.00	1.04	0.59	0.00	0.14	0.70	0.00	0.12	1.27	0.00
Avail Cap(c_a), veh/h	420	2240	1002	760	2240	1002	271	759	340	335	759	340
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.1	18.9	0.0	21.2	18.0	0.0	29.0	32.3	0.0	27.7	34.9	0.0
Incr Delay (d2), s/veh	0.3	0.2	0.0	43.5	1.6	0.0	0.2	2.4	0.0	0.1	131.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	1.3	0.0	20.8	8.8	0.0	0.3	6.2	0.0	0.4	23.2	0.0
LnGrp Delay(d),s/veh	16.4	19.1	0.0	64.7	19.7	0.0	29.3	34.8	0.0	27.8	166.5	0.0
LnGrp LOS	B	B		F	B		C	C		C	F	
Approach Vol, veh/h		308			1712			539			985	
Approach Delay, s/veh		17.8			40.4			34.6			163.5	
Approach LOS		B			D			C			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	38.8	5.9	25.0	11.7	47.1	6.2	24.7				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	59.0	10.0	20.0	10.0	59.0	10.0	20.0				
Max Q Clear Time (g_c+I1), s	17.0	4.8	2.6	22.0	6.8	20.0	2.9	14.8				
Green Ext Time (p_c), s	0.0	25.0	0.0	0.0	0.0	21.1	0.0	2.2				
Intersection Summary												
HCM 2010 Ctrl Delay				71.8								
HCM 2010 LOS				E								

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	23	20	17	29	53
Future Volume (vph)	13	23	20	17	29	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913		0.939			
Flt Protected	0.982					0.983
Satd. Flow (prot)	1607	0	1499	0	0	1638
Flt Permitted	0.982					0.983
Satd. Flow (perm)	1607	0	1499	0	0	1638
Link Speed (mph)	25		25			25
Link Distance (ft)	1000		326			1334
Travel Time (s)	27.3		8.9			36.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	19%	19%	14%	14%
Adj. Flow (vph)	14	25	22	18	32	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	0	40	0	0	90
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.1%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	3.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	23	20	17	29	53
Future Vol, veh/h	13	23	20	17	29	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	19	19	14	14
Mvmt Flow	14	25	22	18	32	58
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	152	31	0	0	40	0
Stage 1	31	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	7.16	6.26	-	-	4.24	-
Critical Hdwy Stg 1	6.16	-	-	-	-	-
Critical Hdwy Stg 2	6.16	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.326	-
Pot Cap-1 Maneuver	806	1032	-	-	1496	-
Stage 1	975	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	792	1032	-	-	1496	-
Mov Cap-2 Maneuver	792	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9	0		2.6		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 930	1496	-		
HCM Lane V/C Ratio	-	- 0.042	0.021	-		
HCM Control Delay (s)	-	- 9	7.5	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0.1	0.1	-		

Lanes, Volumes, Timings
22: E 84th Ave & Lot 2 Access

JR Engineering - ECF
05/02/2017



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	21	113	45	4	1	4
Future Volume (vph)	21	113	45	4	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.990		0.892	
Flt Protected		0.992			0.990	
Satd. Flow (prot)	0	1778	1775	0	1583	0
Flt Permitted		0.992			0.990	
Satd. Flow (perm)	0	1778	1775	0	1583	0
Link Speed (mph)		25	25		30	
Link Distance (ft)		867	403		298	
Travel Time (s)		23.6	11.0		6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	123	49	4	1	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	146	53	0	5	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 23.8% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	113	45	4	1	4
Future Vol, veh/h	21	113	45	4	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	23	123	49	4	1	4
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	53	0	-	0	219	51
Stage 1	-	-	-	-	51	-
Stage 2	-	-	-	-	168	-
Critical Hdwy	4.16	-	-	-	6.46	6.26
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	2.254	-	-	-	3.554	3.354
Pot Cap-1 Maneuver	1527	-	-	-	760	1006
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	852	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1527	-	-	-	748	1006
Mov Cap-2 Maneuver	-	-	-	-	748	-
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	838	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.2		0		8.8	
HCM LOS					A	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1527	-	-	-	941	
HCM Lane V/C Ratio	0.015	-	-	-	0.006	
HCM Control Delay (s)	7.4	0	-	-	8.8	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Lanes, Volumes, Timings
23: Ulster St & Lot 1 Access

JR Engineering - ECF
05/02/2017



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	5	14	30	48	18
Future Volume (vph)	7	5	14	30	48	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	140			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.948				0.962	
Flt Protected	0.970			0.985		
Satd. Flow (prot)	1648	0	0	1573	1536	0
Flt Permitted	0.970			0.985		
Satd. Flow (perm)	1648	0	0	1573	1536	0
Link Speed (mph)	20			25	25	
Link Distance (ft)	413			993	326	
Travel Time (s)	14.1			27.1	8.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	19%	19%	19%	19%
Adj. Flow (vph)	8	5	15	33	52	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	0	48	72	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 19.0% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	5	14	30	48	18
Future Vol, veh/h	7	5	14	30	48	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	19	19	19	19
Mvmt Flow	8	5	15	33	52	20
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	125	62	72	0	-	0
Stage 1	62	-	-	-	-	-
Stage 2	63	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.29	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.371	-	-	-
Pot Cap-1 Maneuver	860	992	1427	-	-	-
Stage 1	951	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	851	992	1427	-	-	-
Mov Cap-2 Maneuver	851	-	-	-	-	-
Stage 1	951	-	-	-	-	-
Stage 2	940	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9	2.4		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1427	-	905	-	-	
HCM Lane V/C Ratio	0.011	-	0.014	-	-	
HCM Control Delay (s)	7.5	0	9	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Lanes, Volumes, Timings
1: Rosemary St & E 88th Ave

JR Engineering - ECF

05/02/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Volume (vph)	287	629	58	625	1051	22
Future Volume (vph)	287	629	58	625	1051	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		90	165		150	80
Storage Lanes		1	1		2	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3059	1369	1467	2935	3242	1495
Flt Permitted			0.429		0.950	
Satd. Flow (perm)	3059	1369	663	2935	3242	1495
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		684				24
Link Speed (mph)	40			40	35	
Link Distance (ft)	1013			1650	440	
Travel Time (s)	17.3			28.1	8.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	18%	18%	23%	23%	8%	8%
Adj. Flow (vph)	312	684	63	679	1142	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	312	684	63	679	1142	24
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1	1	1	1	1	1
Detector Template						
Leading Detector (ft)	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	Perm	pm+pt	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6	2			4
Detector Phase	6	6	5	2	4	4
Switch Phase						
Minimum Initial (s)	6.0	6.0	4.0	6.0	6.0	6.0
Minimum Split (s)	12.0	12.0	10.0	12.0	12.0	12.0

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Split (s)	30.0	30.0	10.0	40.0	45.0	45.0
Total Split (%)	35.3%	35.3%	11.8%	47.1%	52.9%	52.9%
Maximum Green (s)	24.0	24.0	4.0	34.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	5.0	5.0	2.5	5.0	5.0	5.0
Recall Mode	Min	Min	Min	Min	None	None
Act Effect Green (s)	19.2	19.2	29.4	29.4	34.8	34.8
Actuated g/C Ratio	0.25	0.25	0.38	0.38	0.46	0.46
v/c Ratio	0.41	0.80	0.21	0.60	0.77	0.03
Control Delay	26.1	10.6	18.0	22.0	22.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	10.6	18.0	22.0	22.1	5.5
LOS	C	B	B	C	C	A
Approach Delay	15.4			21.7	21.8	
Approach LOS	B			C	C	

Intersection Summary

Area Type: Other

Cycle Length: 85

Actuated Cycle Length: 76.4

Natural Cycle: 65

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 19.6

Intersection LOS: B

Intersection Capacity Utilization 57.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Rosemary St & E 88th Ave

 Ø2 40 s	 Ø4 45 s
 Ø5 10 s	 Ø6 30 s

HCM 2010 Signalized Intersection Summary
1: Rosemary St & E 88th Ave

JR Engineering - ECF
05/02/2017

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑↑	↑	↑	↑↑	↑↑	↑		
Traffic Volume (veh/h)	287	629	58	625	1051	22		
Future Volume (veh/h)	287	629	58	625	1051	22		
Number	6	16	5	2	7	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1610	1610	1545	1545	1759	1759		
Adj Flow Rate, veh/h	312	0	63	679	1142	24		
Adj No. of Lanes	2	1	1	2	2	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	18	18	23	23	8	8		
Cap, veh/h	688	308	308	1080	1496	688		
Arrive On Green	0.22	0.00	0.06	0.37	0.46	0.46		
Sat Flow, veh/h	3140	1369	1471	3012	3250	1495		
Grp Volume(v), veh/h	312	0	63	679	1142	24		
Grp Sat Flow(s),veh/h/ln	1530	1369	1471	1467	1625	1495		
Q Serve(g_s), s	6.1	0.0	2.2	13.3	20.4	0.6		
Cycle Q Clear(g_c), s	6.1	0.0	2.2	13.3	20.4	0.6		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	688	308	308	1080	1496	688		
V/C Ratio(X)	0.45	0.00	0.20	0.63	0.76	0.03		
Avail Cap(c_a), veh/h	1051	470	308	1429	1815	835		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	23.4	0.0	17.8	18.1	15.7	10.3		
Incr Delay (d2), s/veh	1.0	0.0	0.2	1.3	2.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.9	5.6	9.5	0.7		
LnGrp Delay(d),s/veh	24.4	0.0	18.1	19.4	18.0	10.4		
LnGrp LOS	C		B	B	B	B		
Approach Vol, veh/h	312			742	1166			
Approach Delay, s/veh	24.4			19.3	17.8			
Approach LOS	C			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		31.7		38.1	10.0	21.7		
Change Period (Y+Rc), s		6.0		6.0	6.0	6.0		
Max Green Setting (Gmax), s		34.0		39.0	4.0	24.0		
Max Q Clear Time (g_c+I1), s		15.3		22.4	4.2	8.1		
Green Ext Time (p_c), s		8.3		9.7	0.0	7.6		
Intersection Summary								
HCM 2010 Ctrl Delay			19.2					
HCM 2010 LOS			B					

Lanes, Volumes, Timings
3: Ulster St & E 88th Ave

JR Engineering - ECF
05/02/2017

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	262	51	10	517	91	56
Future Volume (vph)	262	51	10	517	91	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.976				0.949	
Flt Protected			0.950		0.970	
Satd. Flow (prot)	2865	0	1467	2935	1534	0
Flt Permitted			0.950		0.970	
Satd. Flow (perm)	2865	0	1467	2935	1534	0
Link Speed (mph)	40			40	25	
Link Distance (ft)	1650			1000	1334	
Travel Time (s)	28.1			17.0	36.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	23%	23%	23%	14%	14%
Adj. Flow (vph)	285	55	11	562	99	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	340	0	11	562	160	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.4%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	2.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑	↑↑	↑	
Traffic Vol, veh/h	262	51	10	517	91	56
Future Vol, veh/h	262	51	10	517	91	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	23	23	23	14	14
Mvmt Flow	285	55	11	562	99	61
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	340	0	616	170
Stage 1	-	-	-	-	313	-
Stage 2	-	-	-	-	303	-
Critical Hdwy	-	-	4.56	-	7.08	7.18
Critical Hdwy Stg 1	-	-	-	-	6.08	-
Critical Hdwy Stg 2	-	-	-	-	6.08	-
Follow-up Hdwy	-	-	2.43	-	3.64	3.44
Pot Cap-1 Maneuver	-	-	1078	-	396	808
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	688	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1078	-	392	808
Mov Cap-2 Maneuver	-	-	-	-	392	-
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	681	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		15.9	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	488	-	-	1078	-	
HCM Lane V/C Ratio	0.327	-	-	0.01	-	
HCM Control Delay (s)	15.9	-	-	8.4	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	1.4	-	-	0	-	

Lanes, Volumes, Timings
5: Lot 4 Access/Lot 3 Access & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	63	8	1	53	2	31	0	5	6	0	32
Future Volume (vph)	8	63	8	1	53	2	31	0	5	6	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.986			0.996			0.983			0.887	
Flt Protected		0.995			0.999			0.958			0.992	
Satd. Flow (prot)	0	1759	0	0	1783	0	0	1688	0	0	1577	0
Flt Permitted		0.995			0.999			0.958			0.992	
Satd. Flow (perm)	0	1759	0	0	1783	0	0	1688	0	0	1577	0
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		376			407			302			298	
Travel Time (s)		10.3			11.1			6.9			6.8	
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
Adj. Flow (vph)	9	68	9	1	58	2	34	0	5	7	0	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	61	0	0	39	0	0	42	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 23.0%	ICU Level of Service A											
Analysis Period (min) 15												

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	63	8	1	53	2	31	0	5	6	0	32
Future Vol, veh/h	8	63	8	1	53	2	31	0	5	6	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	9	68	9	1	58	2	34	0	5	7	0	35
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	60	0	0	77	0	0	168	152	73	154	156	59
Stage 1	-	-	-	-	-	-	90	90	-	61	61	-
Stage 2	-	-	-	-	-	-	78	62	-	93	95	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.16	6.56	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.16	5.56	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.554	4.054	3.354
Pot Cap-1 Maneuver	1518	-	-	1497	-	-	787	732	978	804	729	996
Stage 1	-	-	-	-	-	-	908	813	-	940	836	-
Stage 2	-	-	-	-	-	-	921	835	-	904	809	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1518	-	-	1497	-	-	755	727	978	795	724	996
Mov Cap-2 Maneuver	-	-	-	-	-	-	755	727	-	795	724	
Stage 1	-	-	-	-	-	-	903	808	-	934	835	-
Stage 2	-	-	-	-	-	-	888	834	-	894	804	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.1			9.9			8.9		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	780	1518	-	-	1497	-	-	958				
HCM Lane V/C Ratio	0.05	0.006	-	-	0.001	-	-	0.043				
HCM Control Delay (s)	9.9	7.4	0	-	7.4	0	-	8.9				
HCM Lane LOS	A	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1				

Lanes, Volumes, Timings
6: Rosemary St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	12	13	88	9	40	4	982	60	17	615	19
Future Volume (vph)	20	12	13	88	9	40	4	982	60	17	615	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	140		0	0		0	140		0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.961			0.878			0.992			0.995	
Flt Protected		0.978		0.950						0.950		
Satd. Flow (prot)	0	1685	0	1641	1517	0	0	1745	0	1671	1750	0
Flt Permitted		0.978		0.950						0.950		
Satd. Flow (perm)	0	1685	0	1641	1517	0	0	1745	0	1671	1750	0
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		1013			867			665			2213	
Travel Time (s)		27.6			23.6			13.0			43.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	10%	10%	10%	8%	8%	8%	8%	8%	8%
Adj. Flow (vph)	22	13	14	96	10	43	4	1067	65	18	668	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	49	0	96	53	0	0	1136	0	18	689	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	74.7%											
ICU Level of Service	D											
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	39.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	12	13	88	9	40	4	982	60	17	615	19
Future Vol, veh/h	20	12	13	88	9	40	4	982	60	17	615	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	140	-	-	-	-	-	140	-	-
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, %	6	6	6	10	10	10	8	8	8	8	8	8
Mvmt Flow	22	13	14	96	10	43	4	1067	65	18	668	21
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1851	1857	679	1838	1835	1100	689	0	0	1133	0	0
Stage 1	716	716	-	1109	1109	-	-	-	-	-	-	-
Stage 2	1135	1141	-	729	726	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.2	6.6	6.3	4.18	-	-	4.18	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.59	4.09	3.39	2.272	-	-	2.272	-	-
Pot Cap-1 Maneuver	56	72	445	~ 55	72	249	878	-	-	595	-	-
Stage 1	415	428	-	245	276	-	-	-	-	-	-	-
Stage 2	242	271	-	402	418	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	40	69	445	~ 44	69	249	878	-	-	595	-	-
Mov Cap-2 Maneuver	40	69	-	~ 44	69	-	-	-	-	-	-	-
Stage 1	410	415	-	242	272	-	-	-	-	-	-	-
Stage 2	190	267	-	366	405	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	157.1			\$ 487			0			0.3		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	878	-	-	64	44	168	595	-	-			
HCM Lane V/C Ratio	0.005	-	-	0.764	2.174	0.317	0.031	-	-			
HCM Control Delay (s)	9.1	0	-	157.1	\$ 738	36.1	11.2	-	-			
HCM Lane LOS	A	A	-	F	F	E	B	-	-			
HCM 95th %tile Q(veh)	0	-	-	3.4	10	1.3	0.1	-	-			
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Lanes, Volumes, Timings
7: Ulster St & E 84th Ave

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	7	1	1	9	7	1	16	3	4	1	47
Future Volume (vph)	66	7	1	1	9	7	1	16	3	4	1	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.998			0.943			0.981			0.877	
Flt Protected		0.957			0.997			0.998			0.996	
Satd. Flow (prot)	0	1712	0	0	1685	0	0	1755	0	0	1549	0
Flt Permitted		0.957			0.997			0.998			0.996	
Satd. Flow (perm)	0	1712	0	0	1685	0	0	1755	0	0	1549	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		407			478			500			993	
Travel Time (s)		11.1			13.0			13.6			27.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	19%	19%	6%
Adj. Flow (vph)	72	8	1	1	10	8	1	17	3	4	1	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	81	0	0	19	0	0	21	0	0	56	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.9%				ICU Level of Service A							
Analysis Period (min)	15											

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	66	7	1	1	9	7	1	16	3	4	1	47
Future Vol, veh/h	66	7	1	1	9	7	1	16	3	4	1	47
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	19	19	6
Mvmt Flow	72	8	1	1	10	8	1	17	3	4	1	51
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	17	0	0	9	0	0	194	172	8	178	168	14
Stage 1	-	-	-	-	-	-	152	152	-	16	16	-
Stage 2	-	-	-	-	-	-	42	20	-	162	152	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.16	6.56	6.26	7.29	6.69	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.29	5.69	-
Follow-up Hdwy	2.254	-	-	2.254	-	-	3.554	4.054	3.354	3.671	4.171	3.354
Pot Cap-1 Maneuver	1574	-	-	1585	-	-	757	714	1062	748	695	1054
Stage 1	-	-	-	-	-	-	841	764	-	961	849	-
Stage 2	-	-	-	-	-	-	962	871	-	802	740	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1574	-	-	1585	-	-	694	680	1062	705	662	1054
Mov Cap-2 Maneuver	-	-	-	-	-	-	694	680	-	705	662	-
Stage 1	-	-	-	-	-	-	802	729	-	917	848	-
Stage 2	-	-	-	-	-	-	913	870	-	745	706	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	6.6			0.4			10.2			8.8		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	720	1574	-	-	1585	-	-	1004				
HCM Lane V/C Ratio	0.03	0.046	-	-	0.001	-	-	0.056				
HCM Control Delay (s)	10.2	7.4	0	-	7.3	0	-	8.8				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2				

Lanes, Volumes, Timings
9: E 83rd Ave & Rosemary St

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	6	1	1	1	3	1010	1	1	770	1
Future Volume (vph)	5	1	6	1	1	1	3	1010	1	1	770	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	140		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Frt		0.927			0.955							
Flt Protected		0.981			0.984							
Satd. Flow (prot)	0	1630	0	0	1684	0	0	1792	0	0	1759	0
Flt Permitted		0.981			0.984							
Satd. Flow (perm)	0	1630	0	0	1684	0	0	1792	0	0	1759	0
Link Speed (mph)		25			25			30			35	
Link Distance (ft)		1013			1000			1037			665	
Travel Time (s)		27.6			27.3			23.6			13.0	
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
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	8%	8%
Adj. Flow (vph)	5	1	7	1	1	1	3	1098	1	1	837	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	13	0	0	3	0	0	1102	0	0	839	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	65.5%				ICU Level of Service C							
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1	6	1	1	1	3	1010	1	1	770	1
Future Vol, veh/h	5	1	6	1	1	1	3	1010	1	1	770	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	8	8
Mvmt Flow	5	1	7	1	1	1	3	1098	1	1	837	1
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1946	1945	838	1948	1945	1098	838	0	0	1099	0	0
Stage 1	840	840	-	1105	1105	-	-	-	-	-	-	-
Stage 2	1106	1105	-	843	840	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.16	6.56	6.26	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.554	4.054	3.354	2.254	-	-	2.254	-	-
Pot Cap-1 Maneuver	48	63	360	47	63	254	779	-	-	620	-	-
Stage 1	354	375	-	251	282	-	-	-	-	-	-	-
Stage 2	251	282	-	353	375	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	47	62	360	45	62	254	779	-	-	620	-	-
Mov Cap-2 Maneuver	47	62	-	45	62	-	-	-	-	-	-	-
Stage 1	350	374	-	248	279	-	-	-	-	-	-	-
Stage 2	246	279	-	345	374	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	54.2			58.1			0			0		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	779	-	-	86	71	620	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.152	0.046	0.002	-	-				
HCM Control Delay (s)	9.6	0	-	54.2	58.1	10.8	0	-				
HCM Lane LOS	A	A	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	0	-	-				

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF

05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	365	676	9	446	302	30	13	987	1015	52	675	365
Future Volume (vph)	365	676	9	446	302	30	13	987	1015	52	675	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	575		265	900		320	600		350	150		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3406	1524	1703	3406	1524	1703	3406	1524	1703	3406	1524
Flt Permitted	0.554			0.203			0.221			0.145		
Satd. Flow (perm)	993	3406	1524	364	3406	1524	396	3406	1524	260	3406	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105			105			311			247
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1013			1650			1000			998	
Travel Time (s)		15.3			25.0			22.7			22.7	
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
Adj. Flow (vph)	397	735	10	485	328	33	14	1073	1103	57	734	397
Shared Lane Traffic (%)												
Lane Group Flow (vph)	397	735	10	485	328	33	14	1073	1103	57	734	397
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left					Right				Left		Right
Leading Detector (ft)	40	40	40	40	40	40	40	40	40	40	40	40
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	40	40	40	40	40	40	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	3.0	15.0	15.0	3.0	15.0	15.0	3.0	10.0	10.0	3.0	10.0	10.0
Minimum Split (s)	8.0	21.0	21.0	8.0	21.0	21.0	8.0	15.0	15.0	8.0	15.0	15.0
Total Split (s)	15.0	65.0	65.0	20.0	65.0	65.0	15.0	25.0	25.0	15.0	25.0	25.0

Lanes, Volumes, Timings
12: Quebec Pkwy/Rosemary St & SH 2

JR Engineering - ECF
05/02/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	12.0%	52.0%	52.0%	16.0%	52.0%	52.0%	12.0%	20.0%	20.0%	12.0%	20.0%	20.0%
Maximum Green (s)	10.0	59.0	59.0	15.0	59.0	59.0	10.0	20.0	20.0	10.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	7.0	7.0	1.5	7.0	7.0	1.5	2.0	2.0	1.5	2.0	2.0
Minimum Gap (s)	1.5	4.9	4.9	1.5	4.9	4.9	1.5	2.0	2.0	1.5	2.0	2.0
Time Before Reduce (s)	0.0	25.0	25.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	15.0	15.0	0.0	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Act Effct Green (s)	42.9	31.8	31.8	53.1	36.9	36.9	23.9	20.3	20.3	29.2	27.6	27.6
Actuated g/C Ratio	0.46	0.34	0.34	0.57	0.40	0.40	0.26	0.22	0.22	0.31	0.30	0.30
v/c Ratio	0.74	0.63	0.02	1.14	0.24	0.05	0.08	1.44	1.91	0.31	0.72	0.63
Control Delay	24.8	28.5	0.0	106.2	19.5	0.1	24.5	236.5	438.1	28.1	35.6	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	28.5	0.0	106.2	19.5	0.1	24.5	236.5	438.1	28.1	35.6	16.9
LOS	C	C	A	F	B	A	C	F	F	C	D	B
Approach Delay	27.0			68.4			336.7			29.0		
Approach LOS	C			E			F			C		

Intersection Summary

Area Type: Other

Cycle Length: 125

Actuated Cycle Length: 92.8

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.91

Intersection Signal Delay: 160.3

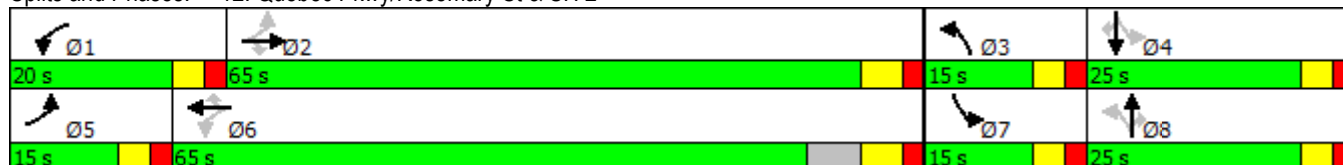
Intersection LOS: F

Intersection Capacity Utilization 98.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 12: Quebec Pkwy/Rosemary St & SH 2



HCM 2010 Signalized Intersection Summary
12: Quebec Pkwy/Rosemary St & SH 2

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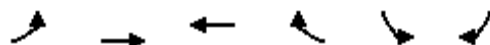
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	365	676	9	446	302	30	13	987	1015	52	675	365
Future Volume (veh/h)	365	676	9	446	302	30	13	987	1015	52	675	365
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792	1792
Adj Flow Rate, veh/h	397	735	0	485	328	0	14	1073	0	57	734	0
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	637	1348	603	491	1521	680	102	690	309	136	783	350
Arrive On Green	0.10	0.40	0.00	0.15	0.45	0.00	0.01	0.20	0.00	0.04	0.23	0.00
Sat Flow, veh/h	1707	3406	1524	1707	3406	1524	1707	3406	1524	1707	3406	1524
Grp Volume(v), veh/h	397	735	0	485	328	0	14	1073	0	57	734	0
Grp Sat Flow(s),veh/h/ln	1707	1703	1524	1707	1703	1524	1707	1703	1524	1707	1703	1524
Q Serve(g_s), s	10.0	16.4	0.0	15.0	5.8	0.0	0.6	20.0	0.0	2.6	20.9	0.0
Cycle Q Clear(g_c), s	10.0	16.4	0.0	15.0	5.8	0.0	0.6	20.0	0.0	2.6	20.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	637	1348	603	491	1521	680	102	690	309	136	783	350
V/C Ratio(X)	0.62	0.55	0.00	0.99	0.22	0.00	0.14	1.56	0.00	0.42	0.94	0.00
Avail Cap(c_a), veh/h	637	2035	910	491	2035	910	258	690	309	246	783	350
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.0	23.0	0.0	19.7	16.7	0.0	32.6	39.4	0.0	31.6	37.3	0.0
Incr Delay (d2), s/veh	1.4	1.6	0.0	37.1	0.3	0.0	0.2	257.0	0.0	0.8	18.5	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	3.3	8.0	0.0	11.2	2.8	0.0	0.3	33.9	0.0	1.2	11.8	0.0
LnGrp Delay(d),s/veh	18.4	24.6	0.0	56.8	17.1	0.0	32.8	296.4	0.0	32.3	55.8	0.0
LnGrp LOS	B	C		E	B		C	F		C	E	
Approach Vol, veh/h	1132				813				1087		791	
Approach Delay, s/veh	22.4				40.8				293.0		54.1	
Approach LOS	C				D				F		D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	45.1	6.0	27.7	15.0	50.1	8.6	25.0				
Change Period (Y+Rc), s	5.0	6.0	5.0	5.0	5.0	6.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	59.0	10.0	20.0	10.0	59.0	10.0	20.0				
Max Q Clear Time (g_c+I1), s	17.0	18.4	2.6	22.9	12.0	7.8	4.6	22.0				
Green Ext Time (p_c), s	0.0	20.7	0.0	0.0	0.0	23.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay	109.8											
HCM 2010 LOS	F											

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	52	86	29	36	23
Future Volume (vph)	26	52	86	29	36	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.909		0.965			
Flt Protected	0.984					0.970
Satd. Flow (prot)	1603	0	1541	0	0	1617
Flt Permitted	0.984					0.970
Satd. Flow (perm)	1603	0	1541	0	0	1617
Link Speed (mph)	25		25			25
Link Distance (ft)	1000		326			1334
Travel Time (s)	27.3		8.9			36.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	19%	19%	14%	14%
Adj. Flow (vph)	28	57	93	32	39	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	0	125	0	0	64
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	21.2%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	4.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	52	86	29	36	23
Future Vol, veh/h	26	52	86	29	36	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	19	19	14	14
Mvmt Flow	28	57	93	32	39	25
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	212	109	0	0	125	0
Stage 1	109	-	-	-	-	-
Stage 2	103	-	-	-	-	-
Critical Hdwy	6.46	6.26	-	-	4.24	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.326	-
Pot Cap-1 Maneuver	767	934	-	-	1391	-
Stage 1	906	-	-	-	-	-
Stage 2	911	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	746	934	-	-	1391	-
Mov Cap-2 Maneuver	746	-	-	-	-	-
Stage 1	906	-	-	-	-	-
Stage 2	885	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9.6		0		4.7	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 862	1391	-		
HCM Lane V/C Ratio	-	- 0.098	0.028	-		
HCM Control Delay (s)	-	- 9.6	7.7	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0.3	0.1	-		

Lanes, Volumes, Timings
22: E 84th Ave & Lot 2 Access

JR Engineering - ECF
05/02/2017



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	82	115	1	3	20
Future Volume (vph)	5	82	115	1	3	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999		0.881	
Flt Protected		0.997			0.994	
Satd. Flow (prot)	0	1787	1791	0	1570	0
Flt Permitted		0.997			0.994	
Satd. Flow (perm)	0	1787	1791	0	1570	0
Link Speed (mph)		25	25		30	
Link Distance (ft)		867	376		298	
Travel Time (s)		23.6	10.3		6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	89	125	1	3	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	94	126	0	25	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 18.4% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	82	115	1	3	20
Future Vol, veh/h	5	82	115	1	3	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	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	5	89	125	1	3	22
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	126	0	-	0	226	126
Stage 1	-	-	-	-	126	-
Stage 2	-	-	-	-	100	-
Critical Hdwy	4.16	-	-	-	6.46	6.26
Critical Hdwy Stg 1	-	-	-	-	5.46	-
Critical Hdwy Stg 2	-	-	-	-	5.46	-
Follow-up Hdwy	2.254	-	-	-	3.554	3.354
Pot Cap-1 Maneuver	1436	-	-	-	753	914
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	914	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1436	-	-	-	750	914
Mov Cap-2 Maneuver	-	-	-	-	750	-
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	910	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.4		0		9.2	
HCM LOS					A	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1436	-	-	-	889	
HCM Lane V/C Ratio	0.004	-	-	-	0.028	
HCM Control Delay (s)	7.5	0	-	-	9.2	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Lanes, Volumes, Timings
23: Ulster St & Lot 1 Access

JR Engineering - ECF
05/02/2017



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	10	8	103	40	9
Future Volume (vph)	12	10	8	103	40	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	140			0
Storage Lanes	1	0	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.938				0.975	
Flt Protected	0.974			0.996		
Satd. Flow (prot)	1638	0	0	1590	1557	0
Flt Permitted	0.974			0.996		
Satd. Flow (perm)	1638	0	0	1590	1557	0
Link Speed (mph)	20			25	25	
Link Distance (ft)	413			993	326	
Travel Time (s)	14.1			27.1	8.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	19%	19%	19%	19%
Adj. Flow (vph)	13	11	9	112	43	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	24	0	0	121	53	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 22.0% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	10	8	103	40	9
Future Vol, veh/h	12	10	8	103	40	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	19	19	19	19
Mvmt Flow	13	11	9	112	43	10
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	177	48	53	0	-	0
Stage 1	48	-	-	-	-	-
Stage 2	129	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.29	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.371	-	-	-
Pot Cap-1 Maneuver	804	1010	1450	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	798	1010	1450	-	-	-
Mov Cap-2 Maneuver	798	-	-	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	881	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.2	0.5		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1450	-	882	-	-	
HCM Lane V/C Ratio	0.006	-	0.027	-	-	
HCM Control Delay (s)	7.5	0	9.2	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	