APPENDIX A

PHOTOGRAPHS

Photo # 1 – Highway 174 (E-W) & Trim Road (N-S)

Photo # 2 – Trim Road (N-S), Taylor Creek Boulevard/Dairy Drive (E-W)

Photo # 3 – Trim Road (N-S), St. Joseph Boulevard/Old Montreal Road (E-W)

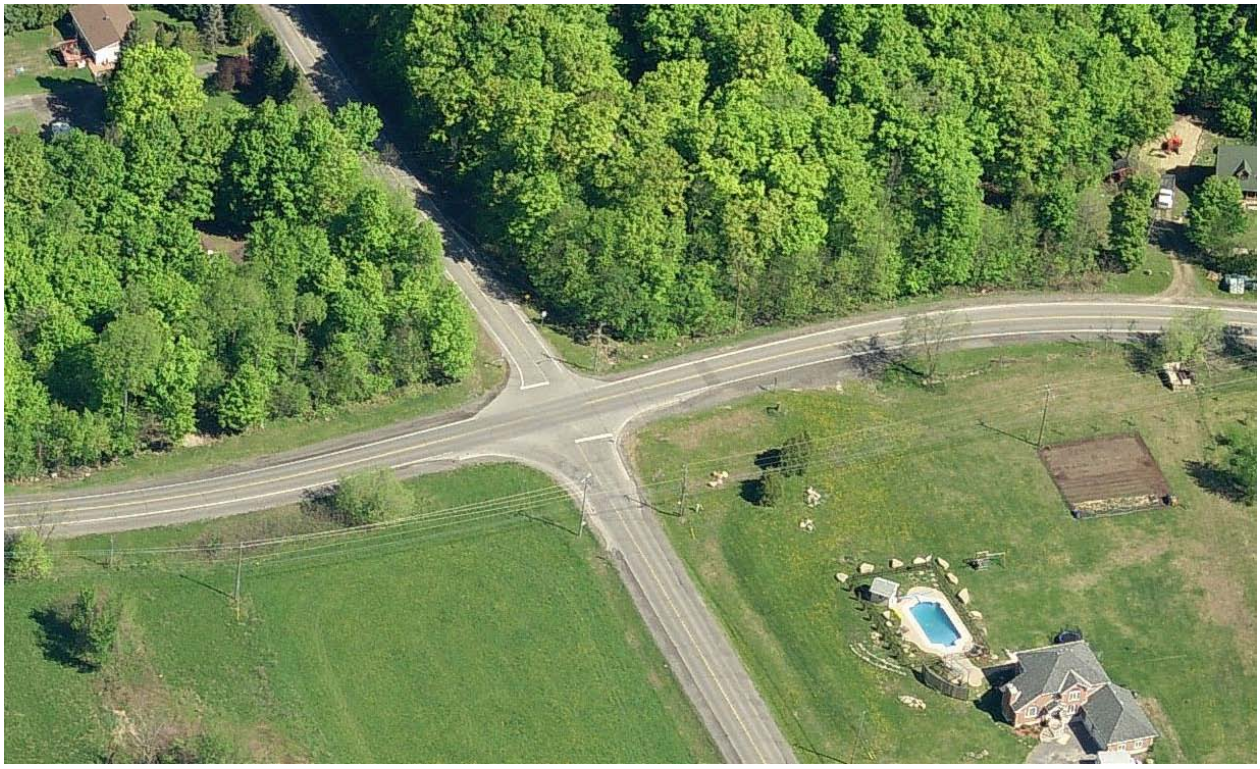


Photo # 4 – Old Montreal Road (E-W), Ted Kelly Lane/Frank Kenney Road (N-S)

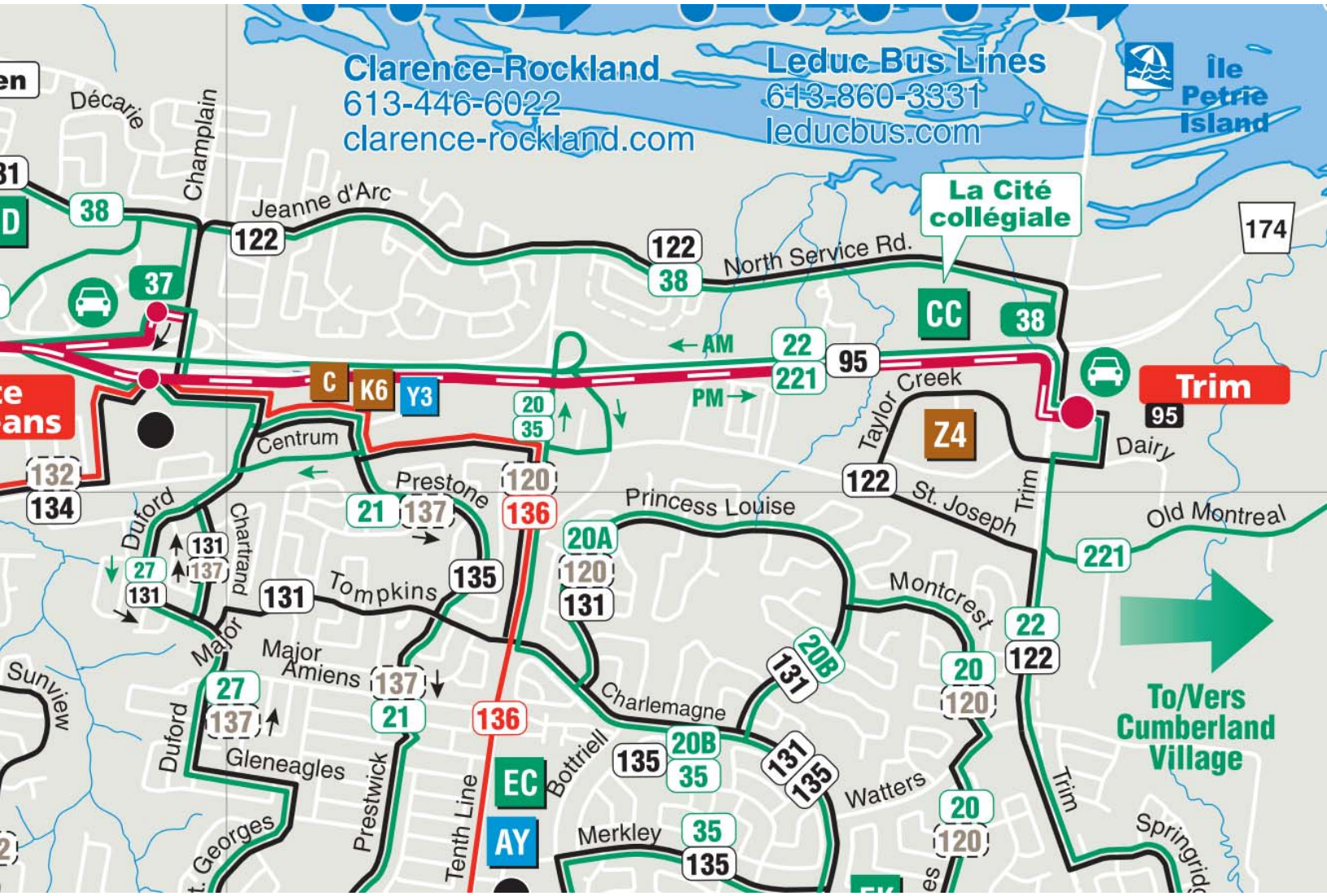
Photo # 5 – Highway 174 (Eastbound) near Proposed Collector Road

Photo # 6 – Old Montreal Road (Eastbound) near Proposed Collector Road

Photo # 7 – Frank Kenny Road (Northbound) near Proposed Collector Road

APPENDIX B

OC TRANSPO MAPS


Clarence-Rockland
613-446-6022
clarence-rockland.com
Leduc Bus Lines
613-860-3331
leducbus.com
Île Petrie Island
La Cité collégiale
Trim
To/Vers Cumberland Village
Jeanne d'Arc
North Service Rd.
Taylor Creek
Dairy
St. Joseph
Old Montreal
Princess Louise
Centrum
Prestone
Tompkins
Montcrest
Charlemagne
Bottriell
Merkley
Watters
Springridge
Trim
Champlain
Décarie
Duford
Chartrand
Major
Major Amiens
Sunview
Gleneagles
Prestwick
Tenth Line
St. Georges
AM
PM
C
K6
Y3
CC
Z4
EC
AY
20A
20B
174
95
221
122
120
136
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131
137
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37
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27
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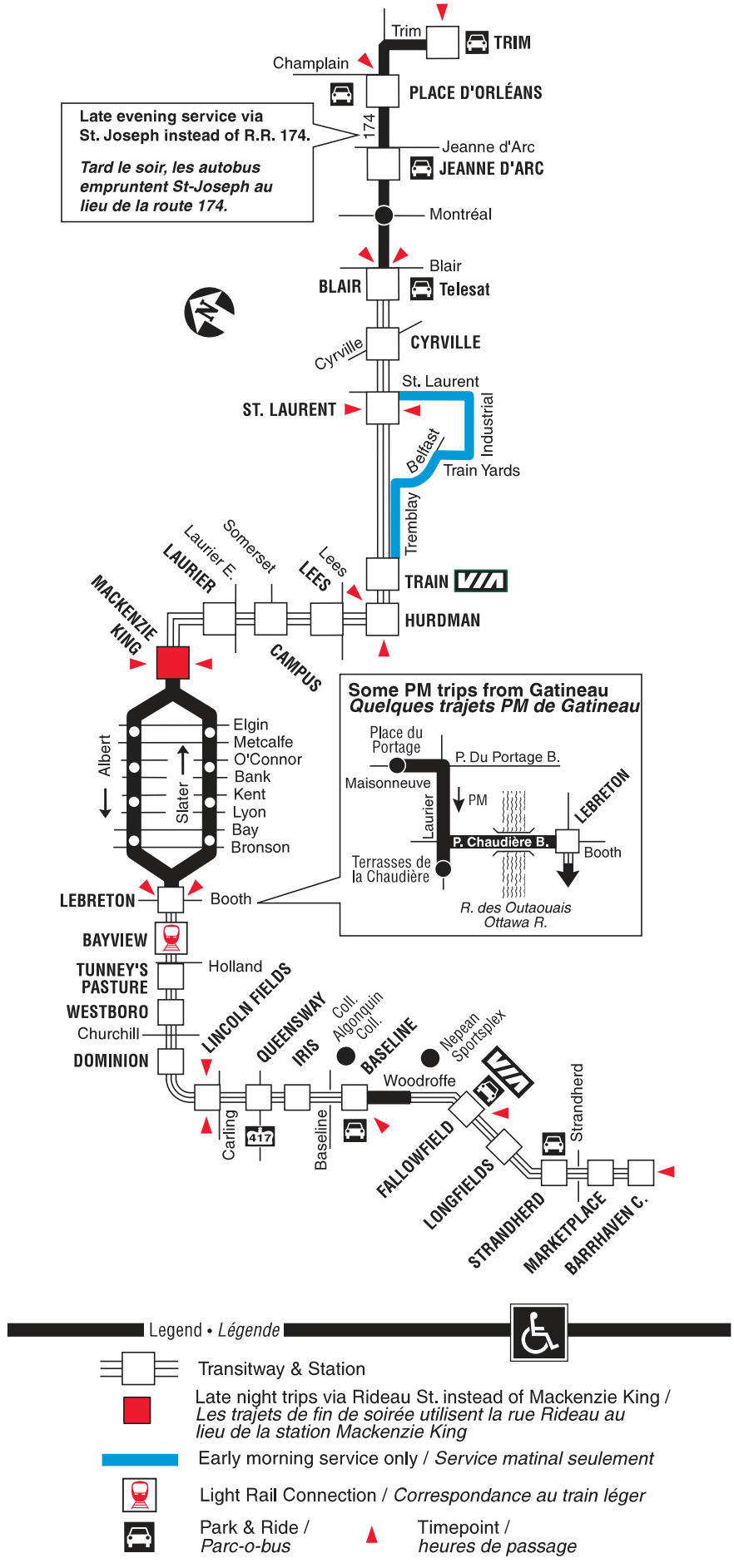
21
20
134
132

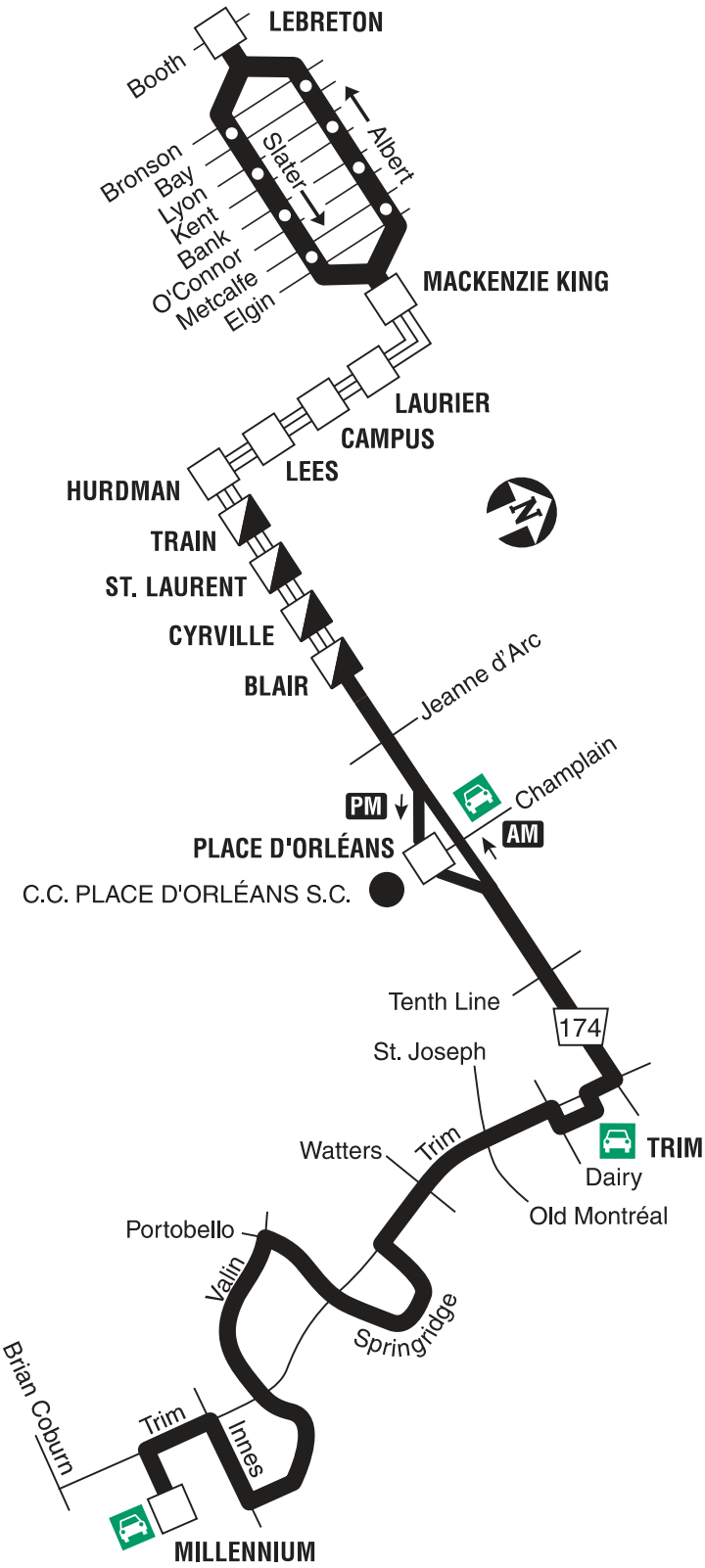
Route / Circuit 95



Legend • *Légende*

- Transitway & Station
- Late night trips via Rideau St. instead of Mackenzie King / *Les trajets de fin de soirée utilisent la rue Rideau au lieu de la station Mackenzie King*
- Early morning service only / *Service matinal seulement*
- Light Rail Connection / *Correspondance au train léger*
- Park & Ride / *Parc-o-bus*
- Timepoint / *heures de passage*

Route / Circuit 22



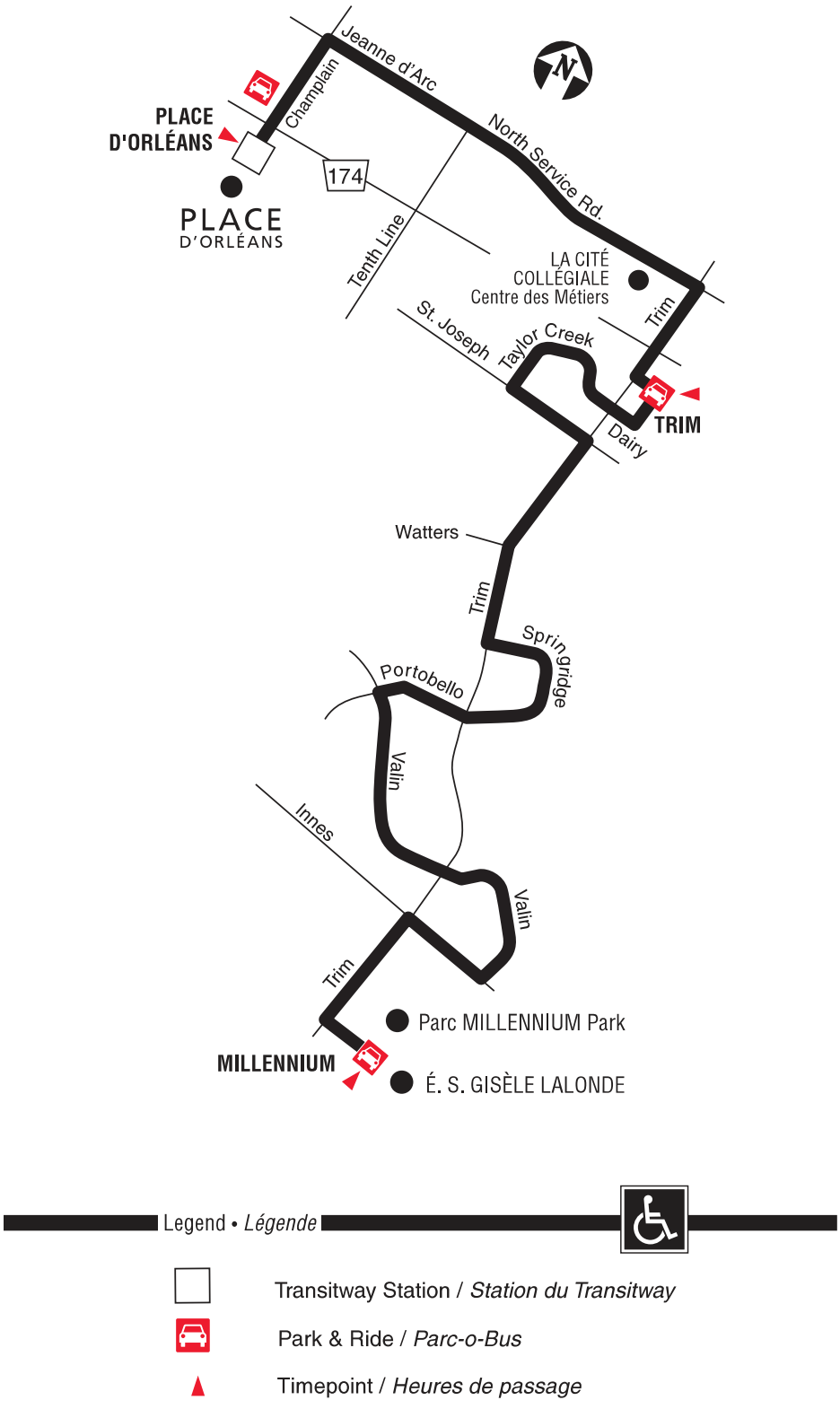
Legend • *Légende*

Transitway & Station

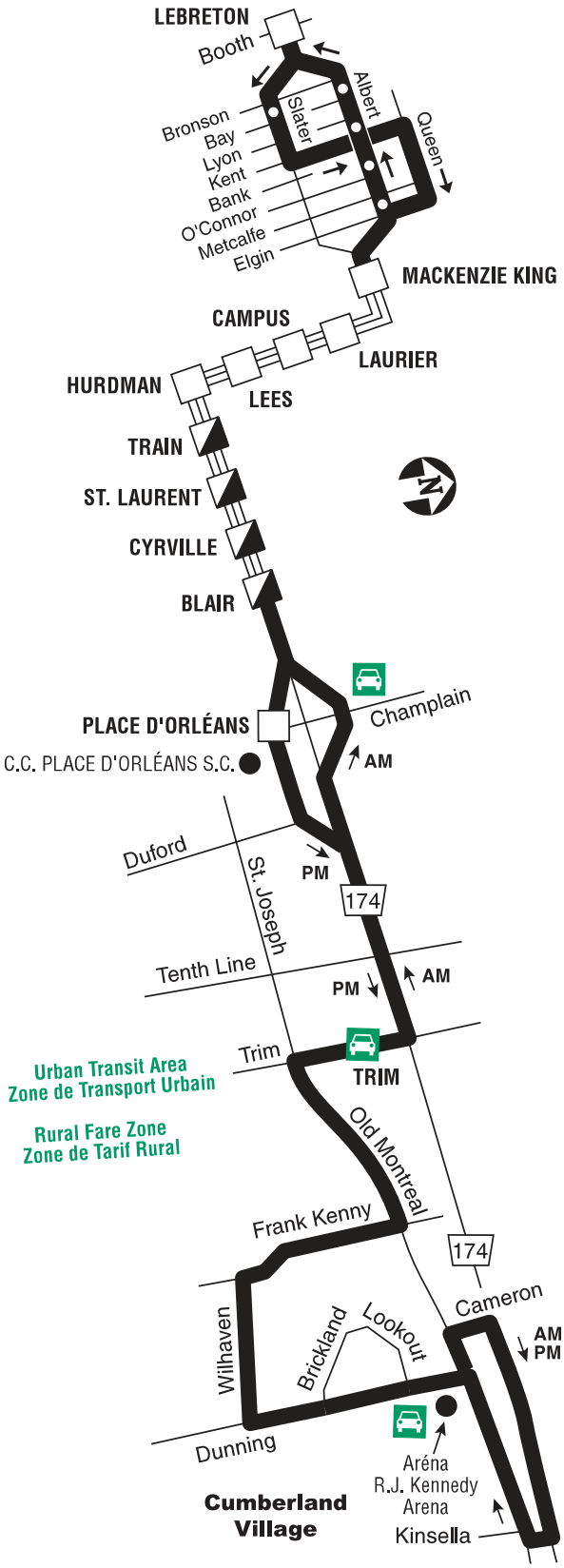
AM: Off only - PM: Full Service
AM: Descente seulement - PM: Service complet

Park & Ride / *Parc-o-Bus*

Route / Circuit 122



Route / Circuit 221



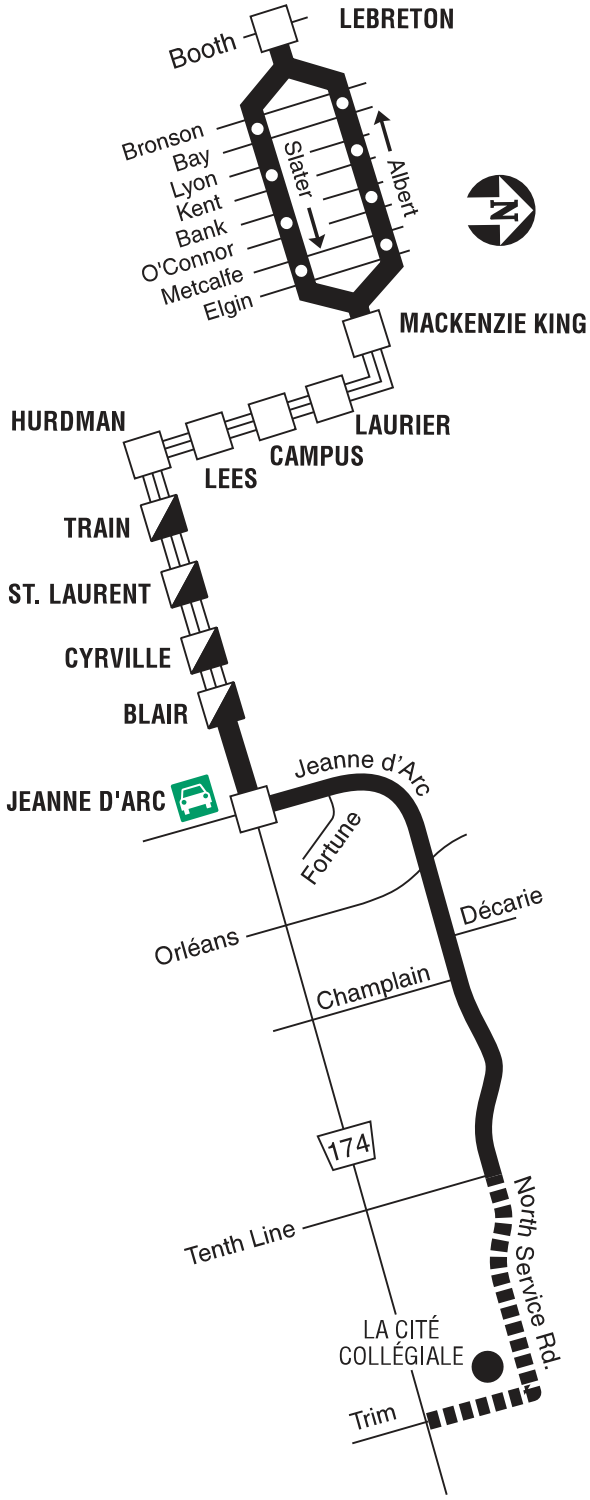
Legend • *Légende*

Transitway & Station

AM: Off only - PM: Full Service
AM: Descente seulement - PM: Service complet

Park & Ride / *Parc-o-Bus*

Route / Circuit 38



Legend • *Légende*

Transitway & Station

AM: Off only - PM: Full Service
AM: Descente seulement - PM: Service complet

Some trips / *Quelques trajets*

Park & Ride / *Parc-o-Bus*

APPENDIX C

TRAFFIC DATA

TRIM RD and HIGHWAY 174

(ULRS Listing RR- 57 & RR-174)

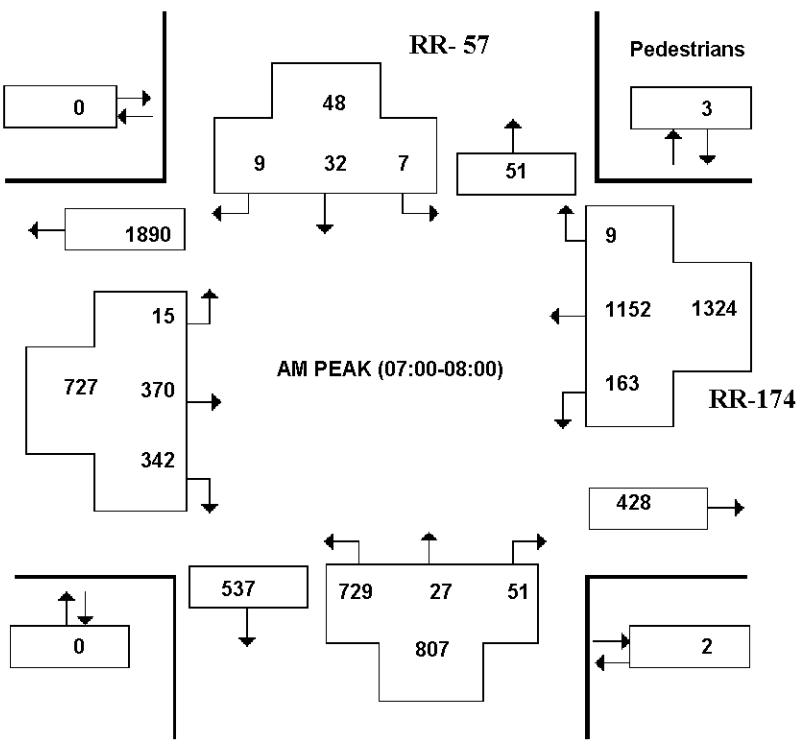
Survey Date: Friday 8 June 2012
Conditions: dry
Start Time: 0700

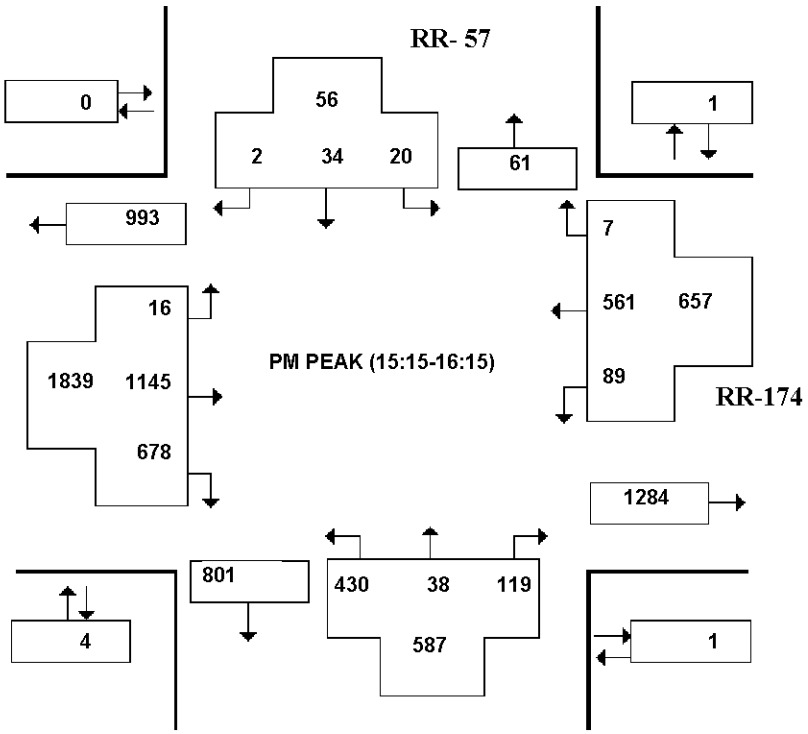
Total Observed U-Turns

Northbound: 2 Southbound: 0
Eastbound: 6 Westbound: 0

AADT Factor

Friday in June is 8





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VEHICLE VOLUME FIELD SHEET
COMBINED VOLUMES AND
PEAK/OFF PEAK HOURS

Street 1 Trim Road **Street 2** OC Transpo park and ride access road

Road Conditions dry **Date** 13/7/12 **Day Name** Friday

Start Time 0700

Number of Hours 8

TIME	NORTHBOUND APPROACH ON TRIM ROAD			SOUTHBOUND APPROACH ON TRIM ROAD			N/A			WESTBOUND APPROACH ON OC TRANSPO PARK AND RIDE ACCESS		
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT
0700-0800	N/A	866	130	67	319	N/A				3	N/A	15
0800-0900		763	50	42	439					3		18
0900-1000		648	13	16	440					3		14
SUB TOTAL		**2277**	**193**	**125**	**1198**					**9**		**47**
1130-1230		629	7	16	596					8		18
1230-1330		555	4	10	632					4		16
SUB TOTAL		**1184**	**11**	**26**	**1228**					**12**		**34**
1500-1600		514	6	19	903					5		41
1600-1700		497	5	23	887					8		81
1700-1800		609	8	11	776					8		47
SUB TOTAL		**1620**	**19**	**53**	**2566**					**21**		**169**
TOTAL		**5081**	**223**	**204**	**4992**					**42**		**250**
GRAND TOTAL	**5304**			**5196**						**292**		

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VEHICLE VOLUME FIELD SHEET
COMBINED VOLUMES AND
PEAK/OFF PEAK HOURS

Date 13/7/12 **Day Name** Friday

TIME	NORTHBOUND APPROACH ON TRIM ROAD			SOUTHBOUND APPROACH ON TRIM ROAD			N/A			WESTBOUND APPROACH ON OC TRANSPO PARK AND RIDE ACCESS		
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT
AM PEAK												
0700-0800	N/A	866	130	67	319	N/A				3	N/A	15
TOTAL	**996**			**386**						**18**		
OFF PEAK												
1200-1300		622	7	15	666					7		21
TOTAL	**629**			**681**						**29**		
PM PEAK												
1615-1715		545	6	20	906					11		88
TOTAL	**551**			**926**						**99**		

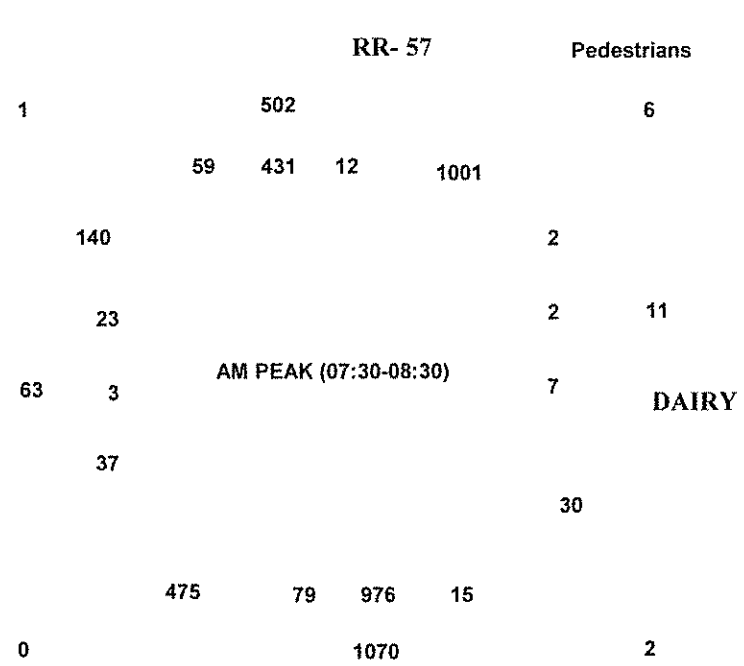
TRIM RD and DAIRY DRIVE

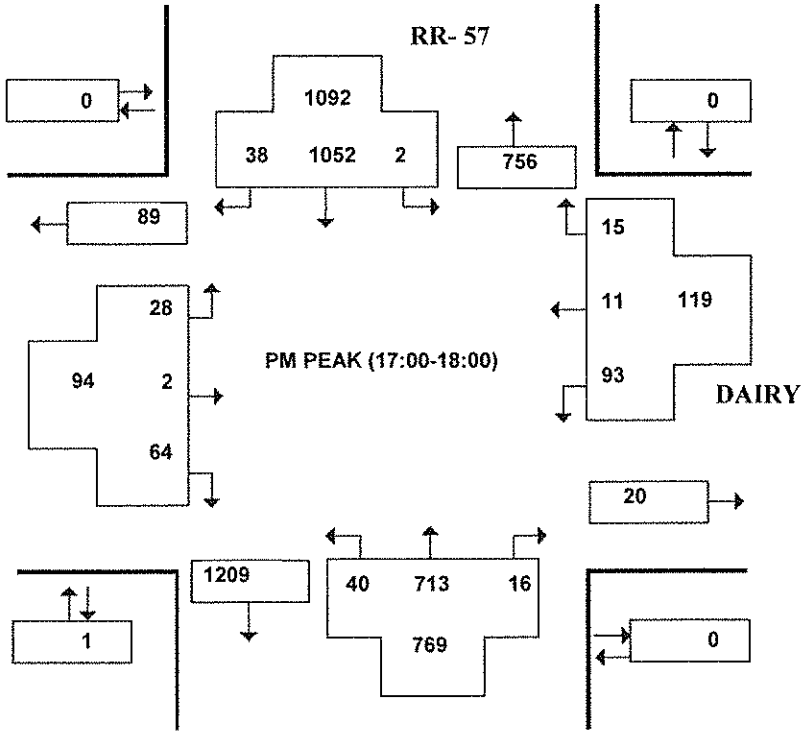
(ULRS Listing RR- 57 & DAIRY)

Survey Date: Friday 10 June 2011
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Friday in June is
8





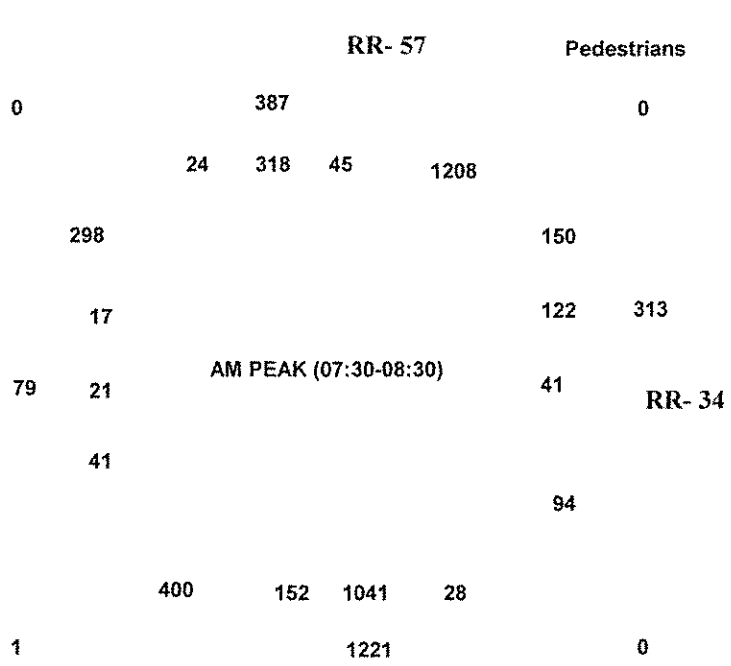
ST. JOSEPH BLVD and TRIM RD

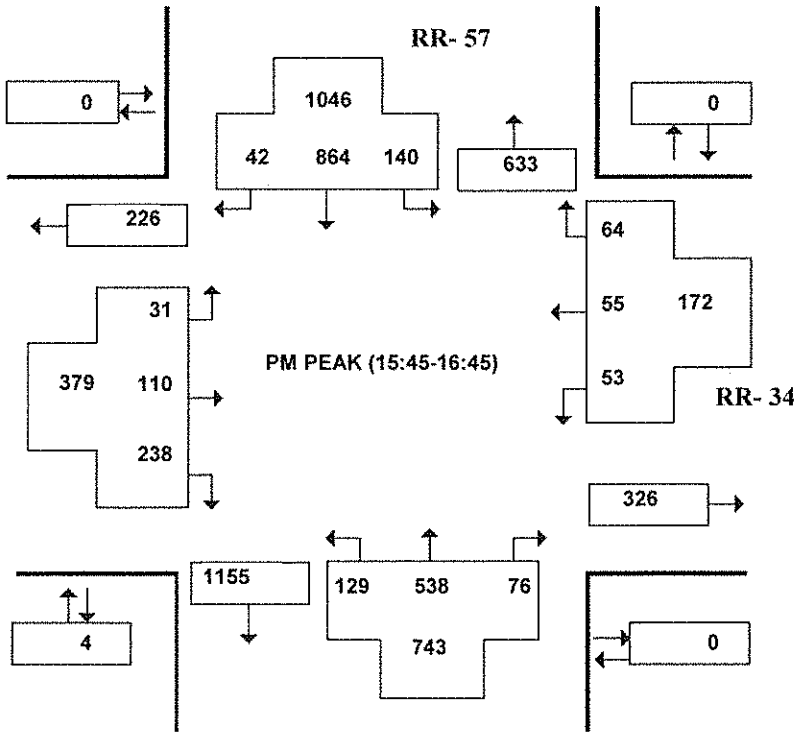
(ULRS Listing RR- 34 & RR- 57)

Survey Date: Monday 11 July 2011
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Monday in July is
1





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VEHICLE VOLUME FIELD SHEET
COMBINED VOLUMES AND
PEAK/OFF PEAK HOURS

Street 1 Old Montreal Rd **Street 2** Frank Kenny **Street 3** Ted Kelly Ln

Road Conditions dry **Date** 20/06/12 **Day Name** Wednesday

Start Time 0700

Number of Hours 8

TIME	NORTHBOUND APPROACH ON FRANK KENNY			SOUTHBOUND APPROACH ON TED KELLY			EASTBOUND APPROACH ON OLD MONTREAL RD			WESTBOUND APPROACH ON OLD MONTREAL RD		
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT
0700-0800	129	1	5	0	3	8	1	31	18	20	236	0
0800-0900	79	3	14	0	2	10	5	54	26	22	137	0
0900-1000	30	2	10	2	3	9	5	52	18	8	64	2
SUB TOTAL	**238**	**6**	**29**	**2**	**8**	**27**	**11**	**137**	**62**	**50**	**437**	**2**
1130-1230	42	1	21	0	2	6	14	80	26	17	71	0
1230-1330	34	5	29	0	1	6	8	105	36	10	86	0
SUB TOTAL	**76**	**6**	**50**	**0**	**3**	**12**	**22**	**185**	**62**	**27**	**157**	**0**
1500-1600	22	8	28	2	3	6	5	149	63	15	91	1
1600-1700	31	2	36	0	5	7	13	242	84	20	67	5
1700-1800	31	2	31	2	2	7	12	173	92	14	58	1
SUB TOTAL	**84**	**12**	**95**	**4**	**10**	**20**	**30**	**564**	**239**	49	216	7
TOTAL	**398**	**24**	**174**	**6**	**21**	**59**	**63**	**886**	**363**	**126**	**810**	**9**
GRAND TOTAL	**596**			**86**			**1312**			**945**		

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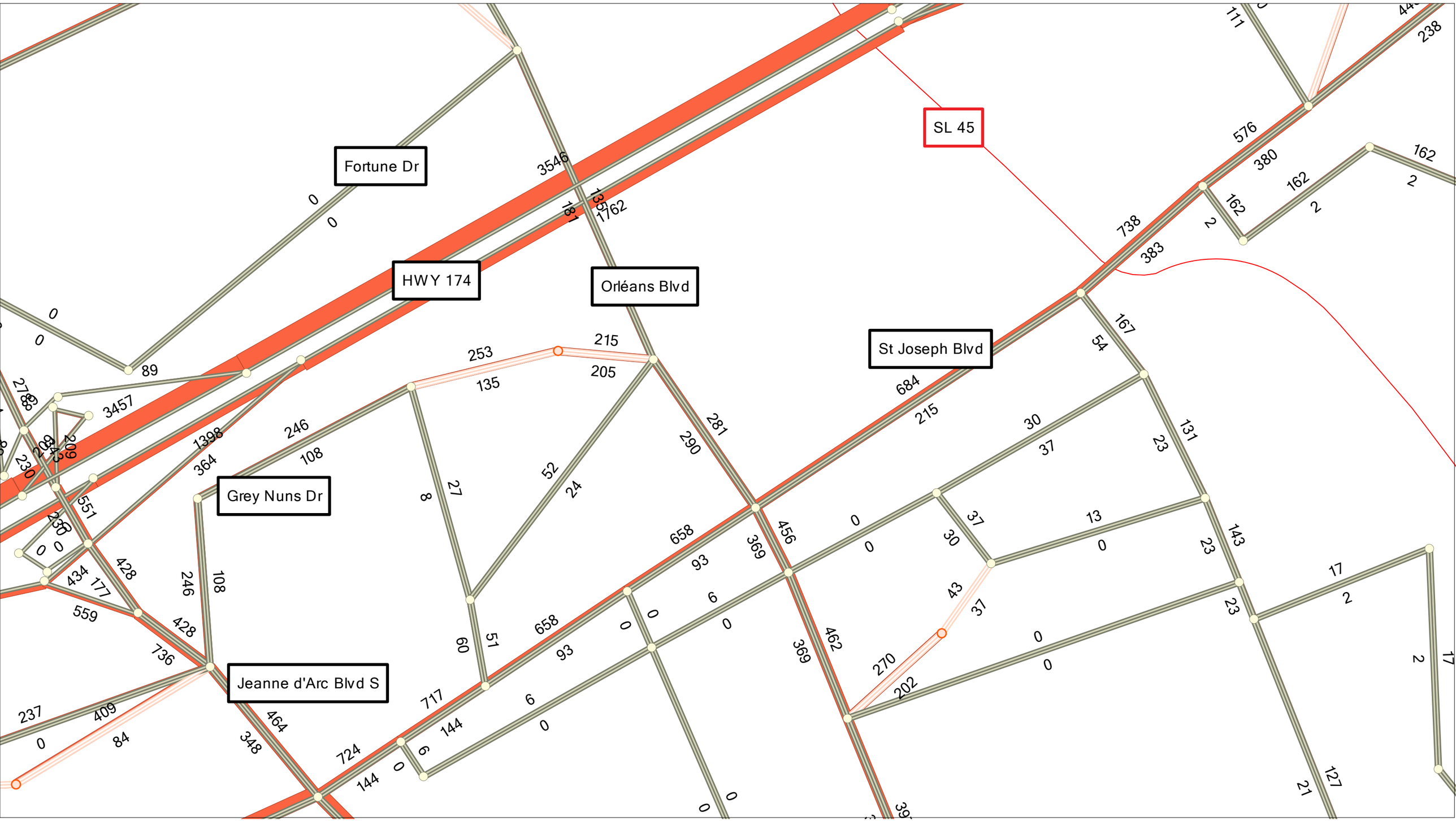
VEHICLE VOLUME FIELD SHEET
COMBINED VOLUMES AND
PEAK/OFF PEAK HOURS

Date 20/06/12 **Day Name** Wednesday

TIME	NORTHBOUND APPROACH ON FRANK KENNY			SOUTHBOUND APPROACH ON TED KELLY			EASTBOUND APPROACH ON OLD MONTREAL RD			WESTBOUND APPROACH ON OLD MONTREAL RD		
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT
AM PEAK												
0700-0800	129	1	5	0	3	8	1	31	18	20	236	0
TOTAL	**135**			**11**			**50**			**256**		
OFF PEAK												
1230-1330	34	5	29	0	1	6	8	105	36	10	86	0
TOTAL	**68**			**7**			**149**			**96**		
PM PEAK												
1600-1700	31	2	36	0	5	7	13	242	84	20	67	5
TOTAL	**69**			**12**			**339**			**92**		


Fortune Dr
HWY 174
Orléans Blvd
SL 45
St Joseph Blvd
Grey Nuns Dr
Jeanne d'Arc Blvd S
3546
1351
1762
181
0
0
89
3457
1398
246
108
364
551
428
434
177
559
246
108
428
736
237
409
0
84
348
464
724
144
0
6
144
717
658
93
0
6
0
60
51
8
27
52
24
215
205
135
253
281
290
456
369
462
369
684
215
0
0
30
37
23
131
37
30
13
0
23
143
43
37
270
202
0
0
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162
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162
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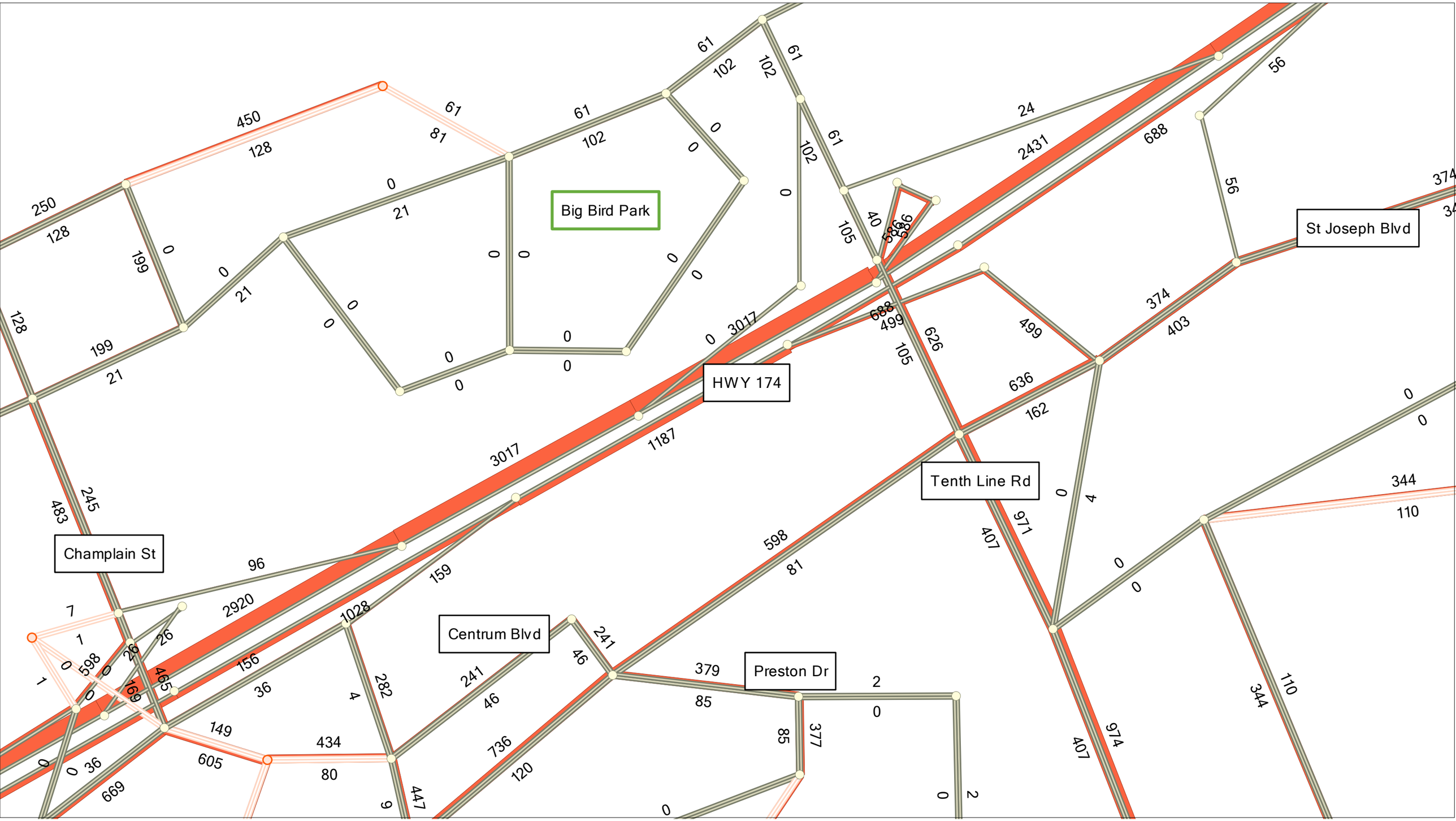
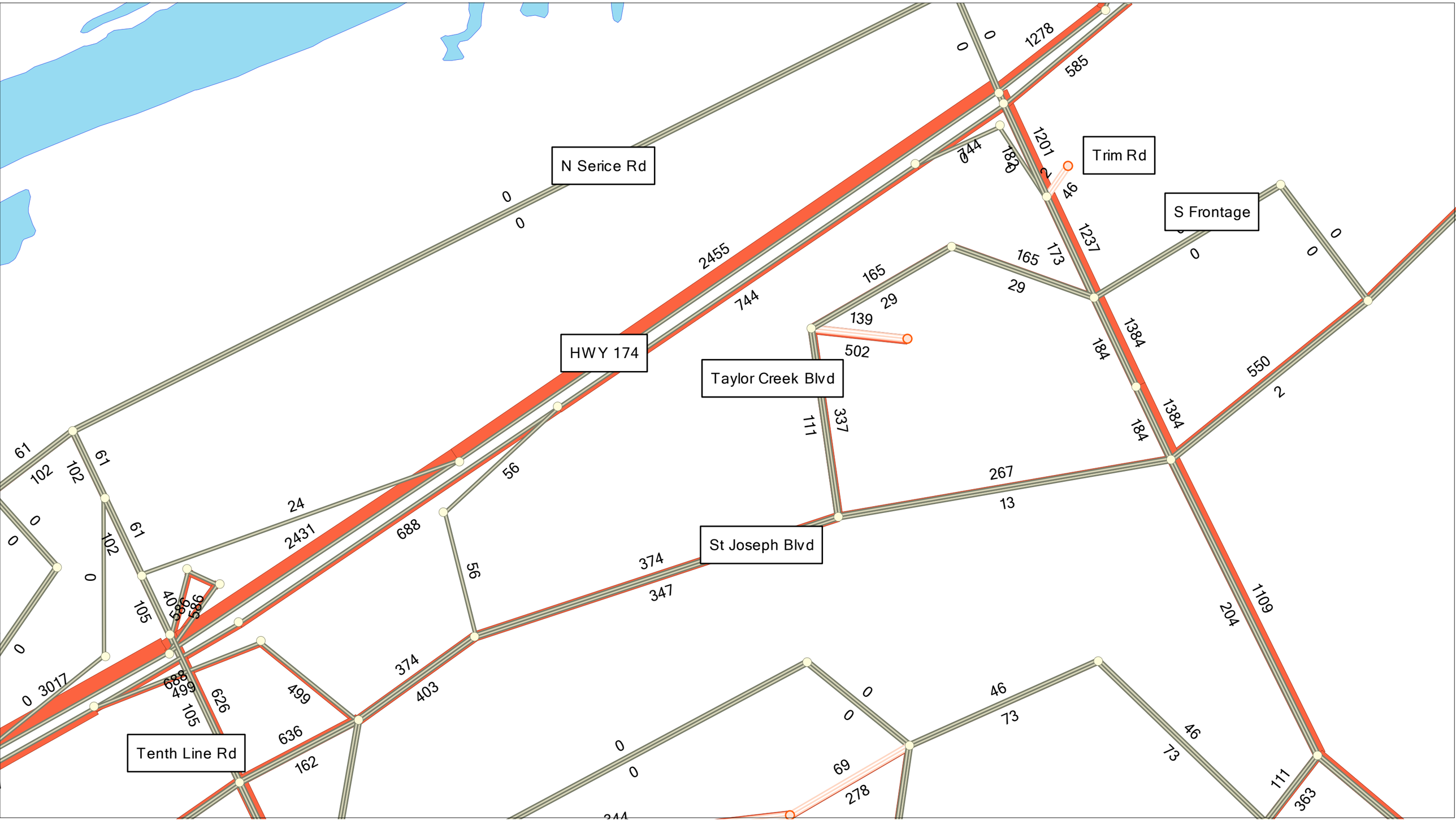
54
167


Big Bird Park
HWY 174
St Joseph Blvd
Champlain St
Centrum Blvd
Preston Dr
Tenth Line Rd


N Serice Rd
HWY 174
Taylor Creek Blvd
Trim Rd
S Frontage
St Joseph Blvd
Tenth Line Rd
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1201
744
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46
1237
2455
165
29
139
502
173
1384
184
550
2
111
337
267
13
1109
204
24
2431
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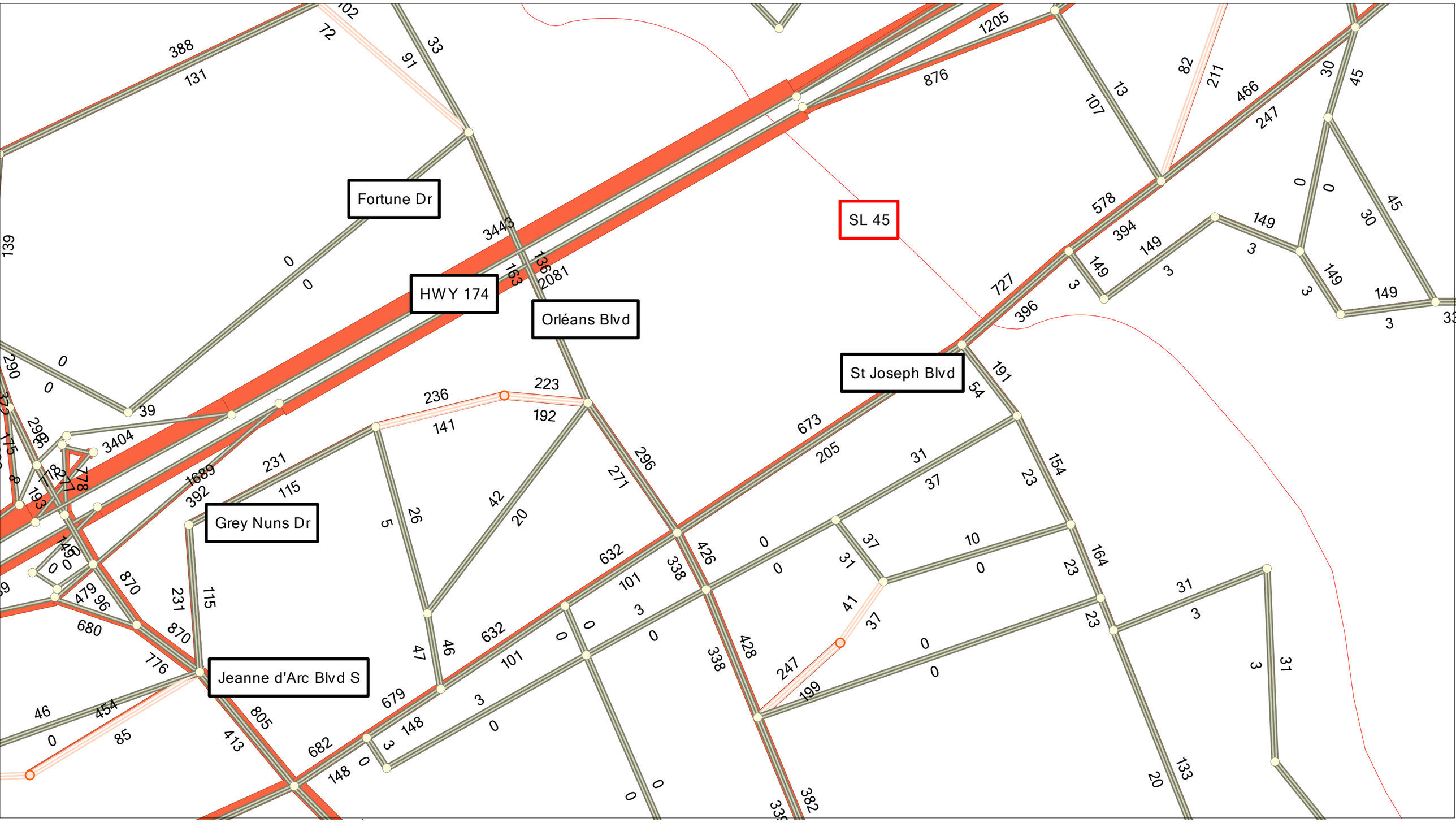
46
73
363

2031 - AM Peak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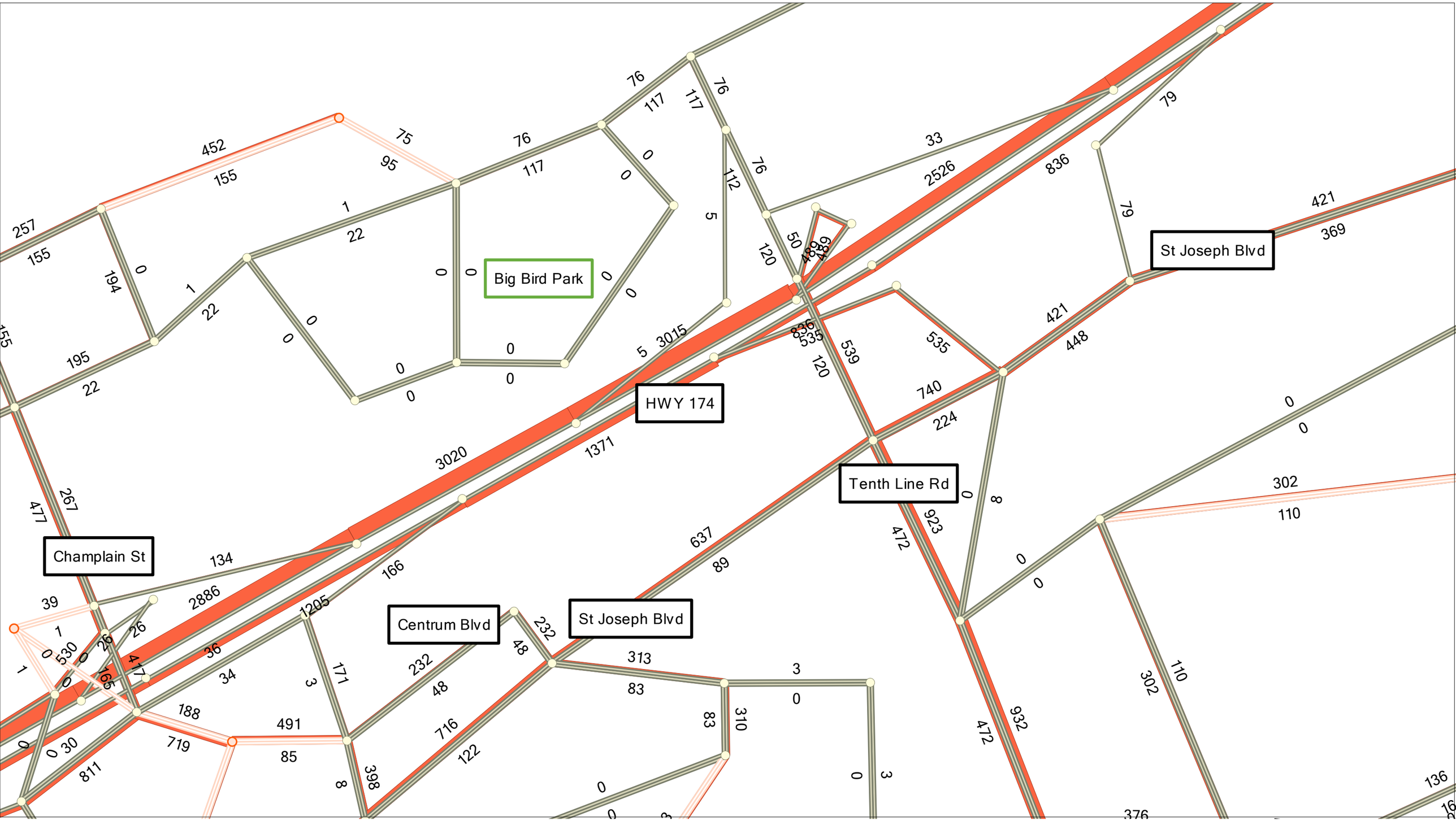
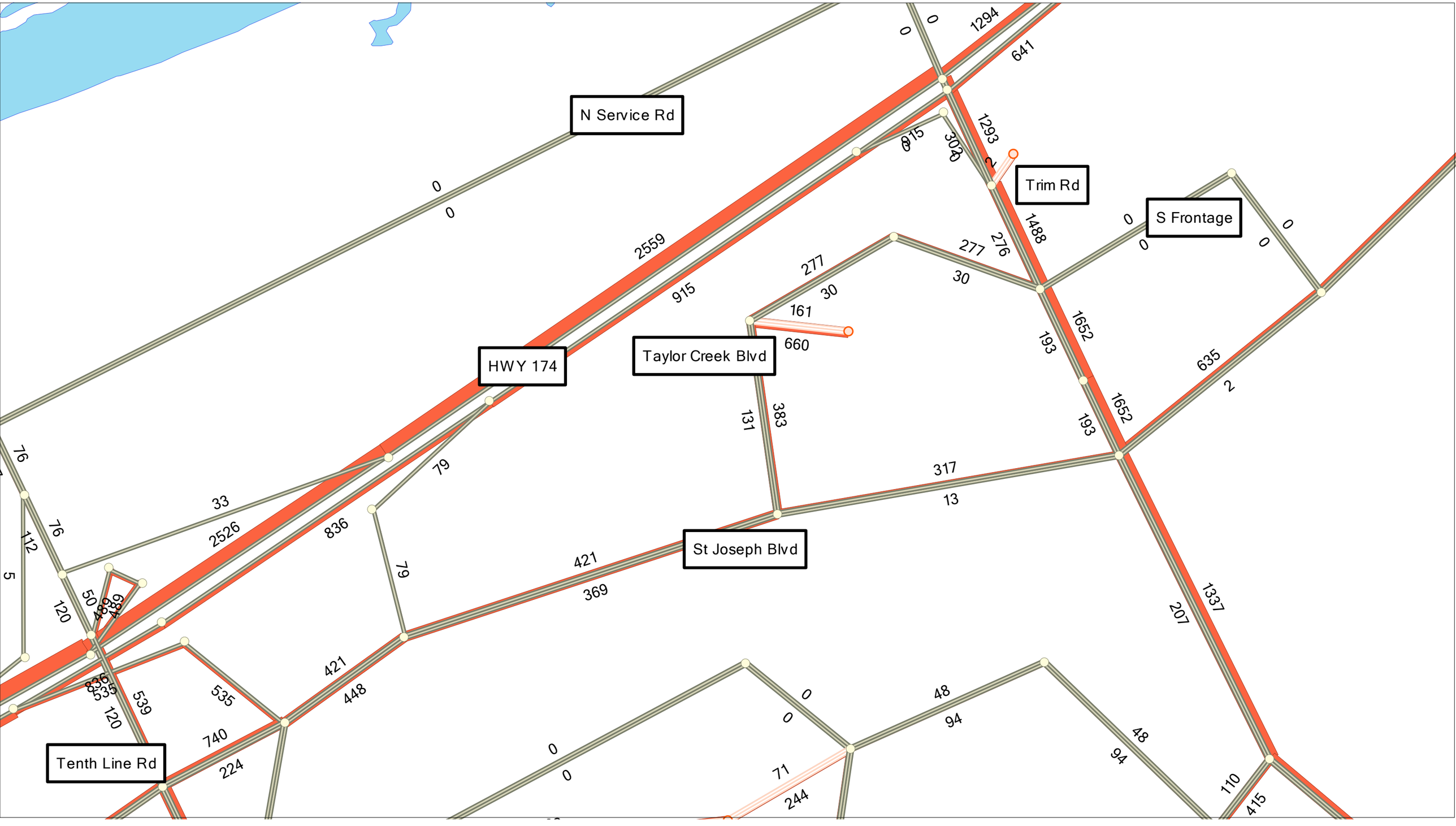
HWY 174
Orléans Blvd
SL 45
St Joseph Blvd
Grey Nuns Dr
Jeanne d'Arc Blvd S


Big Bird Park
HWY 174
St Joseph Blvd
Tenth Line Rd
Champlain St
Centrum Blvd
St Joseph Blvd


N Service Rd
HWY 174
Taylor Creek Blvd
Trim Rd
S Frontage
St Joseph Blvd
Tenth Line Rd
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1294
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1293
915
304
1488
277
276
30
161
660
1652
193
635
2
131
383
317
13
1337
207
2559
915
76
33
2526
836
79
112
120
50
489
48
421
369
535
539
740
224
448
0
48
94
71
244
110
415
5

APPENDIX D

COLLISION DATA

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2008-01-01 TO: 2011-01-01

DAIRY DR & TAYLOR CREEK DR

Former Municipality: **Cumberland** Traffic Control: **Stop sign** Number of Collisions: **4**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
1	2008-09-18	Thu	09:40	Clear	Daylight	Rear end	P.D. only	V1 W	Dry	Going ahead	Passenger van	Other motor vehicle		0
								V2 W	Dry	Stopped	Passenger van	Other motor vehicle		
2	2010-01-22	Frid	18:02	Clear	Dark	Angle	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 S	Dry	Going ahead	Passenger van	Other motor vehicle		
3	2010-11-23	Tue	17:24	Clear	Dark	Angle	Non-fatal	V1 E	Dry	Going ahead	Municipal transit bus	Other motor vehicle		0
								V2 N	Dry	Going ahead	Automobile, station	Other motor vehicle		
								V3 W	Dry	Stopped	Automobile, station	Other motor vehicle		
4	2010-12-13	Mo	16:45	Snow	Dusk	Angle	P.D. only	V1 S	Ice	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Ice	Turning left	Automobile, station	Other motor vehicle		

FRANK KENNY RD & OLD MONTREAL RD

Former Municipality: **Cumberland** Traffic Control: **Stop sign** Number of Collisions: **1**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
5	2008-09-02	Tue	16:05	Clear	Daylight	Rear end	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Turning left	Automobile, station	Other motor vehicle		

GRAND-CHENE, COUR DU CRT & OLD MONTREAL RD

Former Municipality: **Cumberland** Traffic Control: **Stop sign** Number of Collisions: **2**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
6	2008-05-23	Frid	04:30	Clear	Dark	Single vehicle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Ditch		0
7	2009-04-23	Thu	16:05	Clear	Daylight	Rear end	Non-fatal	V1 W	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Stopped	Automobile, station	Other motor vehicle		

Former Municipality: **Cumberland** Traffic Control: **Stop sign** Number of Collisions: **2**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED

(Note: Time of Day = "00:00" represents unknown collision time

8	2008-04-15	Tue	01:59	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other Fixed Objects		0
9	2010-07-11	Sun	16:33	Clear	Daylight	Single vehicle	Non-fatal	V1	N	Dry	Going ahead	Off-road 3 wheels	Ran off road		0

OLD MONTREAL RD, DAIRY DR to GERALD ST

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **1**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
10	2008-05-03	Sat	22:46	Rain	Dark	Single vehicle	P.D. only	V1	E	Wet	Going ahead	Automobile, station	Ran off road		0

OLD MONTREAL RD, DAIRY DR to GRAND-CHENE, COUR DU CRT

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **3**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
11	2008-07-18	Frid	15:10	Rain	Daylight	Single vehicle	P.D. only	V1	E	Wet	Going ahead	Automobile, station	Steel guide wall		0
12	2010-04-24	Sat	04:00	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Ran off road		0
13	2010-12-22	We	18:26	Clear	Dark	Single vehicle	Non-fatal	V1	W	Ice	Going ahead	Automobile, station	Cable guide wall		0

OLD MONTREAL RD, FRANK KENNY RD to GRAND-CHENE, COUR DU CRT

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **12**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
14	2008-02-15	Frid	01:45	Snow	Dark	Single vehicle	P.D. only	V1	E	Loose snow	Going ahead	Automobile, station	Skidding/Sliding		0
15	2008-05-30	Frid	07:31	Clear	Daylight	Sideswipe	Non-fatal	V1 V2	E E	Dry Dry	Going ahead Pulling onto	Truck and trailer Bicycle	Cyclist Other motor vehicle		0
16	2008-09-07	Sun	22:00	Clear	Dark	Single vehicle	P.D. only	V1	W	Wet	Going ahead	Automobile, station	Ran off road		0
17	2008-12-24	We	11:11	Snow	Daylight	Single vehicle	Non-fatal	V1	W	Packed snow	Going ahead	Pick-up truck	Ran off road		0
18	2009-01-08	Thu	17:30	Clear	Dusk	Single vehicle	Non-fatal	V1	E	Wet	Going ahead	Automobile, station	Pedestrian		1

(Note: Time of Day = "00:00" represents unknown collision time

19	2009-10-06	Tue	18:30	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Changing lanes	Automobile, station	Animal - wild		0
20	2009-11-03	Tue	21:29	Clear	Dark	Single vehicle	P.D. only	V1	W	Dry	Going ahead	Automobile, station	Skidding/Sliding		0
21	2010-05-06	Thu	13:58	Clear	Daylight	Single vehicle	Non-fatal	V1	E	Dry	Going ahead	Motorcycle	Other Fixed Objects		0
22	2010-07-19	Mo	21:42	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Animal - wild		0
23	2010-10-14	Thu	08:55	Rain	Daylight	Single vehicle	P.D. only	V1	W	Wet	Going ahead	Automobile, station	Ran off road		0
24	2010-12-10	Frid	19:21	Snow	Dark	Single vehicle	P.D. only	V1	W	Packed snow	Going ahead	Passenger van	Skidding/Sliding		0
25	2010-12-10	Frid	22:45	Snow	Dark	Single vehicle	Non-fatal	V1	W	Loose snow	Going ahead	Automobile, station	Skidding/Sliding		0

OLD MONTREAL RD, GERALD ST to ST. JOSEPH BLVD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **3**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
26	2009-04-08	We	14:48	Snow	Daylight	Single vehicle	Non-fatal	V1 W	Wet	Slowing or	Automobile, station	Ran off road		0
27	2010-02-25	Thu	18:40	Snow	Dark	Approaching	P.D. only	V1 E	Loose snow	Going ahead	Automobile, station	Skidding/Sliding		0
								V2 W	Loose snow	Going ahead	Automobile, station	Other motor vehicle		
28	2010-04-06	Tue	15:30	Rain	Daylight	Rear end	Non-fatal	V1 W	Dry	Pulling away	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Going ahead	Automobile, station	Other motor vehicle		

OLD MONTREAL RD & TRIM RD

Former Municipality: **Cumberland** Traffic Control: **Traffic signal** Number of Collisions: **31**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
29	2008-03-01	Sat	13:05	Snow	Daylight	Rear end	P.D. only	V1 E	Loose snow	Slowing or	Passenger van	Other motor vehicle		0
								V2 E	Loose snow	Stopped	Passenger van	Other motor vehicle		
30	2008-05-07	We	16:48	Rain	Daylight	Single vehicle	P.D. only	V1 N	Wet	Turning left	Automobile, station	Fire hydrant		0
31	2008-05-22	Thu	17:45	Clear	Daylight	Turning	Non-fatal	V1 W	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Wet	Turning left	Passenger van	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

32	2008-06-19	Thu	12:11	Clear	Daylight	Angle	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	
33	2008-07-18	Frid	17:58	Rain	Daylight	Rear end	P.D. only	V1	N	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle	
								V3	N	Wet	Stopped	Automobile, station	Other motor vehicle	
34	2008-09-28	Sun	12:45	Clear	Daylight	Sideswipe	P.D. only	V1	N	Dry	Changing lanes	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
35	2008-09-29	Mo	20:10	Clear	Dark	Rear end	P.D. only	V1	S	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2	S	Dry	Turning right	Automobile, station	Other motor vehicle	
36	2008-11-08	Sat	14:15	Clear	Daylight	Rear end	P.D. only	V1	N	Wet	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	N	Wet	Slowing or	Automobile, station	Other motor vehicle	
37	2008-12-06	Sat	12:13	Clear	Daylight	Rear end	P.D. only	V1	S	Ice	Going ahead	Passenger van	Other motor vehicle	0
								V2	S	Ice	Slowing or	Automobile, station	Other motor vehicle	
								V3	S	Ice	Slowing or	Automobile, station	Other motor vehicle	
38	2009-01-28	We	18:10	Snow	Dark	Approaching	P.D. only	V1	N	Loose snow	Slowing or	Pick-up truck	Skidding/Sliding	0
								V2	S	Loose snow	Stopped	Pick-up truck	Other motor vehicle	
39	2009-02-17	Tue	16:40	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	S	Dry	Slowing or	Pick-up truck	Other motor vehicle	
								V3	S	Dry	Stopped	Passenger van	Other motor vehicle	
40	2009-03-17	Tue	08:19	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Slowing or	Passenger van	Other motor vehicle	0
								V2	N	Dry	Stopped	Passenger van	Other motor vehicle	
41	2009-05-07	Thu	08:45	Rain	Daylight	Rear end	P.D. only	V1	N	Wet	Slowing or	Pick-up truck	Skidding/Sliding	0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle	
42	2009-06-18	Thu	19:00	Rain	Daylight	Rear end	P.D. only	V1	W	Wet	Turning right	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Turning right	Automobile, station	Other motor vehicle	
43	2009-06-18	Thu	19:13	Rain	Daylight	Rear end	Non-fatal	V1	E	Wet	Slowing or	Automobile, station	Other motor vehicle	0
								V2	E	Wet	Stopped	Automobile, station	Other motor vehicle	
44	2009-09-23	We	16:17	Clear	Daylight	Rear end	P.D. only	V1	N	Wet	Slowing or	Passenger van	Other motor vehicle	0
								V2	N	Wet	Stopped	Pick-up truck	Other motor vehicle	
45	2009-09-28	Mo	16:37	Rain	Daylight	Rear end	Non-fatal	V1	W	Wet	Slowing or	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Stopped	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

46	2009-10-21	We	17:22	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2	S	Dry	Slowing or	Passenger van	Other motor vehicle		
47	2009-12-17	Thu	11:15	Clear	Daylight	Rear end	Non-fatal	V1	N	Ice	Slowing or	Automobile, station	Other motor vehicle		0
								V2	N	Ice	Stopped	Automobile, station	Other motor vehicle		
48	2009-12-19	Sat	23:35	Clear	Dark	Rear end	P.D. only	V1	N	Ice	Slowing or	Automobile, station	Other motor vehicle		0
								V2	N	Ice	Stopped	Pick-up truck	Other motor vehicle		
49	2010-02-13	Sat	09:37	Snow	Daylight	Rear end	P.D. only	V1	N	Ice	Slowing or	Automobile, station	Skidding/Sliding		0
								V2	N	Wet	Slowing or	Automobile, station	Other motor vehicle		
50	2010-03-23	Tue	18:23	Rain	Dusk	Turning	Non-fatal	V1	S	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Wet	Turning left	Automobile, station	Other motor vehicle		
51	2010-04-01	Thu	08:51	Clear	Daylight	Angle	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	W	Dry	Turning left	Police vehicle	Other motor vehicle		
52	2010-04-08	Thu	08:00	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Slowing or	Pick-up truck	Other motor vehicle		0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle		
53	2010-08-02	Mo	17:57	Rain	Daylight	Sideswipe	P.D. only	V1	N	Wet	Slowing or	Automobile, station	Skidding/Sliding		0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle		
								V3	N	Wet	Stopped	Automobile, station	Other motor vehicle		
								V4	N	Wet	Stopped	Automobile, station	Other motor vehicle		
								V5	N	Wet	Stopped	Automobile, station	Other motor vehicle		
54	2010-08-09	Mo	10:05	Clear	Daylight	Rear end	Non	V1	N	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle		
55	2010-09-24	Frid	17:31	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Slowing or	Passenger van	Other motor vehicle		
56	2010-09-30	Thu	10:20	Rain	Daylight	Rear end	Non-fatal	V1	N	Wet	Slowing or	Automobile, station	Other motor vehicle		0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle		
57	2010-10-06	We	18:50	Unknow	Dark	Angle	P.D. only	V1	E	Unknown	Turning left	Unknown	Other motor vehicle		0
								V2	N	Unknown	Going ahead	Passenger van	Other motor vehicle		
58	2010-10-07	Thu	06:45	Clear	Dawn	Rear end	Non-fatal	V1	N	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle		
59	2010-11-07	Sun	12:10	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2	S	Dry	Stopped	Passenger van	Other motor vehicle		

OLD TENTH LINE RD & ST. JOSEPH BLVD

Former Municipality: **Cumberland** Traffic Control: **Traffic signal** Number of Collisions: **17**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE / LIGHT	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED

(Note: Time of Day = "00:00" represents unknown collision time

60	2008-03-05	We	04:32	Snow	Dark	Other	P.D. only	V1	N	Slush	Reversing	Truck - dump	Other motor vehicle	0
								V2	N	Slush	Reversing	Automobile, station	Other motor vehicle	
61	2008-09-30	Tue	11:55	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Slowing or	Passenger van	Other motor vehicle	0
								V2	E	Dry	Slowing or	Automobile, station	Other motor vehicle	
62	2008-11-06	Thu	17:30	Clear	Dark	Turning	Non-fatal	V1	W	Dry	Turning left	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	
63	2008-12-19	Frid	14:19	Snow	Daylight	Rear end	P.D. only	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Slowing or	Automobile, station	Other motor vehicle	
64	2009-02-06	Frid	13:50	Clear	Daylight	Angle	P.D. only	V1	S	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	
65	2009-02-09	Mo	13:32	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle	
66	2009-02-14	Sat	14:10	Clear	Daylight	Angle	Non-fatal	V1	E	Dry	Going ahead	Passenger van	Other motor vehicle	
								V2	S	Dry	Going ahead	Passenger van	Other motor vehicle	
67	2009-08-13	Thu	13:15	Clear	Daylight	Angle	Non-fatal	V1	S	Dry	Going ahead	Passenger van	Other motor vehicle	0
								V2	W	Dry	Going ahead	Fire vehicle	Other motor vehicle	
68	2009-09-02	We	08:44	Clear	Daylight	Angle	Non-fatal	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	S	Dry	Turning left	Passenger van	Other motor vehicle	
69	2009-10-07	We	22:43	Clear	Dark	Single vehicle	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Pole (utility, tower)	0
70	2010-01-08	Frid	07:09	Clear	Dawn	Rear end	Non-fatal	V1	W	Ice	Slowing or	Automobile, station	Other motor vehicle	0
								V2	W	Ice	Stopped	Automobile, station	Other motor vehicle	
71	2010-01-17	Sun	09:45	Clear	Daylight	Turning	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Dry	Turning left	Automobile, station	Other motor vehicle	
72	2010-02-21	Sun	14:21	Clear	Daylight	Angle	P.D. only	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle	
								V2	S	Dry	Going ahead	Automobile, station	Other motor vehicle	
73	2010-04-23	Frid	13:05	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	S	Dry	Stopped	Automobile, station	Other motor vehicle	

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74	2010-09-19	Sun	00:56	Clear	Dark	Turning	Non-fatal	V1	W	Dry	Turning left	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle		
75	2010-11-22	Mo	19:01	Rain	Dark	Angle	Non-fatal	V1	W	Wet	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	S	Wet	Going ahead	Automobile, station	Other motor vehicle		
76	2010-12-19	Sun	11:31	Clear	Daylight	Rear end	P.D. only	V1	N	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle		

QUIGLEY HILL RD & REGIONAL RD 174

Former Municipality: **Cumberland** Traffic Control: **Stop sign** Number of Collisions: **3**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
77	2008-02-28	Thu	09:10	Clear	Daylight	Rear end	P.D. only	V1 W	Slush	Slowing or	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Slowing or	Automobile, station	Other motor vehicle		
78	2008-08-26	Tue	08:30	Clear	Daylight	Rear end	Non-fatal	V1 W	Dry	Going ahead	Motorcycle	Other motor vehicle		0
								V2 W	Dry	Going ahead	Automobile, station	Other motor vehicle		
79	2010-04-19	Mo	17:32	Clear	Daylight	Rear end	Non-fatal	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Stopped	Passenger van	Other motor vehicle		
								V3 E	Dry	Going ahead	Automobile, station	Other motor vehicle		

REGIONAL RD 174, ST. JOSEPH BLVD RMP 45 to TENTH LINE RD RMP 63

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **12**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
80	2008-04-07	Mo	18:17	Clear	Daylight	Single vehicle	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Ran off road		0
81	2008-08-07	Thu	23:52	Clear	Dark	Rear end	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle		
82	2008-08-21	Thu	23:00	Clear	Dark	Single vehicle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Unattended vehicle		0
83	2008-10-02	Thu	18:10	Clear	Daylight	Other	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Debris falling off		0
								V2 E	Dry	Going ahead	Truck - dump	Load spill		
84	2008-11-24	Mo	16:03	Clear	Daylight	Single vehicle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Ran off road		0

(Note: Time of Day = "00:00" represents unknown collision time

85	2009-01-07	We	20:53	Snow	Dark	Single vehicle	P.D. only	V1	E	Packed snow	Going ahead	Pick-up truck	Skidding/Sliding		0
86	2009-08-16	Sun	06:55	Clear	Daylight	Other	Non-fatal	V1 V2	E E	Dry Dry	Going ahead Going ahead	Automobile, station Automobile, station	Skidding/Sliding Debris falling off		0
87	2009-11-08	Sun	04:15	Clear	Dark	Single vehicle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Ran off road		0
88	2010-07-25	Sun	15:29	Clear	Daylight	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Debris on road		0
89	2010-09-10	Frid	18:03	Clear	Daylight	Single vehicle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Ran off road		0
90	2010-10-09	Sat	19:31	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Ran off road		0
91	2010-12-14	Tue	23:25	Drifting	Dark	Single vehicle	P.D. only	V1	E	Ice	Going ahead	Automobile, station	Skidding/Sliding		0

REGIONAL RD 174, TENTH LINE RD RAMP 61 to TRIM RD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **4**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
92	2008-06-20	Frid	12:10	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Pick-up truck	Debris falling off		0
93	2008-08-12	Tue	07:52	Clear	Daylight	Single vehicle	Non-fatal	V1 W	Dry	Going ahead	Automobile, station	Ran off road		0
94	2008-09-10	We	00:41	Clear	Dark	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Ran off road		0
95	2008-12-06	Sat	13:14	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Ran off road		0

REGIONAL RD 174 & TRIM RD

Former Municipality: **Cumberland** Traffic Control: **Traffic signal** Number of Collisions: **33**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
96	2008-01-22	Tue	11:35	Snow	Daylight	Other	P.D. only	V1 E V2 N	Loose snow Loose snow	Slowing or Turning left	Passenger van Automobile, station	Ran off road Other motor vehicle		0
97	2008-03-20	Thu	07:00	Clear	Daylight	Sideswipe	P.D. only	V1 N V2 N	Dry Dry	Going ahead Changing lanes	Passenger van Pick-up truck	Other motor vehicle Other motor vehicle		0

(Note: Time of Day = "00:00" represents unknown collision time

98	2008-04-18	Frid	08:30	Clear	Daylight	Rear end	P.D. only	V1	W	Dry	Slowing or	Pick-up truck	Other motor vehicle	0
								V2	W	Dry	Stopped	Automobile, station	Other motor vehicle	
99	2008-05-31	Sat	19:06	Rain	Daylight	Single vehicle	P.D. only	V1	N	Wet	Turning left	Passenger van	Ran off road	0
100	2008-06-09	Mo	00:15	Clear	Dark	Angle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle	
101	2008-07-14	Mo	07:30	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle	
102	2008-07-25	Frid	11:00	Clear	Daylight	Rear end	Non	V1	N	Dry	Unknown	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
103	2008-07-28	Mo	17:15	Rain	Daylight	Single vehicle	P.D. only	V1	N	Wet	Turning left	Pick-up truck	Skidding/Sliding	0
104	2008-08-25	Mo	13:18	Clear	Daylight	Rear end	Non-fatal	V1	W	Dry	Going ahead	Tow truck	Other motor vehicle	0
								V2	W	Dry	Going ahead	Automobile, station	Other motor vehicle	
								V3	W	Dry	Turning right	Automobile, station	Other motor vehicle	
105	2008-08-30	Sat	03:10	Rain	Dark	Single vehicle	P.D. only	V1	E	Wet	Going ahead	Automobile, station	Ran off road	0
106	2008-11-10	Mo	06:50	Clear	Dark	Rear end	P.D. only	V1	W	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	W	Dry	Stopped	Automobile, station	Other motor vehicle	
107	2008-12-09	Tue	17:00	Snow	Dark	Single vehicle	Non-fatal	V1	W	Ice	Turning right	Automobile, station	Skidding/Sliding	0
108	2009-02-28	Sat	20:05	Clear	Dark	Turning	Non-fatal	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	W	Dry	Turning left	Passenger van	Other motor vehicle	
109	2009-05-18	Mo	15:30	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Slowing or	Passenger van	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
110	2009-05-19	Tue	09:12	Clear	Daylight	Sideswipe	P.D. only	V1	N	Dry	Turning right	Truck - closed	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
111	2009-06-30	Tue	11:10	Clear	Daylight	Rear end	P.D. only	V1	W	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	W	Dry	Slowing or	Automobile, station	Other motor vehicle	
112	2009-07-20	Mo	17:32	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Slowing or	Truck and trailer	Other motor vehicle	0
								V2	E	Dry	Slowing or	Passenger van	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

113	2009-08-10	Mo	11:19	Clear	Daylight	Sideswipe	P.D. only	V1	N	Dry	Turning right	Truck and trailer	Other motor vehicle	0
								V2	N	Dry	Turning right	Pick-up truck	Other motor vehicle	
114	2009-09-26	Sat	09:33	Clear	Daylight	Rear end	P.D. only	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Dry	Slowing or	Pick-up truck	Other motor vehicle	
115	2009-11-07	Sat	13:29	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle	
116	2009-11-07	Sat	12:00	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Slowing or	Passenger van	Other motor vehicle	0
								V2	E	Dry	Stopped	Pick-up truck	Other motor vehicle	
117	2009-12-13	Sun	20:28	Clear	Dark	Sideswipe	P.D. only	V1	E	Wet	Overtaking	Passenger van	Other motor vehicle	0
								V2	E	Wet	Slowing or	Automobile, station	Other motor vehicle	
118	2009-12-24	Thu	17:29	Clear	Dark	Turning	P.D. only	V1	E	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Turning left	Automobile, station	Other motor vehicle	
119	2010-01-24	Sun	11:43	Clear	Daylight	Angle	P.D. only	V1	N	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Going ahead	Passenger van	Other motor vehicle	
120	2010-05-03	Mo	10:36	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Changing lanes	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Stopped	Passenger van	Other motor vehicle	
121	2010-06-17	Thu	22:20	Clear	Dark	Turning	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	W	Dry	Turning left	Automobile, station	Other motor vehicle	
122	2010-06-29	Tue	16:45	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Turning right	Truck - tractor	Other motor vehicle	0
								V2	E	Dry	Turning right	Pick-up truck	Other motor vehicle	
123	2010-09-05	Sun	22:35	Clear	Dark	Rear end	Non-fatal	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Municipal transit bus	Other motor vehicle	
124	2010-09-06	Mo	10:37	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Stopped	Pick-up truck	Other motor vehicle	
125	2010-09-10	Frid	21:30	Clear	Dark	Rear end	P.D. only	V1	E	Dry	Going ahead	Passenger van	Other motor vehicle	0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle	
126	2010-11-09	Tue	07:53	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Turning right	Automobile, station	Other motor vehicle	
127	2010-12-15	We	17:30	Snow	Dark	Rear end	P.D. only	V1	W	Packed snow	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Packed snow	Stopped	Pick-up truck	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

128	2010-12-24	Frid	12:48	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Turning right	Passenger van	Other motor vehicle		0
								V2	E	Dry	Turning right	Automobile, station	Other motor vehicle		
								V3	E	Dry	Turning right	Automobile, station	Other motor vehicle		

REGIONAL RD 174 EB, 510 E OF TRIM RD to TRIM RD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **6**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
129	2008-02-13	We	01:06	Snow	Dark	Single vehicle	P.D. only	V1	E	Packed snow	Going ahead	Automobile, station	Ran off road		0
130	2008-07-27	Sun	04:00	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Skidding/Sliding		0
131	2009-05-10	Sun	00:17	Rain	Dark	Single vehicle	P.D. only	V1	E	Wet	Going ahead	Automobile, station	Animal - wild		0
132	2009-11-01	Sun	20:22	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Ambulance	Animal - wild		0
133	2010-03-26	Frid	16:28	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Slowing or	Automobile, station	Other motor vehicle		
134	2010-05-21	Frid	20:20	Clear	Dusk	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Animal - wild		0

REGIONAL RD 174 EB, ST. JOSEPH BLVD RMP 45 to TRIM RD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **11**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
135	2008-03-25	Tue	23:36	Snow	Dark	Single vehicle	P.D. only	V1	E	Slush	Changing lanes	Passenger van	Skidding/Sliding		0
136	2008-05-28	We	00:31	Clear	Dark	Single vehicle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Ran off road		0
137	2008-06-10	Tue	16:15	Clear	Daylight	Sideswipe	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Going ahead	Passenger van	Other motor vehicle		
138	2008-08-21	Thu	23:30	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Debris on road		0
139	2009-07-09	Thu	18:09	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Slowing or	Pick-up truck	Other motor vehicle		0
								V2	E	Dry	Slowing or	Passenger van	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

140	2009-08-28	Frid	18:35	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Going ahead	Motorcycle	Other motor vehicle		0
								V2	E	Dry	Slowing or	Pick-up truck	Other motor vehicle		
141	2009-12-26	Sat	17:50	Snow	Dark	Single vehicle	P.D. only	V1	E	Ice	Going ahead	Pick-up truck	Skidding/Sliding		0
142	2010-07-01	Thu	22:11	Clear	Dark	Sideswipe	P.D. only	V1	E	Dry	Going ahead	Passenger van	Other motor vehicle		0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle		
143	2010-07-05	Mo	15:22	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Stopped	Pick-up truck	Other motor vehicle		
144	2010-08-09	Mo	14:00	Clear	Daylight	Other	P.D. only	V1	E	Dry	Going ahead	Truck - dump	Other Moveable		0
								V2	E	Dry	Going ahead	Automobile, station	Other Events		
145	2010-10-24	Sun	15:20	Rain	Daylight	Sideswipe	P.D. only	V1	E	Wet	Changing lanes	Passenger van	Other motor vehicle		0
								V2	E	Wet	Going ahead	Pick-up truck	Other motor vehicle		

REGIONAL RD 174 EB & TENTH LINE RD OFFRAMP

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **3**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
146	2008-03-01	Sat	09:30	Snow	Daylight	Single vehicle	P.D. only	V1 E	Loose snow	Merging	Automobile, station	Ran off road		0
147	2008-03-01	Sat	08:58	Snow	Daylight	Single vehicle	Non-fatal	V1 E	Loose snow	Merging	Automobile, station	Skidding/Sliding		0
148	2009-02-12	Thu	10:11	Rain	Daylight	Approaching	P.D. only	V1 W	Wet	Changing lanes	Pick-up truck	Other motor vehicle		0
								V2 E	Wet	Going ahead	Truck - closed	Other motor vehicle		

REGIONAL RD 174 WB, 510 E OF TRIM RD to TRIM RD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **3**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
149	2008-01-24	Thu	07:29	Clear	Dawn	Single vehicle	P.D. only	V1 W	Ice	Going ahead	Automobile, station	Ran off road		0
150	2008-02-28	Thu	20:13	Clear	Dark	Single vehicle	P.D. only	V1 W	Loose snow	Going ahead	Passenger van	Steel guide wall		0
151	2010-07-20	Tue	19:31	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Ran off road		0

(Note: Time of Day = "00:00" represents unknown collision time

REGIONAL RD 174 WB, TENTH LINE RD RMP 26 to TENTH LINE RD RMP 61

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **2**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
152	2009-01-15	Thu	08:14	Clear	Daylight	Sideswipe	P.D. only	V1 W	Ice	Going ahead	Passenger van	Other motor vehicle		0
								V2 W	Ice	Going ahead	Automobile, station	Other motor vehicle		
153	2010-05-31	Mo	16:30	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other Moveable		0

REGIONAL ROAD 174, QUIGLEY HILL RD to REGIONAL ROAD 174

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **51**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
154	2008-01-19	Sat	12:09	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Ran off road		0
155	2008-03-17	Mo	15:39	Clear	Daylight	Sideswipe	Non-fatal	V1 E	Wet	Pulling onto	Pick-up truck	Snowbank / drift		0
								V2 E	Wet	Slowing or	Passenger van	Other motor vehicle		
156	2008-04-12	Sat	12:54	Rain	Daylight	Approaching	P.D. only	V1 E	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 W	Wet	Going ahead	Truck - tank	Other motor vehicle		
								V3 E	Wet	Going ahead	Automobile, station	Debris falling off		
157	2008-04-15	Tue	20:48	Clear	Dark	Single vehicle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Animal - wild		0
158	2008-04-16	We	17:29	Clear	Daylight	Rear end	Non-fatal	V1 E	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Slowing or	Automobile, station	Other motor vehicle		
								V3 E	Dry	Going ahead	Passenger van	Other motor vehicle		
159	2008-05-23	Frid	14:56	Clear	Daylight	Approaching	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Going ahead	School bus	Other motor vehicle		
								V3 E	Dry	Going ahead	Automobile, station	Other motor vehicle		
160	2008-06-06	Frid	10:08	Clear	Daylight	Approaching	Non-fatal	V1 W	Dry	Overtaking	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle		
161	2008-06-20	Frid	16:21	Clear	Daylight	Rear end	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Stopped	Automobile, station	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

162	2008-08-23	Sat	11:42	Clear	Daylight	Turning	Non-fatal	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Turning left	Automobile, station	Other motor vehicle	
163	2008-09-19	Frid	17:42	Clear	Daylight	Approaching	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Going ahead	Automobile, station	Other motor vehicle	
164	2008-10-03	Frid	16:58	Clear	Daylight	Rear end	P.D. only	V1 E	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Stopped	Pick-up truck	Other motor vehicle	
165	2008-10-03	Frid	16:58	Clear	Daylight	Rear end	Non-fatal	V1 E	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Stopped	Automobile, station	Other motor vehicle	
166	2008-10-19	Sun	12:15	Clear	Daylight	Single vehicle	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Animal - wild	0
167	2008-12-05	Frid	17:10	Snow	Dark	Single vehicle	P.D. only	V1 W	Loose snow	Going ahead	Passenger van	Cable guide wall	0
168	2008-12-09	Tue	14:15	Snow	Daylight	Rear end	P.D. only	V1 W	Loose snow	Slowing or	Automobile, station	Other motor vehicle	0
								V2 W	Loose snow	Slowing or	Pick-up truck	Other motor vehicle	
169	2008-12-19	Frid	18:45	Snow	Dark	Approaching	Non-fatal	V1 W	Loose snow	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
								V3 E	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
170	2008-12-21	Sun	12:37	Snow	Daylight	Rear end	Non-fatal	V1 E	Loose snow	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 E	Loose snow	Stopped	Passenger van	Other motor vehicle	
171	2008-12-21	Sun	10:15	Snow	Daylight	Single vehicle	P.D. only	V1 W	Packed snow	Going ahead	Automobile, station	Skidding/Sliding	0
172	2008-12-21	Sun	08:47	Snow	Daylight	Single vehicle	P.D. only	V1 W	Ice	Going ahead	Automobile, station	Skidding/Sliding	0
173	2009-01-28	We	16:53	Snow	Dusk	Rear end	P.D. only	V1 W	Loose snow	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Loose snow	Stopped	Pick-up truck	Other motor vehicle	
								V3 E	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
174	2009-01-28	We	10:40	Snow	Daylight	Approaching	P.D. only	V1 W	Loose snow	Going ahead	Automobile, station	Skidding/Sliding	0
								V2 E	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
175	2009-01-28	We	12:30	Snow	Daylight	Single vehicle	P.D. only	V1 W	Loose snow	Going ahead	Automobile, station	Skidding/Sliding	0
176	2009-02-17	Tue	08:11	Clear	Daylight	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Animal - wild	0
177	2009-05-06	We	20:26	Clear	Dusk	Single vehicle	Non-fatal	V1 E	Loose sand or	Going ahead	Automobile, station	Ran off road	0

(Note: Time of Day = "00:00" represents unknown collision time

178	2009-05-20	We	07:54	Rain	Daylight	Rear end	P.D. only	V1 W	Wet	Pulling onto	Automobile, station	Ran off road	0
								V2 W	Wet	Stopped	Automobile, station	Skidding/Sliding	
179	2009-05-25	Mo	17:43	Clear	Daylight	Rear end	P.D. only	V1 E	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Slowing or	Automobile, station	Other motor vehicle	
180	2009-05-30	Sat	08:34	Clear	Daylight	Single vehicle	P.D. only	V1 W	Wet	Going ahead	Passenger van	Animal - wild	0
181	2009-07-05	Sun	00:47	Clear	Dark	Approaching	P.D. only	V1 W	Dry	Changing lanes	Unknown	Other motor vehicle	0
								V2 E	Dry	Going ahead	Passenger van	Other motor vehicle	
182	2009-08-15	Sat	16:49	Clear	Daylight	Rear end	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Stopped	Pick-up truck	Other motor vehicle	
								V3 E	Dry	Turning left	Pick-up truck	Other motor vehicle	
183	2009-09-04	Frid	17:30	Clear	Daylight	Turning	Non-fatal	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Making U-Turn	Automobile, station	Other motor vehicle	
184	2009-09-04	Frid	17:30	Clear	Daylight	Turning	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Making U-Turn	Automobile, station	Other motor vehicle	
								V3 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
185	2009-09-16	We	20:30	Clear	Dark	Rear end	P.D. only	V1 E	Dry	Slowing or	Passenger van	Other motor vehicle	0
								V2 E	Dry	Slowing or	Automobile, station	Other motor vehicle	
186	2009-09-19	Sat	13:15	Clear	Daylight	Sideswipe	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 E	Dry	Stopped	Pick-up truck	Other motor vehicle	
187	2009-11-23	Mo	13:26	Fog,	Daylight	Single vehicle	P.D. only	V1 W	Dry	Going ahead	Pick-up truck	Ran off road	0
188	2009-11-24	Tue	15:15	Clear	Daylight	Other	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Other Moveable	0
								V2 W	Dry	Going ahead	Motor home	Debris falling off	
189	2009-12-04	Frid	12:10	Clear	Daylight	Single vehicle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Ran off road	0
190	2009-12-13	Sun	15:03	Snow	Daylight	Approaching	P.D. only	V1 W	Loose snow	Going ahead	Passenger van	Other motor vehicle	0
								V2 E	Loose snow	Going ahead	Automobile, station	Other motor vehicle	
191	2009-12-15	Tue	06:35	Snow	Dark	Single vehicle	P.D. only	V1 E	Wet	Slowing or	Automobile, station	Skidding/Sliding	0

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192	2010-02-19	Frid	17:15	Clear	Daylight	Turning	Non-fatal	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	W	Dry	Making U-Turn	Automobile, station	Other motor vehicle		
193	2010-07-13	Tue	16:54	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle		
194	2010-07-20	Tue	09:10	Clear	Daylight	Approaching	P.D. only	V1	E	Dry	Going ahead	Unknown	Other motor vehicle		0
								V2	W	Dry	Going ahead	Truck - open	Other motor vehicle		
195	2010-07-27	Tue	05:45	Clear	Dawn	Single vehicle	P.D. only	V1	W	Dry	Going ahead	Automobile, station	Skidding/Sliding		0
196	2010-09-02	Thu	22:02	Clear	Dark	Single vehicle	Non-fatal	V1	W	Dry	Going ahead	Automobile, station	Ran off road		0
197	2010-09-19	Sun	01:30	Clear	Dark	Single vehicle	P.D. only	V1	W	Dry	Going ahead	Passenger van	Animal - wild		0
198	2010-09-25	Sat	22:30	Rain	Dark	Single vehicle	P.D. only	V1	E	Wet	Going ahead	Automobile, station	Animal - wild		0
199	2010-10-21	Thu	05:53	Clear	Dark	Single vehicle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Ran off road		0
200	2010-10-28	Thu	06:25	Clear	Dark	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Passenger van	Animal - wild		0
201	2010-10-31	Sun	04:09	Clear	Dark	Single vehicle	P.D. only	V1	E	Wet	Going ahead	Automobile, station	Skidding/Sliding		0
202	2010-11-03	We	14:30	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Slowing or	Automobile, station	Other motor vehicle		
203	2010-11-23	Tue	14:03	Clear	Daylight	Turning	P.D. only	V1	E	Dry	Overtaking	Pick-up truck	Other motor vehicle		0
								V2	E	Dry	Turning left	Pick-up truck	Other motor vehicle		
204	2010-11-25	Thu	06:49	Clear	Dark	Rear end	P.D. only	V1	W	Dry	Going ahead	Passenger van	Other motor vehicle		0
								V2	W	Dry	Slowing or	Automobile, station	Other motor vehicle		

ST. JOSEPH BLVD, FIRST AVE to SECOND AVE

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **2**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE / LIGHT	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
205	2009-02-06	Frid	12:40	Clear	Daylight Angle	P.D. only	V1 S	Wet	Turning left	Passenger van	Other motor vehicle		0
							V2 W	Wet	Going ahead	Automobile, station	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

206	2009-06-12	Frid	07:35	Clear	Daylight	Rear end	Non-fatal	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	W	Dry	Slowing or	Automobile, station	Other motor vehicle		

ST. JOSEPH BLVD, FIRST AVE to TAYLOR CREEK DR

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **3**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
207	2008-01-08	Tue	11:45	Snow	Daylight	Angle	P.D. only	V1	E	Wet	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	N	Wet	Going ahead	Automobile, station	Other motor vehicle		
208	2008-03-11	Tue	05:41	Clear	Dark	Single vehicle	P.D. only	V1	U	Wet	Unknown	Unknown	Other Fixed Objects		0
209	2008-11-21	Frid	15:39	Clear	Daylight	Rear end	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Turning left	Automobile, station	Other motor vehicle		

ST. JOSEPH BLVD, OLD MONTREAL RD to TAYLOR CREEK DR

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **11**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
210	2008-09-16	Tue	16:10	Clear	Daylight	Angle	P.D. only	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Turning left	Automobile, station	Other motor vehicle		
211	2008-12-14	Sun	09:20	Clear	Daylight	Single vehicle	P.D. only	V1	W	Slush	Going ahead	Passenger van	Skidding/Sliding		0
212	2009-03-24	Tue	16:45	Unknow	Daylight	Angle	P.D. only	V1	S	Unknown	Turning left	Automobile, station	Other motor vehicle		0
								V2	E	Unknown	Going ahead	Passenger van	Other motor vehicle		
213	2009-06-18	Thu	15:45	Rain	Daylight	Single vehicle	Non-fatal	V1	E	Wet	Going ahead	Passenger van	Ditch		0
214	2009-11-03	Tue	09:50	Clear	Daylight	Rear end	P.D. only	V1	W	Wet	Going ahead	Passenger van	Other motor vehicle		0
								V2	W	Wet	Going ahead	Automobile, station	Other motor vehicle		
215	2009-11-17	Tue	16:55	Clear	Dusk	Rear end	P.D. only	V1	E	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2	E	Dry	Stopped	Passenger van	Other motor vehicle		
216	2009-12-26	Sat	10:09	Freezing	Daylight	Single vehicle	P.D. only	V1	W	Slush	Going ahead	Automobile, station	Skidding/Sliding		0

(Note: Time of Day = "00:00" represents unknown collision time

217	2010-02-25	Thu	19:30	Snow	Dark	Single vehicle	P.D. only	V1	W	Packed snow	Going ahead	Automobile, station	Steel guide wall		0
218	2010-04-07	We	12:32	Clear	Daylight	Single vehicle	Non-fatal	V1	N	Dry	Going ahead	Automobile, station	Pedestrian		1
219	2010-09-09	Thu	13:20	Rain	Daylight	Rear end	Non-fatal	V1	E	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2	E	Wet	Stopped	Pick-up truck	Other motor vehicle		
220	2010-11-22	Mo	16:00	Clear	Dusk	Rear end	P.D. only	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2	W	Wet	Turning right	Pick-up truck	Other motor vehicle		

ST. JOSEPH BLVD & TAYLOR CREEK DR

Former Municipality: **Cumberland** Traffic Control: **Stop sign** Number of Collisions: **6**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE / LIGHT	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
221	2008-09-09	Tue	11:46	Clear	Daylight Rear end	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
							V2 E	Dry	Stopped	Automobile, station	Other motor vehicle		
222	2009-04-22	We	07:05	Rain	Daylight Rear end	P.D. only	V1 E	Wet	Slowing or	Automobile, station	Skidding/Sliding		0
							V2 E	Wet	Stopped	Automobile, station	Other motor vehicle		
223	2009-04-24	Frid	18:35	Clear	Daylight Rear end	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
							V2 E	Dry	Stopped	Pick-up truck	Other motor vehicle		
224	2009-08-10	Mo	16:51	Clear	Daylight Sideswipe	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
							V2 E	Dry	Slowing or	Pick-up truck	Other motor vehicle		
225	2009-09-22	Tue	07:38	Rain	Daylight Rear end	P.D. only	V1 E	Wet	Going ahead	Automobile, station	Other motor vehicle		0
							V2 E	Wet	Turning left	Automobile, station	Other motor vehicle		
							V3 E	Wet	Going ahead	Automobile, station	Other motor vehicle		
226	2010-09-26	Sun	00:36	Rain	Dark Rear end	P.D. only	V1 E	Wet	Going ahead	Automobile, station	Other motor vehicle		0
							V2 E	Wet	Turning left	Automobile, station	Other motor vehicle		

ST. JOSEPH BLVD & TENTH LINE RD

Former Municipality: **Cumberland** Traffic Control: **Traffic signal** Number of Collisions: **49**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE / LIGHT	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
227	2008-01-03	Thu	10:30	Clear	Daylight Rear end	P.D. only	V1 N	Ice	Slowing or	Passenger van	Skidding/Sliding		0
							V2 N	Ice	Turning right	Pick-up truck	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

228	2008-02-05	Tue	15:13	Clear	Daylight	Rear end	P.D. only	V1	N	Wet	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	N	Wet	Slowing or	Automobile, station	Other motor vehicle	
229	2008-03-11	Tue	14:35	Clear	Daylight	Sideswipe	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Going ahead	Pick-up truck	Other motor vehicle	
230	2008-04-24	Thu	14:43	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Turning left	Pick-up truck	Other motor vehicle	
231	2008-04-25	Frid	08:46	Clear	Daylight	Angle	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	N	Dry	Turning left	Automobile, station	Other motor vehicle	
232	2008-04-30	We	14:00	Clear	Daylight	Rear end	Non-fatal	V1	S	Dry	Going ahead	Passenger van	Other motor vehicle	0
								V2	S	Dry	Stopped	Automobile, station	Other motor vehicle	
233	2008-09-30	Tue	07:20	Rain	Daylight	Rear end	P.D. only	V1	N	Wet	Turning left	Automobile, station	Other motor vehicle	0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle	
234	2008-10-06	Mo	15:00	Clear	Daylight	Angle	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Going ahead	Passenger van	Other motor vehicle	
235	2008-10-20	Mo	11:35	Clear	Daylight	Single vehicle	Non	V1	N	Dry	Going ahead	Automobile, station	Curb	0
236	2008-10-29	We	08:20	Snow	Daylight	Rear end	P.D. only	V1	U	Loose snow	Going ahead	Automobile, station	Other motor vehicle	0
								V2	U	Loose snow	Stopped	Automobile, station	Other motor vehicle	
237	2008-11-10	Mo	18:15	Rain	Dark	Rear end	Non	V1	S	Wet	Turning right	Passenger van	Other motor vehicle	0
								V2	S	Wet	Turning right	Automobile, station	Other motor vehicle	
238	2008-11-29	Sat	08:15	Rain	Daylight	Rear end	P.D. only	V1	N	Ice	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Ice	Stopped	Automobile, station	Other motor vehicle	
239	2008-12-04	Thu	13:11	Clear	Daylight	Other	P.D. only	V1	N	Dry	Reversing	Truck and trailer	Other motor vehicle	0
								V2	S	Dry	Stopped	Automobile, station	Other motor vehicle	
240	2008-12-10	We	00:20	Snow	Dark	Turning	P.D. only	V1	N	Ice	Turning right	Snow plow	Other motor vehicle	0
								V2	N	Ice	Going ahead	Pick-up truck	Other motor vehicle	
241	2009-01-03	Sat	15:39	Clear	Daylight	Angle	Non-fatal	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	S	Wet	Going ahead	Automobile, station	Other motor vehicle	
242	2009-01-05	Mo	22:55	Clear	Dark	Angle	P.D. only	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Wet	Going ahead	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

243	2009-04-07	Tue	06:30	Clear	Dawn	Rear end	P.D. only	V1	N	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle	
244	2009-04-16	Thu	07:00	Clear	Daylight	Angle	Non-fatal	V1	W	Dry	Going ahead	Bicycle	Other motor vehicle	0
								V2	S	Dry	Going ahead	Passenger van	Cyclist	
245	2009-05-26	Tue	07:35	Clear	Daylight	Other	Non-fatal	V1	N	Dry	Reversing	Truck - closed	Other motor vehicle	0
								V2	S	Dry	Turning left	Automobile, station	Other motor vehicle	
246	2009-05-27	We	17:36	Rain	Daylight	Rear end	Non-fatal	V1	N	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Passenger van	Other motor vehicle	
247	2009-07-24	Frid	22:18	Clear	Dark	Angle	Non-fatal	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Wet	Going ahead	Automobile, station	Other motor vehicle	
248	2009-08-17	Mo	09:00	Rain	Daylight	Single vehicle	P.D. only	V1	N	Wet	Turning left	Automobile, station	Curb	0
249	2009-09-07	Mo	22:18	Clear	Dark	Angle	Non-fatal	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Dry	Going ahead	Automobile, station	Other motor vehicle	
250	2009-09-15	Tue	19:15	Clear	Dusk	Rear end	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Pick-up truck	Other motor vehicle	
251	2009-09-22	Tue	06:51	Rain	Dawn	Rear end	P.D. only	V1	N	Dry	Slowing or	Automobile, station	Skidding/Sliding	0
								V2	N	Dry	Stopped	Pick-up truck	Other motor vehicle	
252	2009-11-14	Sat	15:45	Rain	Daylight	Rear end	P.D. only	V1	N	Wet	Turning left	Automobile, station	Other motor vehicle	0
								V2	N	Wet	Turning left	Passenger van	Other motor vehicle	
253	2009-11-30	Mo	10:24	Clear	Daylight	Angle	Non-fatal	V1	E	Wet	Slowing or	Automobile, station	Skidding/Sliding	0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle	
								V3	N	Wet	Stopped	Delivery van	Other motor vehicle	
254	2009-12-01	Tue	10:10	Clear	Daylight	Rear end	P.D. only	V1	N	Wet	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	N	Wet	Going ahead	Automobile, station	Other motor vehicle	
255	2009-12-04	Frid	09:47	Clear	Daylight	Angle	P.D. only	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Going ahead	Passenger van	Other motor vehicle	
256	2009-12-30	We	10:40	Clear	Daylight	Rear end	Non-fatal	V1	N	Ice	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Ice	Stopped	Pick-up truck	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

257	2009-12-30	We	12:40	Clear	Daylight	Rear end	P.D. only	V1	N	Ice	Slowing or	Automobile, station	Skidding/Sliding	0
								V2	N	Wet	Stopped	Pick-up truck	Other motor vehicle	
								V3	N	Ice	Slowing or	Passenger van	Other motor vehicle	
								V4	N	Wet	Slowing or	Pick-up truck	Other motor vehicle	
258	2010-01-30	Sat	11:30	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Going ahead	Truck - open	Other motor vehicle	0
								V2	S	Dry	Stopped	Pick-up truck	Other motor vehicle	
								V3	S	Dry	Stopped	Automobile, station	Other motor vehicle	
259	2010-02-10	We	06:40	Clear	Dawn	Rear end	P.D. only	V1	N	Wet	Slowing or	Pick-up truck	Other motor vehicle	0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle	
								V3	N	Wet	Stopped	Pick-up truck	Other motor vehicle	
260	2010-02-12	Frid	15:05	Clear	Daylight	Rear end	P.D. only	V1	W	Dry	Turning left	Pick-up truck	Other motor vehicle	0
								V2	W	Dry	Turning left	Automobile, station	Other motor vehicle	
261	2010-02-18	Thu	19:10	Clear	Dark	Rear end	Non-fatal	V1	N	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
								V3	N	Dry	Stopped	Passenger van	Other motor vehicle	
262	2010-02-19	Frid	06:40	Clear	Dark	Rear end	P.D. only	V1	N	Dry	Slowing or	Pick-up truck	Other motor vehicle	0
								V2	N	Dry	Stopped	Pick-up truck	Other motor vehicle	
263	2010-03-04	Thu	18:36	Clear	Dusk	Rear end	P.D. only	V1	N	Dry	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Slowing or	Automobile, station	Other motor vehicle	
264	2010-04-01	Thu	07:05	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Slowing or	Delivery van	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
								V3	N	Dry	Stopped	Pick-up truck	Other motor vehicle	
265	2010-04-29	Thu	10:45	Clear	Daylight	Angle	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	N	Dry	Going ahead	Passenger van	Other motor vehicle	
266	2010-05-04	Tue	18:40	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle	
267	2010-05-25	Tue	09:05	Clear	Daylight	Rear end	Non-fatal	V1	N	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	N	Dry	Stopped	Pick-up truck	Other motor vehicle	
268	2010-05-28	Frid	11:38	Clear	Daylight	Angle	Non-fatal	V1	N	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	
269	2010-07-12	Mo	16:02	Clear	Daylight	Angle	P.D. only	V1	W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	S	Dry	Going ahead	Pick-up truck	Other motor vehicle	
								V3	S	Dry	Going ahead	Pick-up truck	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

270	2010-08-24	Tue	07:25	Clear	Daylight	Rear end	Non-fatal	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle		
								V3	N	Dry	Stopped	Automobile, station	Other motor vehicle		
271	2010-09-08	We	21:53	Clear	Dark	Rear end	Non-fatal	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle		
272	2010-10-09	Sat	15:00	Clear	Daylight	Angle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle		
273	2010-10-24	Sun	15:50	Rain	Daylight	Sideswipe	P.D. only	V1	N	Wet	Unknown	Pick-up truck	Other motor vehicle		0
								V2	N	Wet	Changing lanes	Automobile, station	Other motor vehicle		
274	2010-10-26	Tue	07:35	Clear	Daylight	Rear end	Non-fatal	V1	N	Wet	Slowing or	Automobile, station	Skidding/Sliding		0
								V2	N	Wet	Stopped	Automobile, station	Other motor vehicle		
275	2010-11-12	Frid	07:25	Clear	Daylight	Rear end	Non	V1	W	Dry	Turning right	Police vehicle	Other motor vehicle		0
								V2	W	Dry	Turning right	Automobile, station	Other motor vehicle		

ST. JOSEPH BLVD RMP 45, REGIONAL ROAD 174 to ST. JOSEPH BLVD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **1**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
276	2010-04-25	Sun	00:25	Clear	Dark Rear end	P.D. only	V1	E	Dry	Going ahead	Delivery van	Other motor vehicle		0
							V2	E	Dry	Stopped	Automobile, station	Other motor vehicle		
							V3	E	Dry	Stopped	Automobile, station	Other motor vehicle		

TENTH LINE RD & TENTH LINE RD RMP 61

Former Municipality: **Cumberland** Traffic Control: **Stop sign** Number of Collisions: **3**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
277	2009-04-23	Thu	18:20	Clear	Daylight Angle	P.D. only	V1	W	Dry	Turning left	Automobile, station	Other motor vehicle		0
							V2	N	Dry	Going ahead	Passenger van	Other motor vehicle		
278	2010-08-29	Sun	18:18	Clear	Daylight Angle	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
							V2	W	Dry	Turning left	Automobile, station	Other motor vehicle		
279	2010-09-27	Mo	19:20	Rain	Dark Rear end	P.D. only	V1	U	Wet	Slowing or	Automobile, station	Other motor vehicle		0
							V2	U	Wet	Stopped	Automobile, station	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

TENTH LINE RD RAMP 26, REGIONAL ROAD 174 to TENTH LINE RD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **1**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
280	2010-02-28	Sun	12:50	Clear	Daylight	Rear end	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Going ahead	Pick-up truck	Other motor vehicle		

TENTH LINE RD RMP 63, OLD TENTH LINE RD to REGIONAL ROAD 174

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **1**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
281	2009-04-06	Mo	18:10	Rain	Daylight	Single vehicle	P.D. only	V1 E	Wet	Going ahead	Automobile, station	Steel guide wall		0

TRIM RD, DAIRY DR to OLD MONTREAL RD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **12**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
282	2008-01-30	We	07:09	Rain	Dawn	Angle	P.D. only	V1 S	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Wet	Turning left	Automobile, station	Other motor vehicle		
283	2008-08-25	Mo	15:56	Clear	Daylight	Single vehicle	P.D. only	V1 N	Dry	Going ahead	Pick-up truck	Ran off road		0
284	2008-12-10	We	16:19	Clear	Dusk	Rear end	P.D. only	V1 S	Wet	Slowing or	Pick-up truck	Other motor vehicle		0
								V2 S	Wet	Stopped	Automobile, station	Other motor vehicle		
285	2008-12-15	Mo	20:28	Clear	Dark	Single vehicle	P.D. only	V1 N	Ice	Going ahead	Pick-up truck	Skidding/Sliding		0
286	2009-01-15	Thu	14:40	Clear	Daylight	Rear end	P.D. only	V1 N	Ice	Going ahead	Automobile, station	Other motor vehicle		0
								V2 N	Ice	Going ahead	Pick-up truck	Other motor vehicle		
287	2009-04-29	We	17:45	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle		
								V3 S	Dry	Stopped	Automobile, station	Other motor vehicle		
288	2009-06-23	Tue	14:40	Snow	Daylight	Angle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle		
289	2010-06-11	Frid	16:45	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 S	Dry	Turning right	Pick-up truck	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

290	2010-06-18	Frid	14:23	Clear	Daylight	Turning	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	S	Dry	Turning right	Automobile, station	Other motor vehicle		
291	2010-07-21	We	12:48	Clear	Daylight	Angle	P.D. only	V1	S	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	E	Dry	Turning left	Automobile, station	Other motor vehicle		
292	2010-08-17	Tue	08:08	Clear	Daylight	Angle	Non-fatal	V1	N	Dry	Going ahead	Bicycle	Other motor vehicle		0
								V2	E	Dry	Stopped	Automobile, station	Cyclist		
293	2010-10-08	Frid	18:10	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2	S	Dry	Stopped	Pick-up truck	Other motor vehicle		

TRIM RD, DAIRY DR to REGIONAL RD 174

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **4**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
294	2009-04-20	Mo	19:24	Rain	Daylight	Single vehicle	P.D. only	V1 S	Wet	Going ahead	Automobile, station	Skidding/Sliding		0
295	2009-10-19	Mo	20:05	Clear	Dark	Single vehicle	Non-fatal	V1 N	Dry	Going ahead	Automobile, station	Pedestrian		1
296	2010-09-29	We	17:48	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle		
297	2010-11-27	Sat	04:29	Clear	Dark	Single vehicle	P.D. only	V1 S	Ice	Going ahead	Automobile, station	Ran off road		0

TRIM RD, NORTH SERVICE RD to REGIONAL ROAD 174

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **2**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
298	2009-04-22	We	17:44	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Slowing or	Automobile, station	Other motor vehicle		
								V3 S	Dry	Stopped	Automobile, station	Other motor vehicle		
299	2009-11-15	Sun	21:00	Clear	Dark	Single vehicle	P.D. only	V1 N	Wet	Turning left	Automobile, station	Ditch		0

(Note: Time of Day = "00:00" represents unknown collision time

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2008-01-01 TO: 2011-01-01

TRIM RD, OLD MONTREAL RD to WATTERS RD

Former Municipality: **Cumberland** Traffic Control: **No control** Number of Collisions: **12**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE		CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
300	2008-02-13	We	06:30	Snow	Dark	Sideswipe	P.D. only	V1 S	Ice	Going ahead	Snow plow	Other motor vehicle		0
								V2 S	Packed snow	Stopped	Automobile, station	Other motor vehicle		
301	2008-03-20	Thu	14:07	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle		
302	2008-06-13	Frid	18:13	Clear	Daylight	Rear end	P.D. only	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Slowing or	Passenger van	Other motor vehicle		
								V3 N	Dry	Slowing or	Automobile, station	Other motor vehicle		
303	2008-12-08	Mo	17:19	Clear	Dark	Rear end	Non-fatal	V1 S	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Wet	Stopped	Automobile, station	Other motor vehicle		
304	2009-02-06	Frid	06:35	Clear	Dawn	Single vehicle	Non-fatal	V1 S	Slush	Going ahead	Unknown	Pedestrian		1
305	2009-03-27	Frid	15:18	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle		
								V3 S	Dry	Stopped	Automobile, station	Other motor vehicle		
306	2009-04-03	Frid	14:45	Rain	Daylight	Approaching	P.D. only	V1 N	Wet	Slowing or	Automobile, station	Other motor vehicle		0
								V2 S	Wet	Going ahead	Automobile, station	Other motor vehicle		
307	2009-06-22	Mo	18:18	Clear	Daylight	Single vehicle	Non-fatal	V1 S	Dry	Going ahead	Automobile, station	Pedestrian		1
308	2009-07-17	Frid	08:17	Clear	Daylight	Sideswipe	P.D. only	V1 N	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Turning left	Police vehicle	Other motor vehicle		
309	2010-06-28	Mo	16:30	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Slowing or	Pick-up truck	Other motor vehicle		0
								V2 S	Dry	Slowing or	Pick-up truck	Other motor vehicle		
310	2010-10-01	Frid	15:10	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Pick-up truck	Other motor vehicle		
311	2010-10-18	Mo	12:49	Clear	Daylight	Approaching	P.D. only	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Going ahead	Pick-up truck	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2008-01-01 TO: 2011-01-01

TRIM RD & WATTERS RD

Former Municipality: **Cumberland** Traffic Control: **Traffic signal** Number of Collisions: **16**

COLLISION ID	DATE	DAY	TIME	ENV	IMPACT TYPE	LIGHT	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
312	2008-04-21	Mo	16:05	Clear	Turning	Daylight	P.D. only	V1 S	Dry	Going ahead	Unknown	Other motor vehicle		0
								V2 N	Dry	Turning left	Automobile, station	Other motor vehicle		
313	2008-07-12	Sat	08:15	Clear	Rear end	Daylight	Non-fatal	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Turning left	Automobile, station	Other motor vehicle		
314	2008-09-19	Frid	17:05	Clear	Rear end	Daylight	P.D. only	V1 S	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Pick-up truck	Other motor vehicle		
315	2008-11-13	Thu	16:00	Rain	Rear end	Daylight	P.D. only	V1 N	Wet	Slowing or	Automobile, station	Other motor vehicle		0
								V2 N	Wet	Slowing or	Pick-up truck	Other motor vehicle		
316	2008-11-15	Sat	12:27	Rain	Turning	Daylight	P.D. only	V1 N	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Wet	Turning left	Automobile, station	Other motor vehicle		
317	2008-12-28	Sun	20:49	Clear	Rear end	Dark	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle		
318	2009-01-26	Mo	13:20	Clear	Rear end	Daylight	P.D. only	V1 N	Wet	Slowing or	Passenger van	Other motor vehicle		0
								V2 N	Wet	Stopped	Automobile, station	Other motor vehicle		
319	2009-04-30	Thu	08:55	Clear	Rear end	Daylight	P.D. only	V1 N	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Stopped	Passenger van	Other motor vehicle		
320	2009-06-28	Sun	20:45	Rain	Rear end	Dusk	Non	V1 S	Wet	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 S	Wet	Stopped	Pick-up truck	Other motor vehicle		
321	2009-08-14	Frid	11:30	Clear	Rear end	Daylight	P.D. only	V1 N	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 N	Dry	Stopped	Pick-up truck	Other motor vehicle		
322	2009-08-25	Tue	21:24	Clear	Rear end	Dark	P.D. only	V1 E	Dry	Turning right	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Turning right	Automobile, station	Other motor vehicle		
323	2009-10-23	Frid	19:25	Rain	Turning	Dark	P.D. only	V1 S	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 N	Wet	Turning left	Automobile, station	Other motor vehicle		
324	2009-10-24	Sat	10:35	Rain	Rear end	Daylight	Non-fatal	V1 N	Wet	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 N	Wet	Stopped	Pick-up truck	Other motor vehicle		
325	2010-04-23	Frid	17:38	Clear	Turning	Daylight	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Turning left	Passenger van	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

326	2010-10-18	Mo	16:45	Clear	Daylight	Sideswipe	P.D. only	V1	N	Dry	Changing lanes	Passenger van	Other motor vehicle	0
								V2	N	Dry	Going ahead	Municipal transit bus	Other motor vehicle	
327	2010-11-22	Mo	20:50	Rain	Dark	Turning	Non-fatal	V1	N	Wet	Turning left	Automobile, station	Other motor vehicle	0
								V2	S	Wet	Going ahead	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

APPENDIX E

TRIP GENERATION DATA

Project: ***Cardinal Creek Village*** **Proj #** ***31539*** **Date:** ***July 24, 2012***

Trip Generation - TOTAL

Land Use Type	Quantity	Units	AM Peak Hour			PM Peak Hour		
			Entering	Exiting	Total	Entering	Exiting	Total
210: Single Detached Housing			*T=0.7(X)+9.74*			*T=e^(0.9*LN(X)+0.51)*		
Peak Hour of Adjacent Street Traffic	2,641	units	25%	75%	100%	63%	37%	100%
variable: Dwelling Units			465	1394	1858	1260	740	2000
230: Townhouse			*T=e^(0.80*LN(X)+0.26)*			*T=e^(0.82*LN(X)+0.32)*		
Peak Hour of Adjacent Street Traffic	1,681	units	17%	83%	100%	67%	33%	100%
variable: Dwelling Units			84	410	494	407	201	608
220: Apartment			*T=0.49*(X)+3.73*			*T=0.55*(X)+17.65*		
Peak Hour of Adjacent Street Traffic	478	units	20%	80%	100%	65%	35%	100%
variable: Dwelling Units			48	190	238	182	98	281
Total Residential Trips After TMS Reduction		-35%	**387**	**1296**	**1683**	**1202**	**675**	**1878**
820: Shopping Centre - AREA 1	305,000	sq. feet	*T=e^(0.59*LN(X)+2.32)*			*T=e^(0.67*LN(X)+3.37)*		
Peak Hour of Adjacent Street Traffic			61%	39%	100%	49%	51%	100%
variable: 1,000 sq. feet GLA			181	116	297	658	685	1343
Pass-By Trips	50%		74	74	149	336	336	671
New Trips	50%		91	58	149	329	342	671
New Trips (Internal)	25%		23	14	37	82	86	168
New Trips (External)	75%		68	43	112	247	257	504
820: Shopping Centre - AREAS 2 & 3	135,000	sq. feet	*T=e^(0.59*LN(X)+2.32)*			*T=e^(0.67*LN(X)+3.37)*		
Peak Hour of Adjacent Street Traffic			61%	39%	100%	49%	51%	100%
variable: 1,000 sq. feet GLA			112	72	184	381	397	778
Pass-By Trips	50%		46	46	92	194	194	389
New Trips	50%		56	36	92	191	198	389
New Trips (Internal)	50%		28	18	46	95	99	194
New Trips (External)	50%		28	18	46	95	99	194
Total New Trips (Commercial)			**147**	**94**	**241**	**520**	**541**	**1,060**
Total New Trips (Residential+Commercial)			**534**	**1,390**	**1,924**	**1,722**	**1,216**	**2,938**
2031 Total External Trips (Residential + Commercial)			**484**	**1357**	1841	**1544**	**1031**	2576
2021 Total External Trips (Residential + Commercial)			**276**	**700**	976	**896**	**644**	1540

Single-Family Detached Housing
(210)

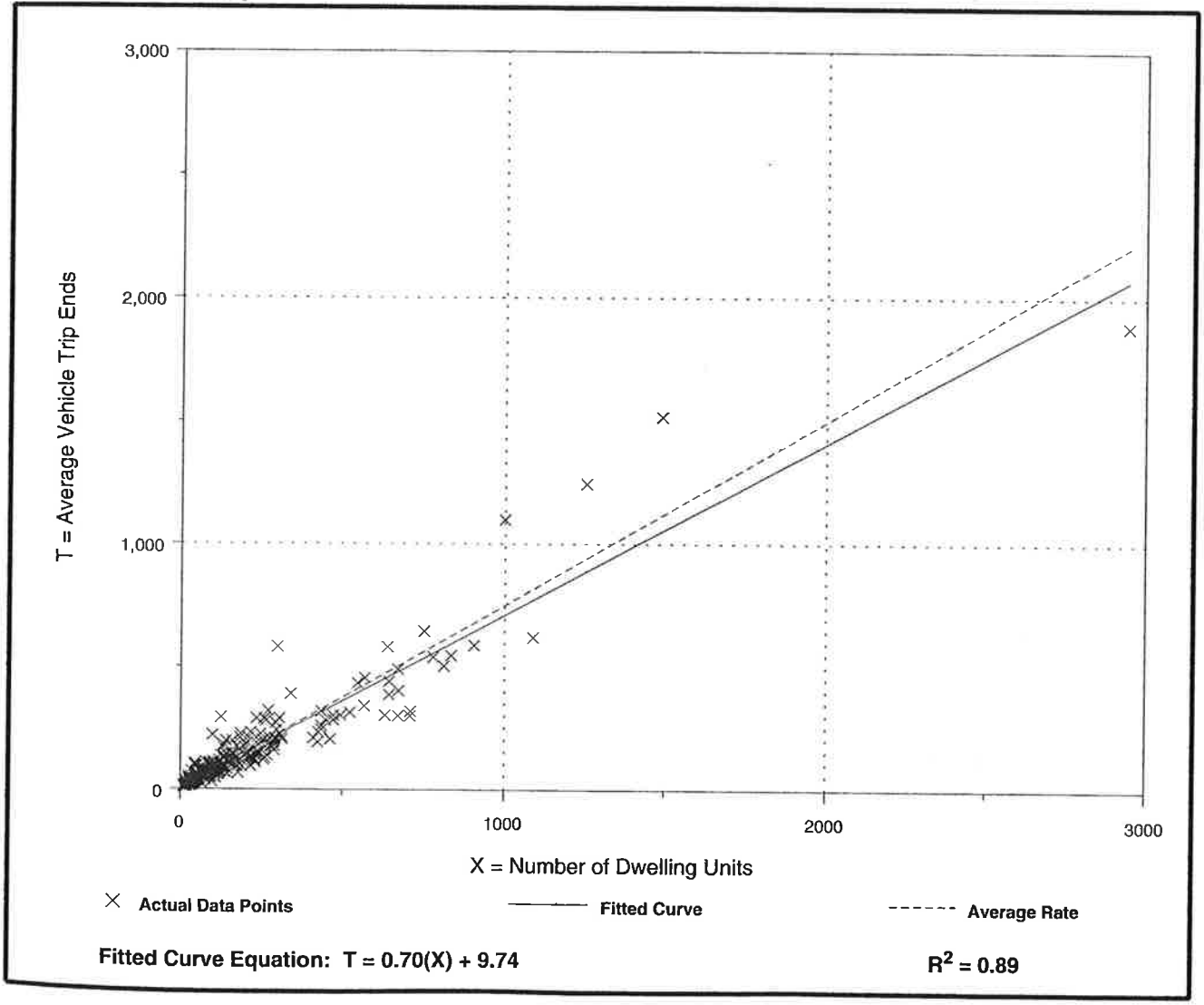
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 286
Avg. Number of Dwelling Units: 194
Directional Distribution: 25% entering, 75% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.75	0.33 - 2.27	0.90

Data Plot and Equation



Fitted Curve Equation: T = 0.70(X) + 9.74

R^2 = 0.89

Single-Family Detached Housing
(210)

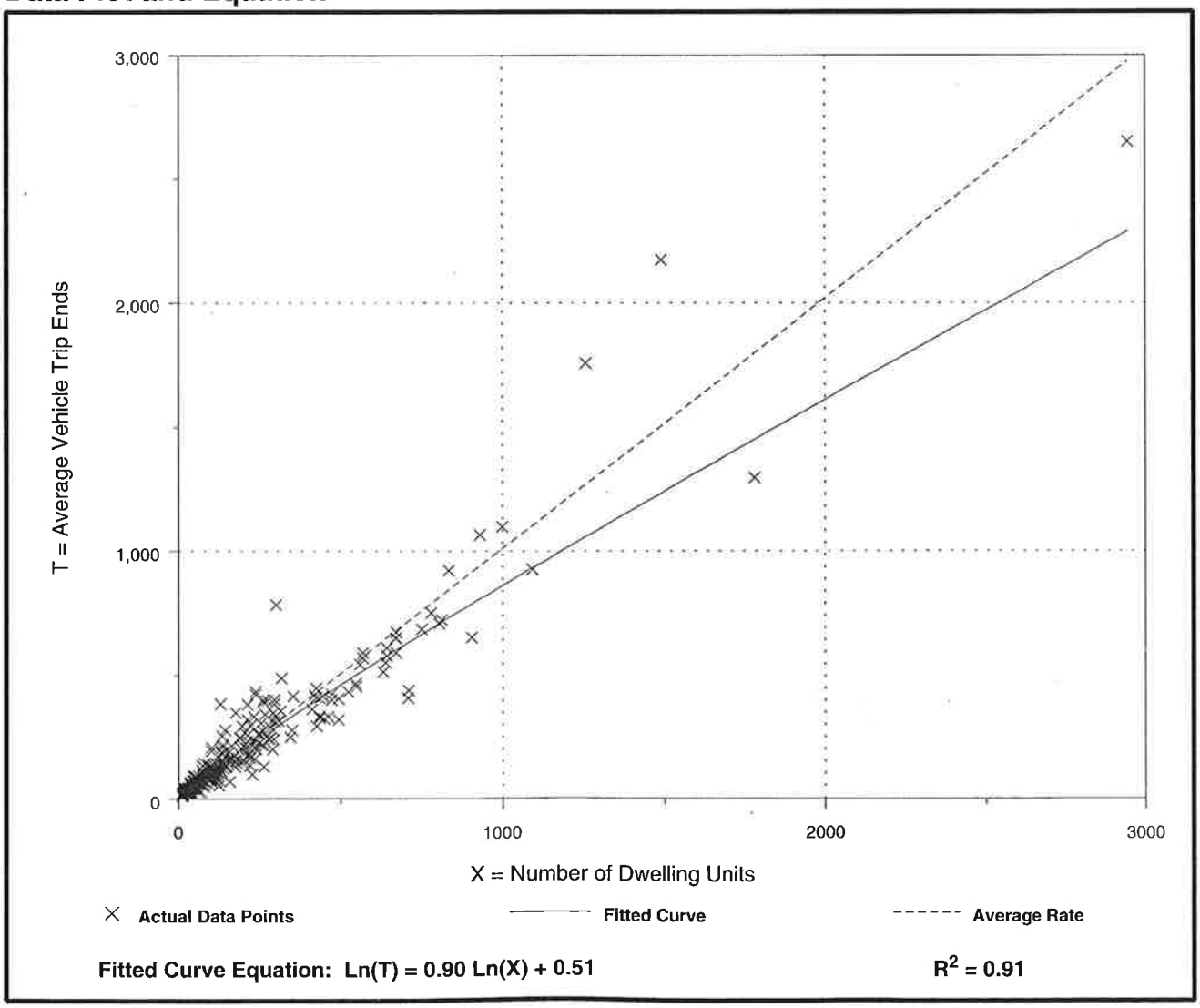
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 314
Avg. Number of Dwelling Units: 208
Directional Distribution: 63% entering, 37% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
1.01	0.42 - 2.98	1.05

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.90 Ln(X) + 0.51 **R^2 = 0.91**

Residential Condominium/Townhouse
(230)

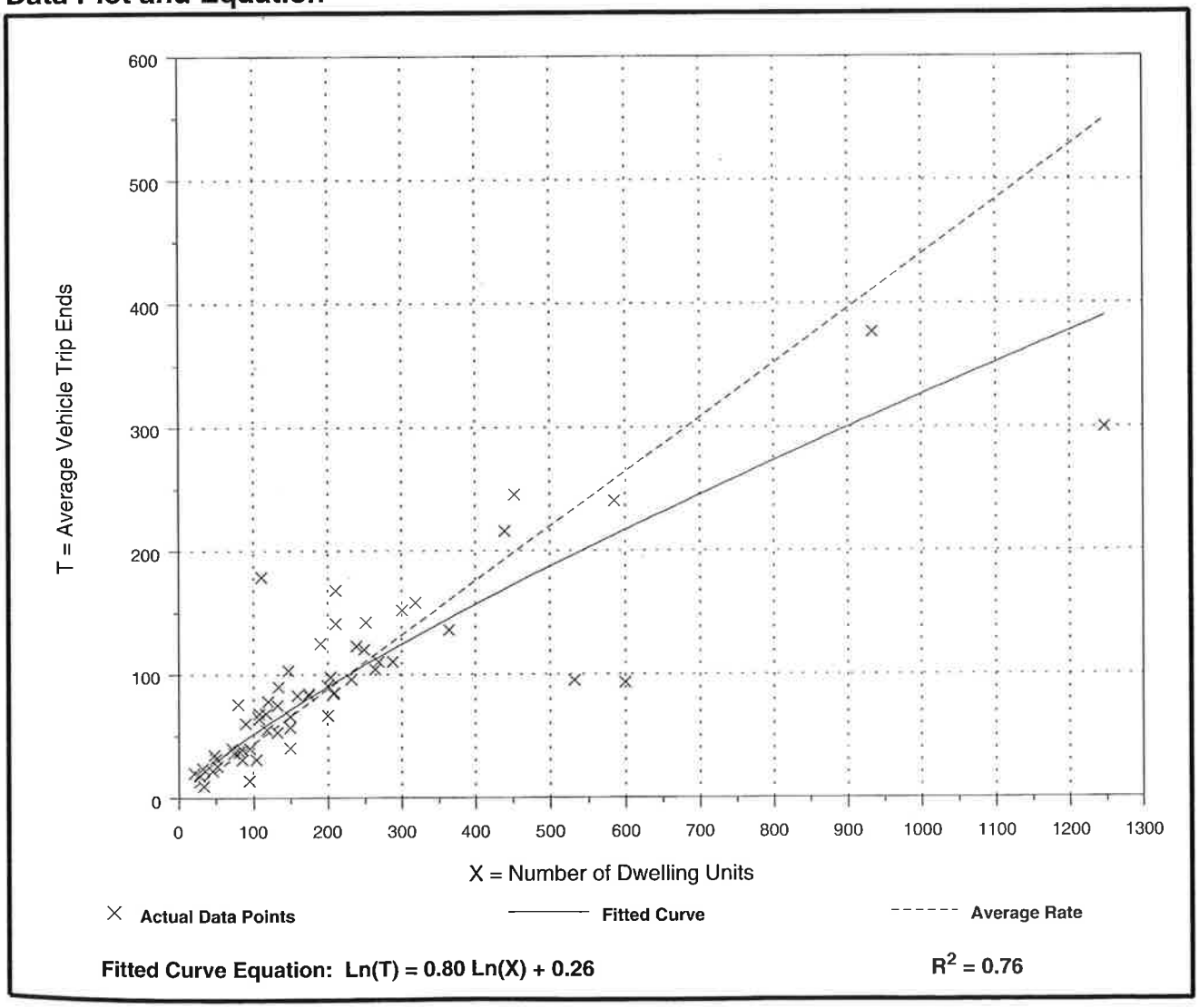
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 59
Avg. Number of Dwelling Units: 213
Directional Distribution: 17% entering, 83% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.61	0.69

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.80 Ln(X) + 0.26

$R^2 = 0.76$

Residential Condominium/Townhouse
(230)

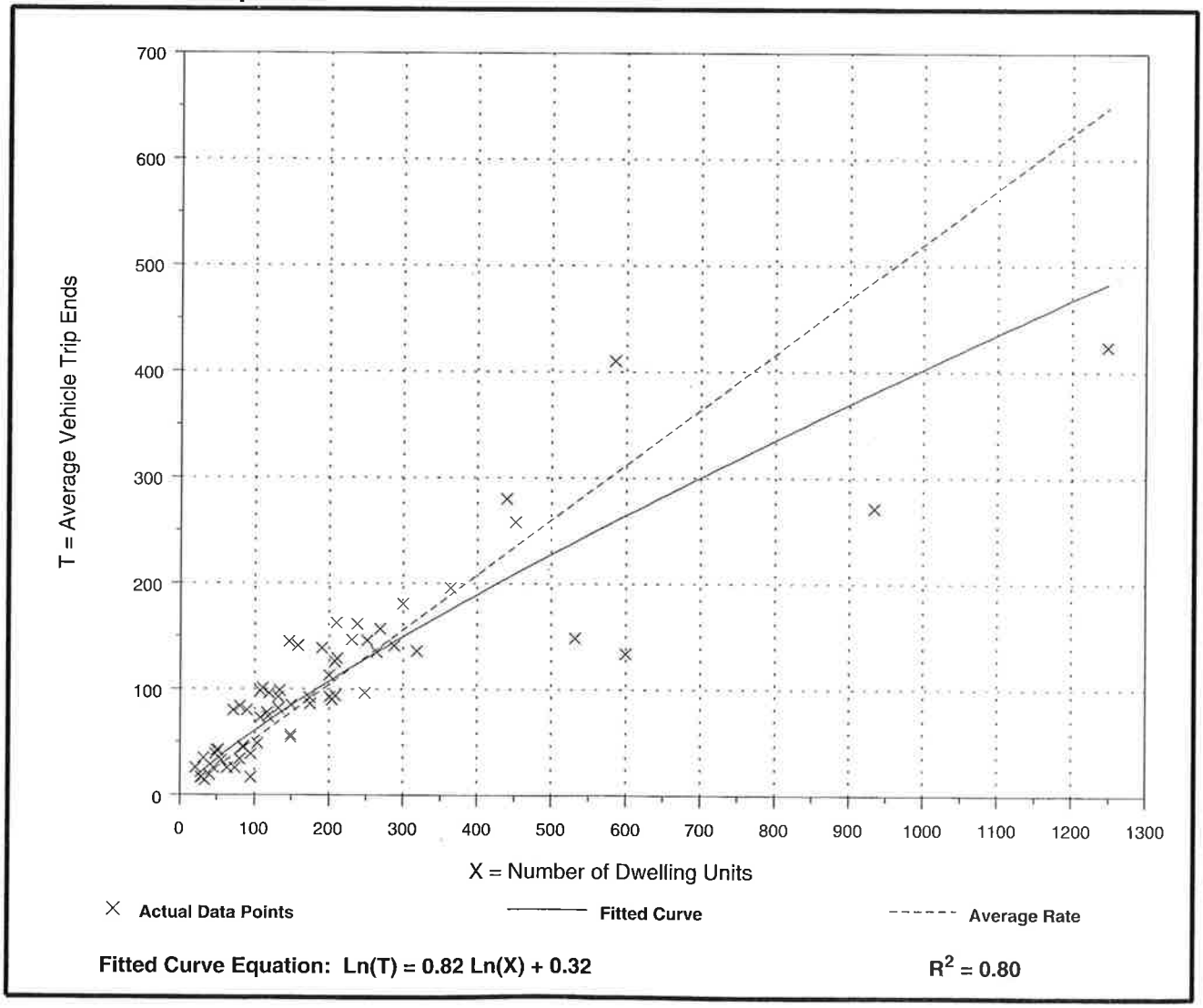
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 62
Avg. Number of Dwelling Units: 205
Directional Distribution: 67% entering, 33% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.52	0.18 - 1.24	0.75

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.82 Ln(X) + 0.32

R^2 = 0.80

Apartment
(220)

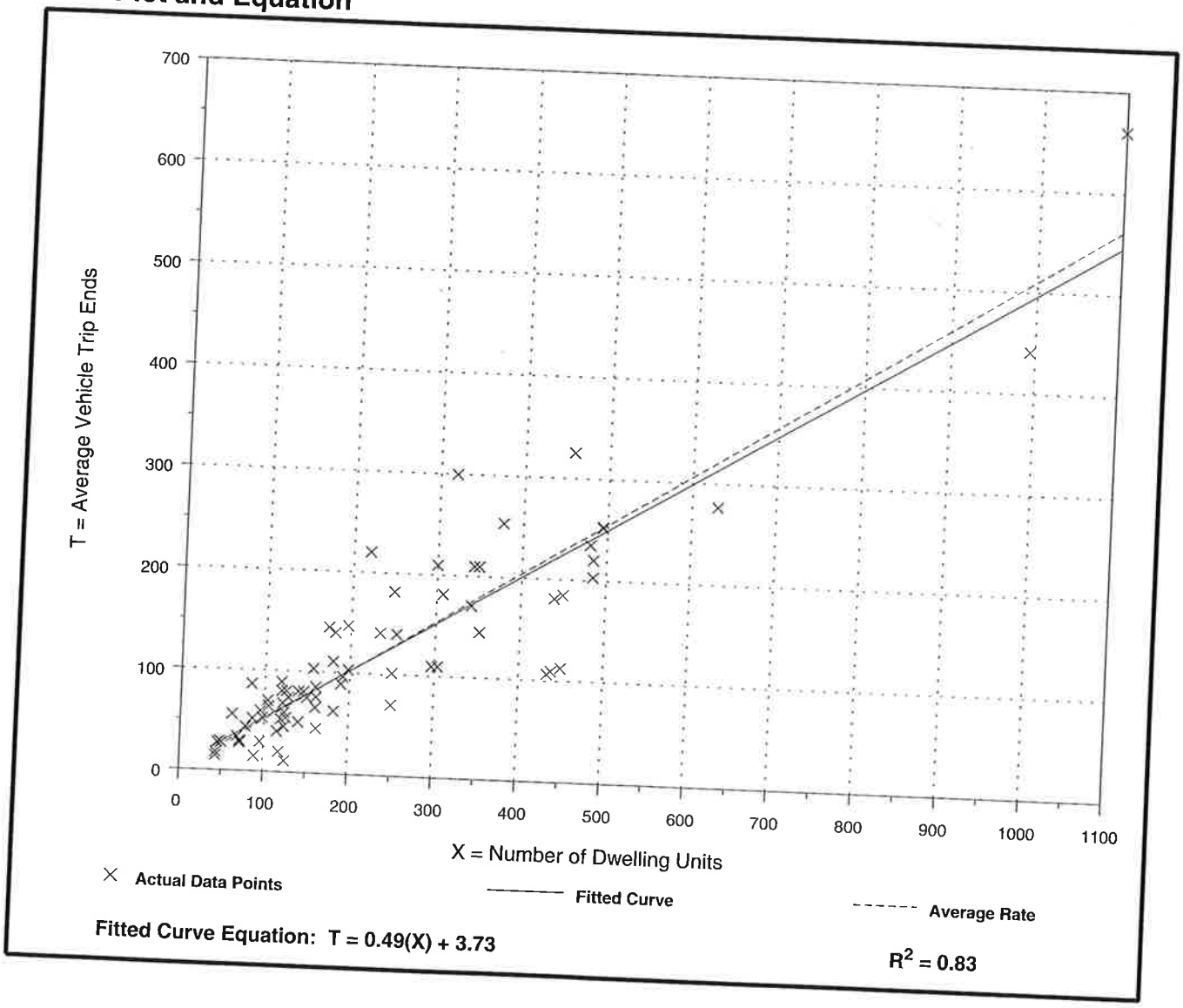
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 78
Avg. Number of Dwelling Units: 235
Directional Distribution: 20% entering, 80% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.10 - 1.02	0.73

Data Plot and Equation



Fitted Curve Equation: $T = 0.49(X) + 3.73$

$R^2 = 0.83$

Apartment
(220)

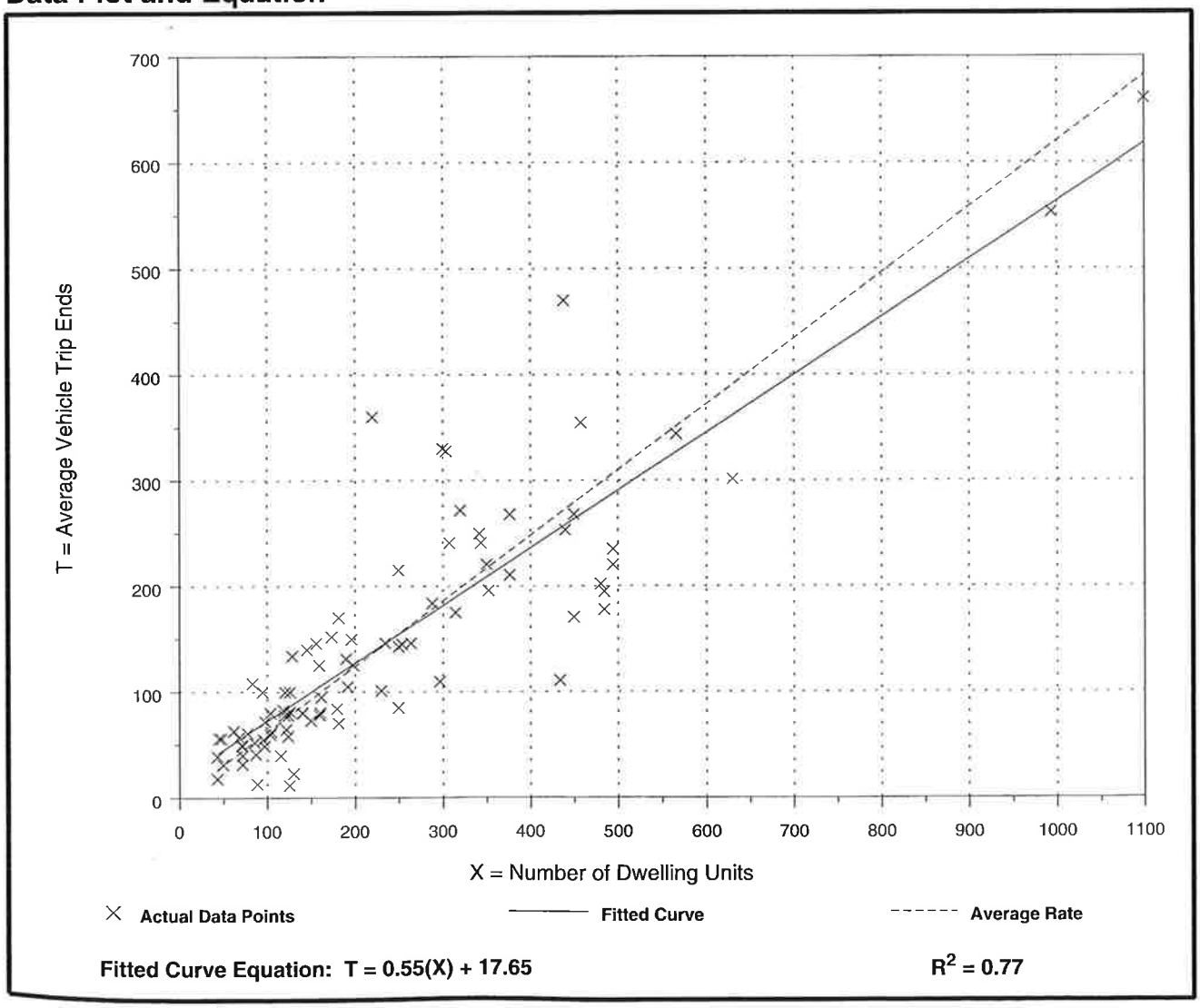
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 90
Avg. Number of Dwelling Units: 233
Directional Distribution: 65% entering, 35% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.62	0.10 - 1.64	0.82

Data Plot and Equation



Fitted Curve Equation: T = 0.55(X) + 17.65

R^2 = 0.77

Shopping Center
(820)

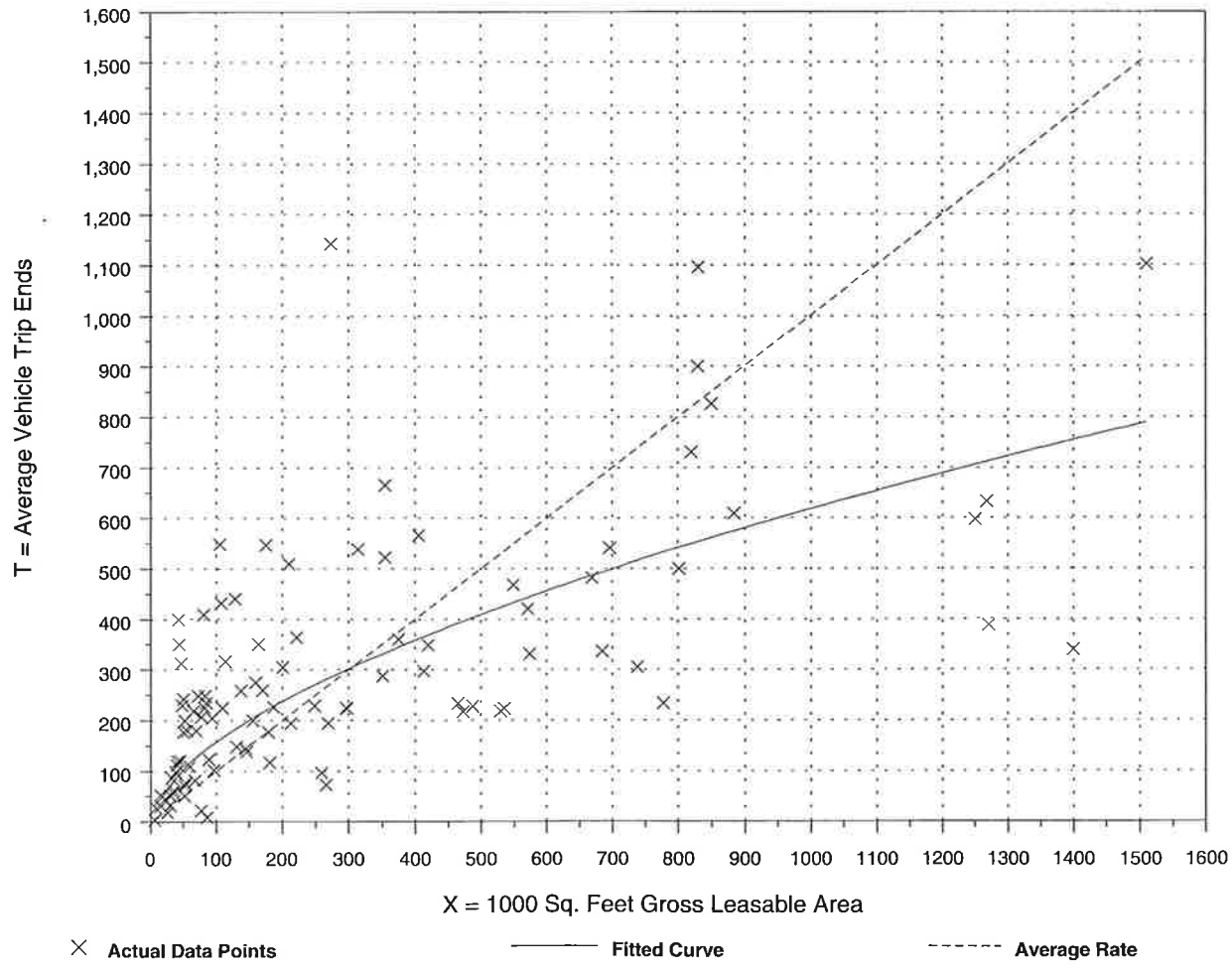
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Leasable Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 101
Average 1000 Sq. Feet GLA: 296
Directional Distribution: 61% entering, 39% exiting

Trip Generation per 1000 Sq. Feet Gross Leasable Area

Average Rate	Range of Rates	Standard Deviation
1.00	0.10 - 9.05	1.38

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.59 Ln(X) + 2.32

R^2 = 0.52

Shopping Center
(820)

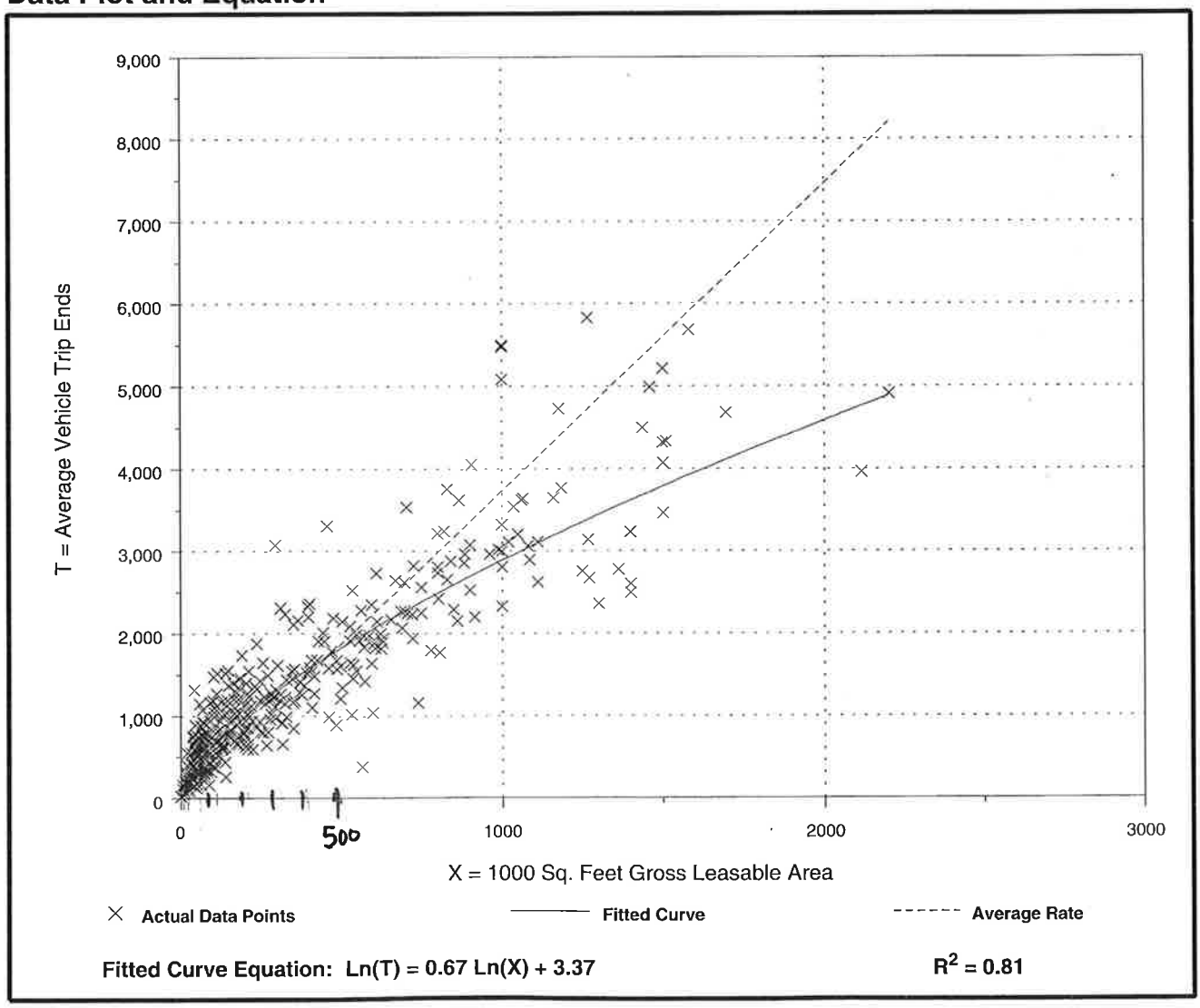
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Leasable Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 412
Average 1000 Sq. Feet GLA: 379
Directional Distribution: 49% entering, 51% exiting

Trip Generation per 1000 Sq. Feet Gross Leasable Area

Average Rate	Range of Rates	Standard Deviation
3.73	0.68 - 29.27	2.74

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.67 Ln(X) + 3.37

R^2 = 0.81

by trips while a million square foot shopping center might have as little as 19 percent. It should be noted, however, that for each size and type of land use there is a wide range in the proportion of pass-by trips reported. Table 3–10 presents only the average percentage.

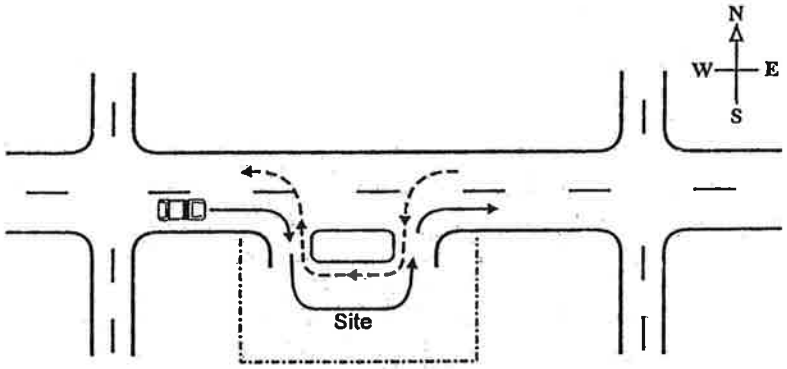


Figure 3–10. ***Pass-By Trips***

Table 3–10. ***Trips Attracted from Passing Traffic***

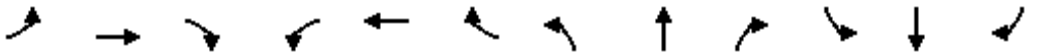
Generator	Percent of Site Traffic
Banks with drive-thru windows	14 %
Supermarkets	28 %
Hardware Stores	8 %
Convenience Stores	16 %
Fast-food Restaurants	45 %
Service Stations	58 %
Shopping Center, sq feet GLA:	
> 1 million, 2 centers, range 12%-25%	19 %
800,000 to 1 million, 3 centers, range 9%-25%	15 %
600,000 to 799,999, 2 centers, range 14%-23%	19 %
400,000 to 599,999, 6 centers, range 15%-48%	32 %
200,000 to 399,999, 4 centers, range 17%-56%	41 %
100,000 to 199,999	50 %
< 100,000, 4 centers, range 51%-72%	60 %

Source: Traffic Institute, Northwestern University [3].

APPENDIX F

INTERSECTION CAPACITY ANALYSES

Existing (2012) Traffic

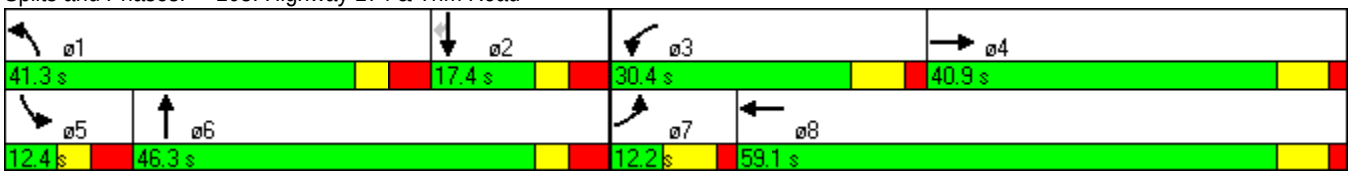


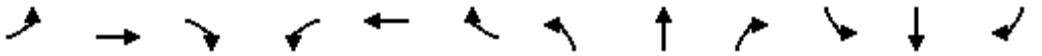
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	370	342	163	1152	9	729	27	51	7	32	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999			0.902				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			372		1			55				10
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		889.6			513.7			431.1			390.0	
Travel Time (s)		40.0			23.1			25.9			23.4	
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)	16	402	372	177	1252	10	792	29	55	8	35	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	402	372	177	1262	0	792	84	0	8	35	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free									2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.0		12.2	32.0		17.4	43.4		12.4	17.4	17.4
Total Split (s)	12.2	40.9	0.0	30.4	59.1	0.0	41.3	46.3	0.0	12.4	17.4	17.4
Total Split (%)	9.4%	31.5%	0.0%	23.4%	45.5%	0.0%	31.8%	35.6%	0.0%	9.5%	13.4%	13.4%
Maximum Green (s)	5.0	33.9		23.2	52.1		33.9	38.9		5.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes				Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	5.0	30.0	119.8	17.6	50.4		32.9	48.1		5.0	10.1	10.1
Actuated g/C Ratio	0.04	0.25	1.00	0.15	0.42		0.27	0.40		0.04	0.08	0.08
v/c Ratio	0.23	0.49	0.25	0.73	0.91		0.90	0.07		0.12	0.24	0.08
Control Delay	67.5	41.2	0.4	67.3	44.3		57.3	12.0		63.3	59.2	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	41.2	0.4	67.3	44.3		57.3	12.0		63.3	59.2	28.7
LOS	E	D	A	E	D		E	B		E	E	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		22.5			47.1			53.0			54.1	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	3.4	39.6	0.0	36.3	125.0		82.2	1.8		1.7	7.1	0.0
Queue Length 95th (m)	10.9	56.6	0.0	61.3	#194.6		#130.2	8.2		6.8	17.9	5.2
Internal Link Dist (m)		865.6			489.7			407.1			366.0	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	69	945	1473	321	1442		911	1227		69	146	133
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.23	0.43	0.25	0.55	0.88		0.87	0.07		0.12	0.24	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 119.8			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 42.7		Intersection LOS: D	
Intersection Capacity Utilization 84.7%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road



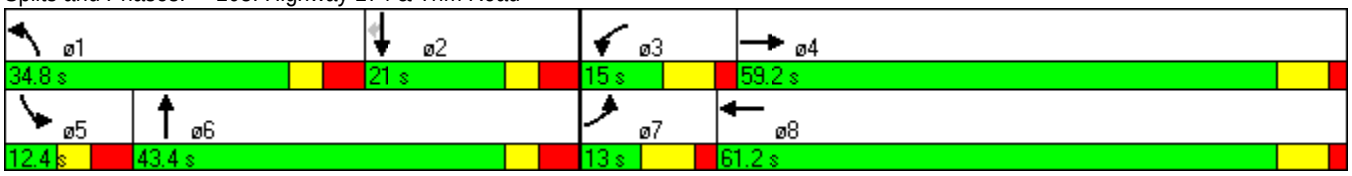


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1145	678	89	561	7	430	38	119	20	34	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.998			0.886				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			432		1			129				2
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		889.6			513.7			431.1			390.0	
Travel Time (s)		40.0			23.1			25.9			23.4	
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)	17	1245	737	97	610	8	467	41	129	22	37	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	1245	737	97	618	0	467	170	0	22	37	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free									2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.0		12.2	32.0		17.4	43.4		12.4	17.4	17.4
Total Split (s)	13.0	59.2	0.0	15.0	61.2	0.0	34.8	43.4	0.0	12.4	21.0	21.0
Total Split (%)	10.0%	45.5%	0.0%	11.5%	47.1%	0.0%	26.8%	33.4%	0.0%	9.5%	16.2%	16.2%
Maximum Green (s)	5.8	52.2		7.8	54.2		27.4	36.0		5.0	13.6	13.6
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes				Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	5.8	49.6	119.1	7.8	59.8		22.3	32.8		5.0	10.3	10.3
Actuated g/C Ratio	0.05	0.42	1.00	0.07	0.50		0.19	0.28		0.04	0.09	0.09
v/c Ratio	0.21	0.91	0.50	0.90	0.37		0.78	0.19		0.31	0.25	0.02
Control Delay	64.1	43.6	1.2	119.2	20.6		56.4	11.4		70.5	58.0	37.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	64.1	43.6	1.2	119.2	20.6		56.4	11.4		70.5	58.0	37.5
LOS	E	D	A	F	C		E	B		E	E	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		28.2			34.0			44.3			61.8	
Approach LOS		C			C			D			E	
Queue Length 50th (m)	3.7	130.4	0.0	21.7	37.7		50.9	3.7		4.8	7.8	0.0
Queue Length 95th (m)	11.1	#183.0	0.0	#55.1	67.1		68.2	11.9		13.4	18.3	2.4
Internal Link Dist (m)		865.6			489.7			407.1			366.0	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	81	1450	1473	108	1650		739	984		70	199	171
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.21	0.86	0.50	0.90	0.37		0.63	0.17		0.31	0.19	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 119.1			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 33.0		Intersection LOS: C	
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road



INPUT REPORT

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2012 Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2012 Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	79.0	5.00	92.0	1.20	100.00	2.00
North	976.0	5.00	92.0	1.20	100.00	2.00
East	15.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	7.0	5.00	92.0	1.20	100.00	2.00
West	2.0	5.00	92.0	1.20	100.00	2.00
North	2.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	12.0	5.00	92.0	1.20	100.00	2.00
South	431.0	5.00	92.0	1.20	100.00	2.00
West	59.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	23.0	5.00	92.0	1.20	100.00	2.00
East	3.0	5.00	92.0	1.20	100.00	2.00
South	37.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	50.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

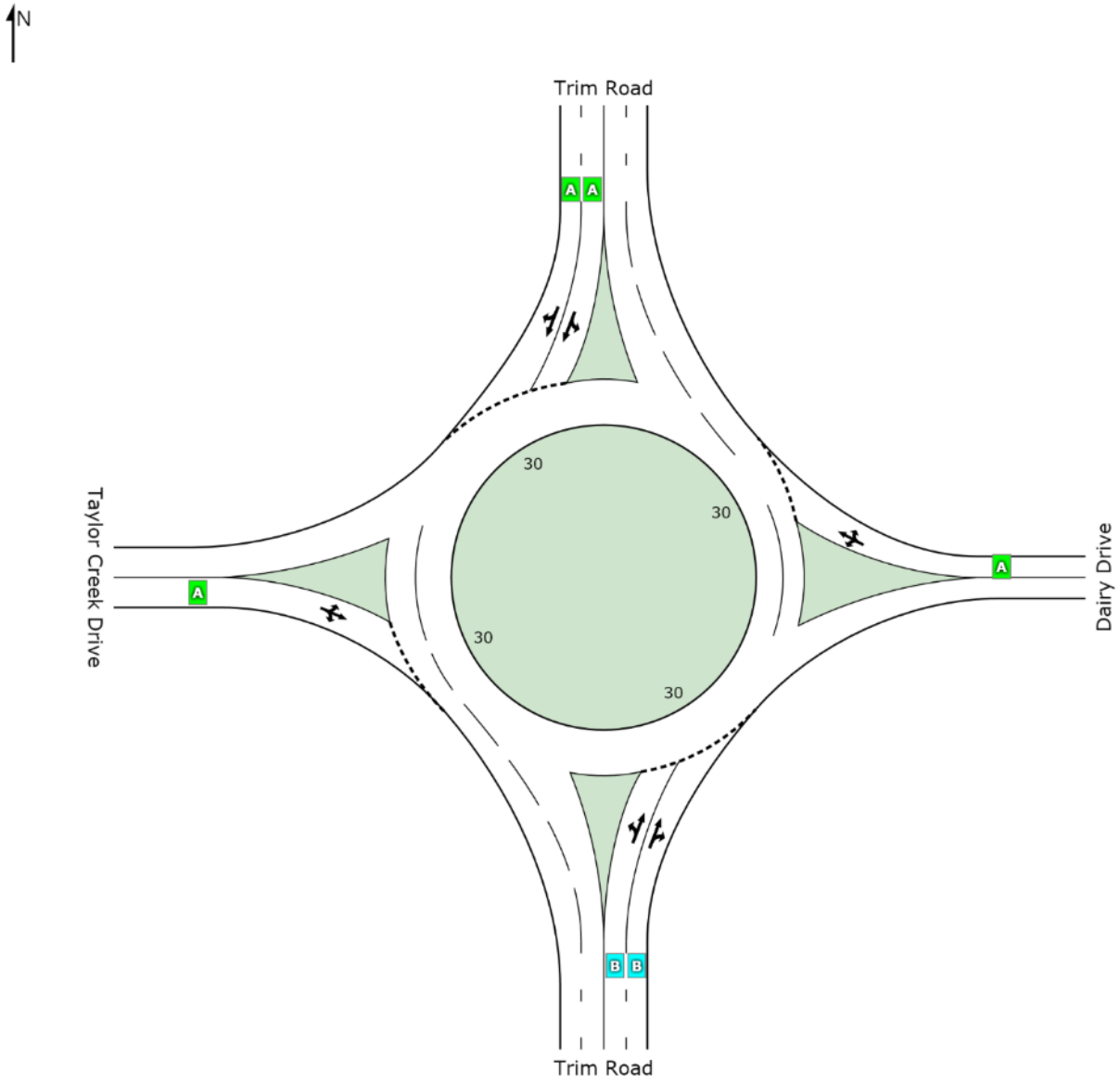
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2012 AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2012 Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	B	A	A	A	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2012 AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2012 Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	86	5.0	0.600	12.1	LOS B	3.7	29.5	0.25	0.85	33.0
8	T	1061	5.0	0.600	12.1	LOS B	3.7	29.5	0.25	0.47	38.9
18	R	16	5.0	0.600	12.1	LOS B	3.7	29.5	0.25	0.56	35.4
Approach		1163	5.0	0.600	12.1	LOS B	3.7	29.5	0.25	0.50	38.3
East: Dairy Drive											
1	L	8	5.0	0.026	8.3	LOS A	0.1	0.5	0.58	0.91	38.0
6	T	2	5.0	0.026	8.3	LOS A	0.1	0.5	0.58	0.67	39.1
16	R	2	5.0	0.026	8.3	LOS A	0.1	0.5	0.58	0.75	40.3
Approach		12	5.0	0.026	8.3	LOS A	0.1	0.5	0.58	0.84	38.5
North: Trim Road											
7	L	13	5.0	0.297	7.1	LOS A	1.2	9.3	0.26	0.91	40.0
4	T	468	5.0	0.297	7.1	LOS A	1.2	9.3	0.26	0.46	45.2
14	R	64	5.0	0.297	7.1	LOS A	1.2	9.3	0.26	0.58	43.8
Approach		546	5.0	0.297	7.1	LOS A	1.2	9.3	0.26	0.48	44.8
West: Taylor Creek Drive											
5	L	25	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.84	39.4
2	T	3	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.47	41.4
12	R	40	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.61	42.3
Approach		68	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.69	41.1
All Vehicles		1789	5.0	0.600	10.3	LOS B	3.7	29.5	0.26	0.50	40.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2012 Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2012 Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	40.0	5.00	92.0	1.20	100.00	2.00
North	713.0	5.00	92.0	1.20	100.00	2.00
East	16.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	93.0	5.00	92.0	1.20	100.00	2.00
West	11.0	5.00	92.0	1.20	100.00	2.00
North	15.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	2.0	5.00	92.0	1.20	100.00	2.00
South	1052.0	5.00	92.0	1.20	100.00	2.00
West	38.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	28.0	5.00	92.0	1.20	100.00	2.00
East	2.0	5.00	92.0	1.20	100.00	2.00
South	64.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

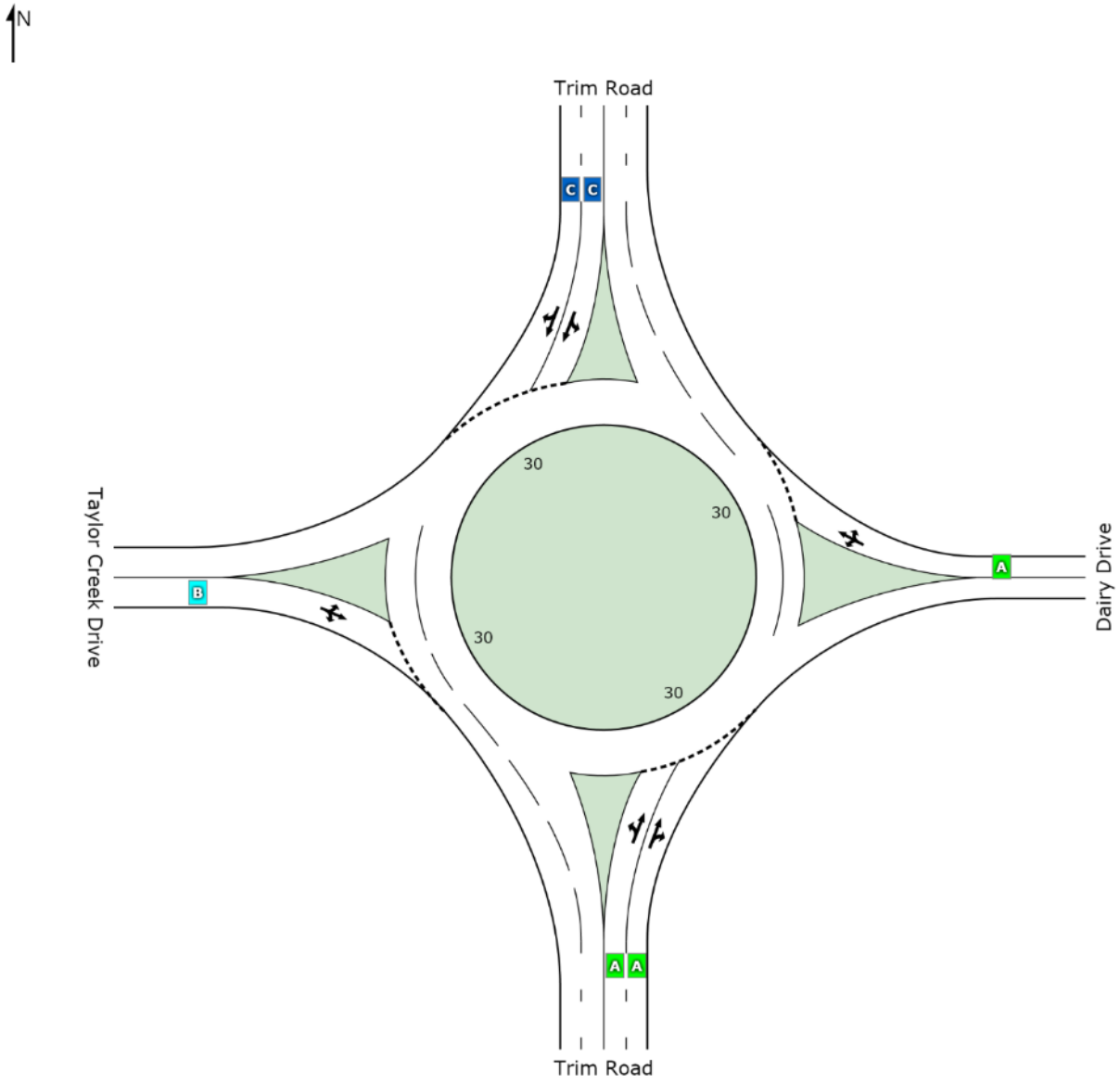
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2012 PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2012 Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	A	A	C	B	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2012 PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2012 Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	43	5.0	0.428	8.6	LOS A	2.0	16.2	0.18	0.90	35.6
8	T	775	5.0	0.428	8.6	LOS A	2.0	16.2	0.18	0.46	42.5
18	R	17	5.0	0.428	8.6	LOS A	2.0	16.2	0.18	0.57	38.9
Approach		836	5.0	0.428	8.6	LOS A	2.0	16.2	0.18	0.49	42.1
East: Dairy Drive											
1	L	101	5.0	0.224	9.2	LOS A	0.6	4.7	0.52	0.88	37.3
6	T	12	5.0	0.224	9.2	LOS A	0.6	4.7	0.52	0.62	38.4
16	R	16	5.0	0.224	9.2	LOS A	0.6	4.7	0.52	0.71	39.6
Approach		129	5.0	0.224	9.2	LOS A	0.6	4.7	0.52	0.83	37.7
North: Trim Road											
7	L	2	5.0	0.687	16.2	LOS C	4.9	38.5	0.55	0.90	33.7
4	T	1143	5.0	0.687	16.2	LOS C	4.9	38.5	0.55	0.64	38.1
14	R	41	5.0	0.687	16.2	LOS C	4.9	38.5	0.55	0.70	35.5
Approach		1187	5.0	0.687	16.2	LOS C	4.9	38.5	0.55	0.65	38.0
West: Taylor Creek Drive											
5	L	30	5.0	0.237	12.1	LOS B	0.6	4.9	0.66	0.94	36.0
2	T	2	5.0	0.237	12.1	LOS B	0.6	4.9	0.66	0.74	36.5
12	R	70	5.0	0.237	12.1	LOS B	0.6	4.9	0.66	0.81	37.8
Approach		102	5.0	0.237	12.1	LOS B	0.6	4.9	0.66	0.85	37.2
All Vehicles		2254	5.0	0.687	12.8	LOS B	4.9	38.5	0.42	0.61	39.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2012 AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2012 Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2012 Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	152.0	5.00	92.0	1.20	100.00	2.00
North	1041.0	5.00	92.0	1.20	100.00	2.00
East	28.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	41.0	5.00	92.0	1.20	100.00	2.00
West	122.0	5.00	92.0	1.20	100.00	2.00
North	150.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	45.0	5.00	92.0	1.20	100.00	2.00
South	318.0	5.00	92.0	1.20	100.00	2.00
West	24.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	17.0	5.00	92.0	1.20	100.00	2.00
East	21.0	5.00	92.0	1.20	100.00	2.00
South	41.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

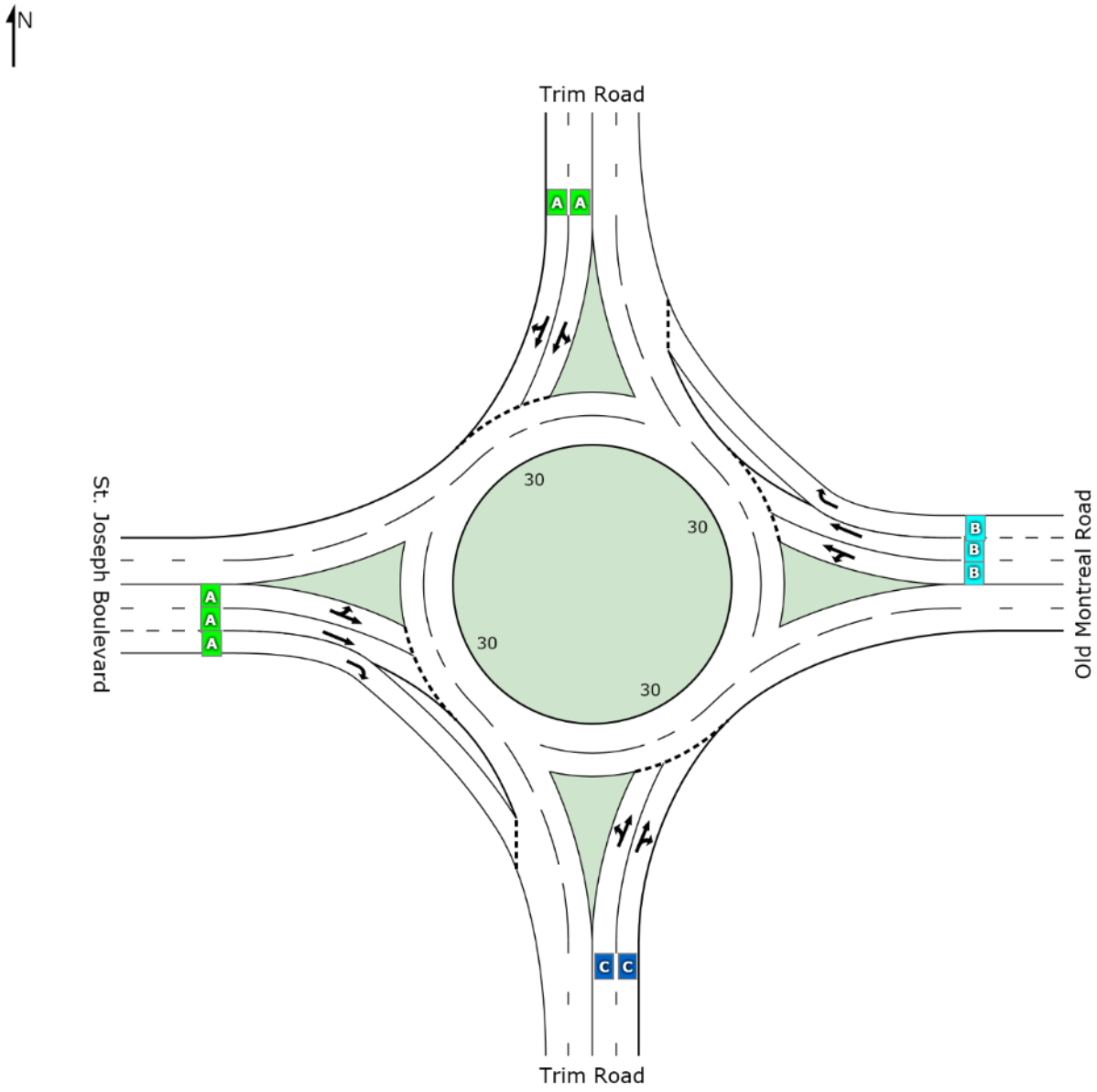
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2012 AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2012 Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	B	A	A	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2012 AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2012 Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	165	5.0	0.701	15.7	LOS C	3.9	30.6	0.35	0.81	38.1
8	T	1132	5.0	0.701	15.7	LOS C	3.9	30.6	0.34	0.52	35.8
18	R	30	5.0	0.701	15.6	LOS C	3.6	28.8	0.33	0.59	33.7
Approach		1327	5.0	0.701	15.7	LOS C	3.9	30.6	0.34	0.56	36.1
East: Old Montreal Road											
1	L	45	5.0	0.232	13.4	LOS B	0.6	4.9	0.70	0.96	27.0
6	T	133	5.0	0.232	13.4	LOS B	0.6	4.9	0.70	0.82	26.8
16	R	163	5.0	0.353	13.7	LOS B	1.0	8.1	0.67	0.86	28.1
Approach		340	5.0	0.353	13.6	LOS B	1.0	8.1	0.68	0.86	27.4
North: Trim Road											
7	L	49	5.0	0.265	7.5	LOS A	0.8	6.0	0.38	0.91	37.7
4	T	346	5.0	0.265	7.5	LOS A	0.8	6.0	0.37	0.63	43.7
14	R	26	5.0	0.265	7.4	LOS A	0.7	5.7	0.36	0.69	41.5
Approach		421	5.0	0.265	7.5	LOS A	0.8	6.0	0.37	0.67	42.7
West: St. Joseph Boulevard											
5	L	18	5.0	0.028	5.2	LOS A	0.1	0.5	0.36	0.76	43.2
2	T	23	5.0	0.028	5.2	LOS A	0.1	0.5	0.36	0.53	47.6
12	R	45	5.0	0.057	5.2	LOS A	0.1	1.0	0.32	0.59	47.5
Approach		86	5.0	0.057	5.2	LOS A	0.1	1.0	0.34	0.61	46.5
All Vehicles		2174	5.0	0.701	13.3	LOS B	3.9	30.6	0.40	0.63	36.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2012 Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2012 Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	129.0	5.00	92.0	1.20	100.00	2.00
North	538.0	5.00	92.0	1.20	100.00	2.00
East	76.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	53.0	5.00	92.0	1.20	100.00	2.00
West	55.0	5.00	92.0	1.20	100.00	2.00
North	64.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	140.0	5.00	92.0	1.20	100.00	2.00
South	864.0	5.00	92.0	1.20	100.00	2.00
West	42.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	31.0	5.00	92.0	1.20	100.00	2.00
East	110.0	5.00	92.0	1.20	100.00	2.00
South	238.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

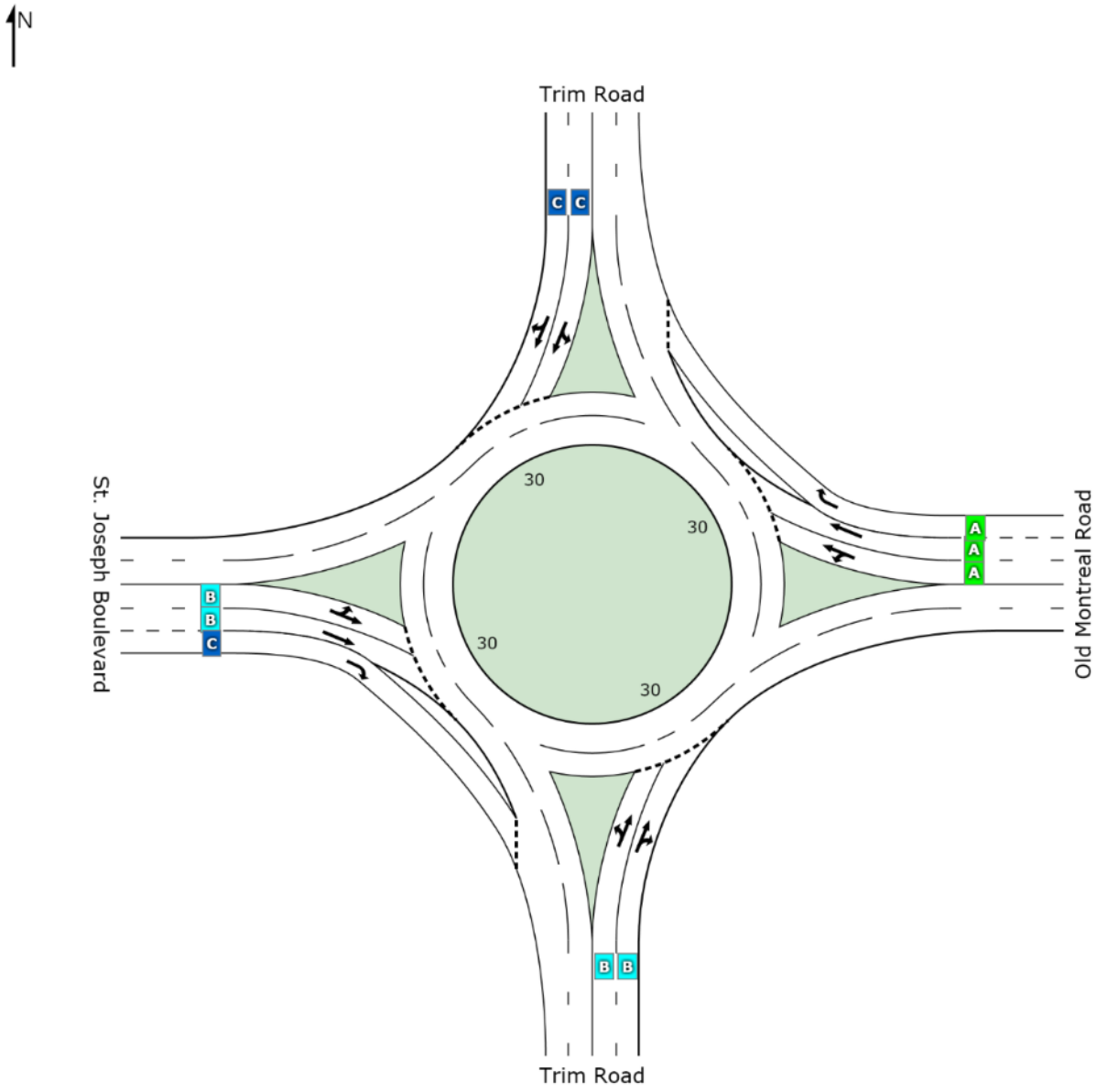
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2012 PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2012 Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	B	A	C	B	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2012 PM

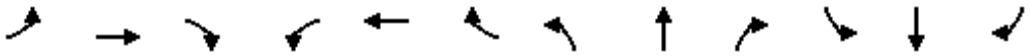
Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2012 Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	140	5.0	0.496	11.2	LOS B	1.9	15.2	0.45	0.91	41.0
8	T	585	5.0	0.496	11.2	LOS B	1.9	15.2	0.44	0.68	39.6
18	R	83	5.0	0.496	11.1	LOS B	1.8	14.4	0.43	0.73	37.7
Approach		808	5.0	0.496	11.2	LOS B	1.9	15.2	0.44	0.72	39.8
East: Old Montreal Road											
1	L	58	5.0	0.100	7.3	LOS A	0.3	2.0	0.48	0.85	30.8
6	T	60	5.0	0.100	7.3	LOS A	0.3	2.0	0.48	0.69	33.2
16	R	70	5.0	0.104	6.5	LOS A	0.3	2.0	0.42	0.70	35.3
Approach		187	5.0	0.104	7.0	LOS A	0.3	2.0	0.46	0.74	33.0
North: Trim Road											
7	L	152	5.0	0.675	16.1	LOS C	3.8	30.1	0.53	0.94	31.6
4	T	939	5.0	0.675	16.1	LOS C	3.8	30.1	0.52	0.72	35.4
14	R	46	5.0	0.675	16.0	LOS C	3.6	28.5	0.51	0.77	33.6
Approach		1137	5.0	0.675	16.1	LOS C	3.8	30.1	0.52	0.75	34.8
West: St. Joseph Boulevard											
5	L	34	5.0	0.176	10.9	LOS B	0.5	3.6	0.64	0.95	39.8
2	T	120	5.0	0.176	10.9	LOS B	0.5	3.6	0.64	0.78	42.2
12	R	259	5.0	0.500	16.2	LOS C	1.7	13.8	0.67	0.89	38.8
Approach		412	5.0	0.500	14.2	LOS B	1.7	13.8	0.66	0.86	39.8
All Vehicles		2543	5.0	0.675	13.6	LOS B	3.8	30.1	0.51	0.76	37.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

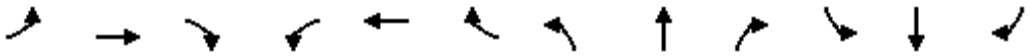
SIDRA INTERSECTION



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	31	18	20	236	0	129	1	5	0	3	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	34	20	22	257	0	140	1	5	0	3	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	257			53			356	346	43	352	355	257
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	257			53			356	346	43	352	355	257
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			76	100	99	100	99	99
cM capacity (veh/h)	1291			1533			578	564	1018	587	557	775

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	54	278	147	12
Volume Left	1	22	140	0
Volume Right	20	0	5	9
cSH	1291	1533	587	700
Volume to Capacity	0.00	0.01	0.25	0.02
Queue Length 95th (m)	0.0	0.3	6.9	0.4
Control Delay (s)	0.2	0.7	13.2	10.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.7	13.2	10.2
Approach LOS			B	B

Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	42.2%	ICU Level of Service	A	
Analysis Period (min)	15			

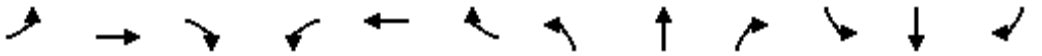


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	242	84	20	67	5	31	2	36	0	5	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	263	91	22	73	5	34	2	39	0	5	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	78			354			466	459	309	496	502	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	78			354			466	459	309	496	502	76
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			93	100	95	100	99	99
cM capacity (veh/h)	1501			1188			483	481	724	442	455	977

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	368	100	75	13
Volume Left	14	22	34	0
Volume Right	91	5	39	8
cSH	1501	1188	584	661
Volume to Capacity	0.01	0.02	0.13	0.02
Queue Length 95th (m)	0.2	0.4	3.1	0.4
Control Delay (s)	0.4	1.9	12.1	10.6
Lane LOS	A	A	B	B
Approach Delay (s)	0.4	1.9	12.1	10.6
Approach LOS			B	B

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	38.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Future (2021) Background Traffic



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	583	189	85	1204	9	1163	43	81	7	17	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		140.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999			0.902				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			205		1			88				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	16	634	205	92	1309	10	1264	47	88	8	18	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	634	205	92	1319	0	1264	135	0	8	18	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		17.4	43.4		17.4	17.4	17.4
Total Split (s)	12.2	50.6	0.0	19.0	57.4	0.0	53.0	53.0	0.0	17.4	17.4	17.4
Total Split (%)	8.7%	36.1%	0.0%	13.6%	41.0%	0.0%	37.9%	37.9%	0.0%	12.4%	12.4%	12.4%
Maximum Green (s)	5.0	43.6		11.8	50.5		45.6	45.6		10.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.0		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	6.9	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	5.0	37.1	132.7	10.8	50.6		45.7	59.8		10.0	10.0	10.0
Actuated g/C Ratio	0.04	0.28	1.00	0.08	0.38		0.34	0.45		0.08	0.08	0.08
v/c Ratio	0.26	0.69	0.14	0.69	1.05		1.15	0.10		0.06	0.14	0.08
Control Delay	74.7	47.0	0.2	85.2	79.7		117.4	10.3		61.0	62.2	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	74.7	47.0	0.2	85.2	79.7		117.4	10.3		61.0	62.2	30.9
LOS	E	D	A	F	E		F	B		E	E	C

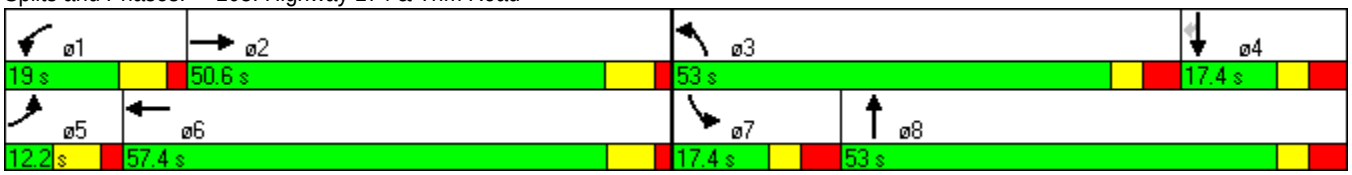
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		36.3			80.0			107.1			53.3	
Approach LOS		D			F			F			D	
Queue Length 50th (m)	3.7	72.6	0.0	20.9	~164.6		~172.3	2.8		1.8	4.0	0.0
Queue Length 95th (m)	11.3	91.4	0.0	#45.3	#242.2		#241.2	11.4		7.1	11.9	5.4
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		140.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	62	1084	1473	147	1255		1100	1388		125	131	120
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.26	0.58	0.14	0.63	1.05		1.15	0.10		0.06	0.14	0.08

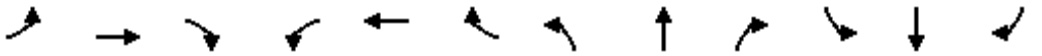
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 132.7			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.15			
Intersection Signal Delay: 79.9		Intersection LOS: E	
Intersection Capacity Utilization 99.2%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	583	189	85	1204	9	1163	43	81	7	17	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		140.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999			0.902				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			205		1			88				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	16	634	205	92	1309	10	1264	47	88	8	18	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	634	205	92	1319	0	1264	135	0	8	18	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		12.4	17.4		12.4	17.4	17.4
Total Split (s)	12.2	45.0	0.0	22.6	55.4	0.0	55.0	60.0	0.0	12.4	17.4	17.4
Total Split (%)	8.7%	32.1%	0.0%	16.1%	39.6%	0.0%	39.3%	42.9%	0.0%	8.9%	12.4%	12.4%
Maximum Green (s)	5.0	38.0		15.4	48.5		47.6	52.6		5.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.0		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	6.9	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	5.1	34.6	126.2	11.9	49.5		48.2	55.6		5.1	10.1	10.1
Actuated g/C Ratio	0.04	0.27	1.00	0.09	0.39		0.38	0.44		0.04	0.08	0.08
v/c Ratio	0.24	0.70	0.14	0.59	1.02		1.04	0.10		0.12	0.13	0.08
Control Delay	73.2	47.4	0.2	72.8	69.2		74.6	9.4		68.7	61.8	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	73.2	47.4	0.2	72.8	69.2		74.6	9.4		68.7	61.8	30.7
LOS	E	D	A	E	E		E	A		E	E	C

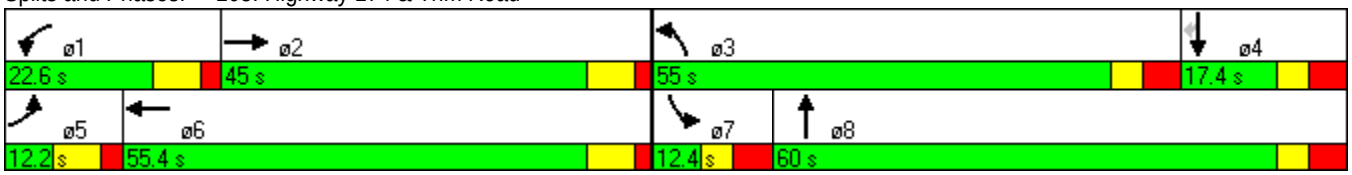
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		36.6			69.5			68.3			54.7	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	3.8	74.8	0.0	21.1	~174.7		~171.5	2.8		1.9	4.0	0.0
Queue Length 95th (m)	11.3	97.1	0.0	39.5	#249.0		#235.0	10.5		7.4	11.9	5.4
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		140.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	66	1004	1473	203	1291		1220	1410		66	139	128
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.24	0.63	0.14	0.45	1.02		1.04	0.10		0.12	0.13	0.08

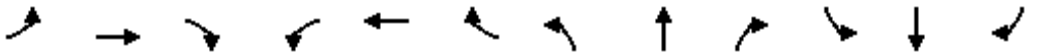
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 126.2			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 61.3		Intersection LOS: E	
Intersection Capacity Utilization 99.2%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road



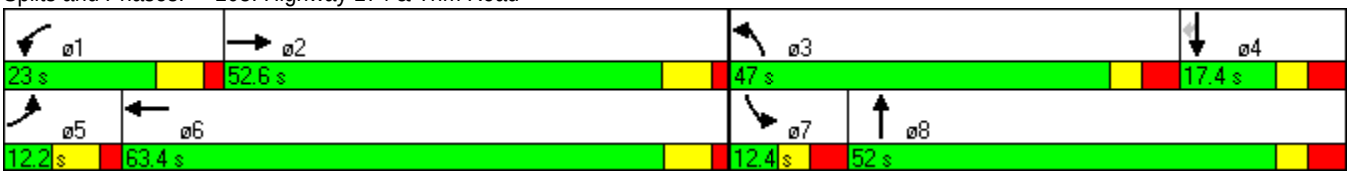


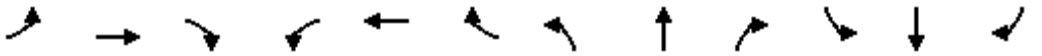
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	583	189	85	1204	9	1163	43	81	7	17	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.902				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	4644	1563	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	4644	1563	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			205		1			71				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	16	634	205	92	1309	10	1264	47	88	8	18	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	634	205	92	1319	0	1264	135	0	8	18	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		43.4	43.4		12.4	17.4	17.4
Total Split (s)	12.2	52.6	0.0	23.0	63.4	0.0	47.0	52.0	0.0	12.4	17.4	17.4
Total Split (%)	8.7%	37.6%	0.0%	16.4%	45.3%	0.0%	33.6%	37.1%	0.0%	8.9%	12.4%	12.4%
Maximum Green (s)	5.0	45.6		15.8	56.5		39.6	44.6		5.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.0		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	6.9	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0		11.0	11.0				
Flash Dont Walk (s)		18.0			18.0		25.0	25.0				
Pedestrian Calls (#/hr)		0			0		0	0				
Act Effct Green (s)	5.1	41.2	122.2	11.9	56.3		37.6	44.9		5.1	10.2	10.2
Actuated g/C Ratio	0.04	0.34	1.00	0.10	0.46		0.31	0.37		0.04	0.08	0.08
v/c Ratio	0.23	0.57	0.14	0.57	0.87		0.88	0.22		0.12	0.12	0.08
Control Delay	72.1	37.5	0.2	70.5	39.6		50.0	15.3		68.3	61.3	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.1	37.5	0.2	70.5	39.6		50.0	15.3		68.3	61.3	31.1
LOS	E	D	A	E	D		D	B		E	E	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		29.2			41.6			46.7			54.5	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	3.7	68.3	0.0	20.7	147.1		98.4	8.4		1.8	4.0	0.0
Queue Length 95th (m)	11.3	89.4	0.0	39.4	#222.0		#140.3	26.8		7.4	11.9	5.4
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	69	1259	1473	218	1556		1540	683		69	145	133
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.23	0.50	0.14	0.42	0.85		0.82	0.20		0.12	0.12	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 122.2			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 40.8		Intersection LOS: D	
Intersection Capacity Utilization 87.5%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1400	846	97	597	7	564	50	156	20	35	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.998			0.886				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			409		1			138				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	22	1522	920	105	649	8	613	54	170	22	38	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1522	920	105	657	0	613	224	0	22	38	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		17.4	43.4		12.4	17.4	17.4
Total Split (s)	13.6	68.0	0.0	16.2	70.6	0.0	35.3	43.4	0.0	12.4	20.5	20.5
Total Split (%)	9.7%	48.6%	0.0%	11.6%	50.4%	0.0%	25.2%	31.0%	0.0%	8.9%	14.6%	14.6%
Maximum Green (s)	6.4	61.0		9.0	63.6		27.9	36.0		5.0	13.1	13.1
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	6.2	61.0	137.2	9.0	69.1		27.9	38.2		5.0	10.3	10.3
Actuated g/C Ratio	0.05	0.44	1.00	0.07	0.50		0.20	0.28		0.04	0.08	0.08
v/c Ratio	0.30	1.04	0.62	0.97	0.40		0.94	0.25		0.37	0.29	0.02
Control Delay	73.9	71.8	2.0	142.9	23.0		77.8	16.6		81.8	66.1	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	73.9	71.8	2.0	142.9	23.0		77.8	16.6		81.8	66.1	40.5
LOS	E	E	A	F	C		E	B		F	E	D

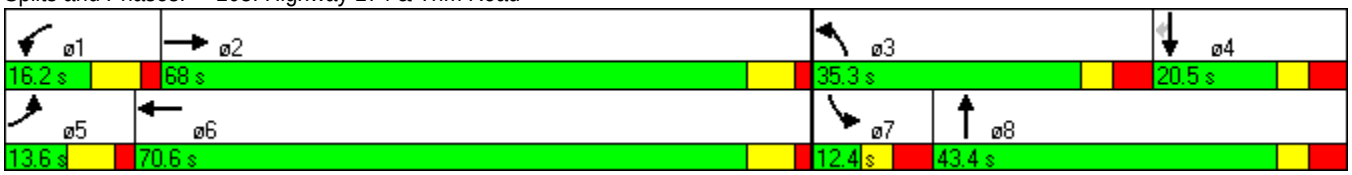
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		45.8			39.5			61.4			70.9	
Approach LOS		D			D			E			E	
Queue Length 50th (m)	5.4	~214.5	0.0	26.6	56.4		78.2	8.8		5.5	9.2	0.0
Queue Length 95th (m)	14.0	#258.2	0.0	#61.9	72.5		#112.3	18.9		14.1	20.0	2.6
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	77	1464	1473	108	1655		650	943		60	166	143
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.29	1.04	0.62	0.97	0.40		0.94	0.24		0.37	0.23	0.01

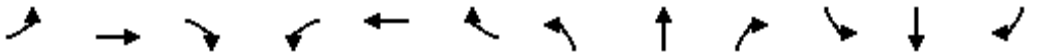
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 137.2			
Natural Cycle: 115			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 48.2		Intersection LOS: D	
Intersection Capacity Utilization 88.2%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1400	846	97	597	7	564	50	156	20	35	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.998			0.886				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			409		1			148				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	22	1522	920	105	649	8	613	54	170	22	38	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1522	920	105	657	0	613	224	0	22	38	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		12.4	17.4		12.4	17.4	17.4
Total Split (s)	13.6	71.9	0.0	16.7	75.0	0.0	34.0	37.6	0.0	13.8	17.4	17.4
Total Split (%)	9.7%	51.4%	0.0%	11.9%	53.6%	0.0%	24.3%	26.9%	0.0%	9.9%	12.4%	12.4%
Maximum Green (s)	6.4	64.9		9.5	68.0		26.6	30.2		6.4	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	6.2	65.1	136.5	9.5	73.9		26.7	32.2		6.2	10.0	10.0
Actuated g/C Ratio	0.05	0.48	1.00	0.07	0.54		0.20	0.24		0.05	0.07	0.07
v/c Ratio	0.29	0.97	0.62	0.91	0.37		0.98	0.28		0.29	0.30	0.02
Control Delay	75.0	52.1	2.0	126.0	20.5		86.7	16.8		75.0	68.3	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.0	52.1	2.0	126.0	20.5		86.7	16.8		75.0	68.3	42.0
LOS	E	D	A	F	C		F	B		E	E	D

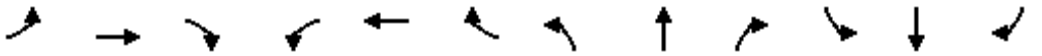
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		33.6			35.0			68.0			69.8	
Approach LOS		C			D			E			E	
Queue Length 50th (m)	5.5	200.2	0.0	27.2	55.3		~82.6	8.3		5.5	9.4	0.0
Queue Length 95th (m)	14.1	#250.2	0.0	#60.9	69.4		#118.5	18.7		14.1	20.2	2.7
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	77	1570	1473	115	1779		624	817		77	127	110
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.29	0.97	0.62	0.91	0.37		0.98	0.27		0.29	0.30	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 136.5			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 41.4		Intersection LOS: D	
Intersection Capacity Utilization 88.2%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1400	846	97	597	7	564	50	156	20	35	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.886				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3287	0	4644	1536	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3287	0	4644	1536	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			409		1			109				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	22	1522	920	105	649	8	613	54	170	22	38	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1522	920	105	657	0	613	224	0	22	38	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		17.4	43.4		12.4	17.4	17.4
Total Split (s)	13.6	68.0	0.0	16.2	70.6	0.0	33.0	43.4	0.0	12.4	22.8	22.8
Total Split (%)	9.7%	48.6%	0.0%	11.6%	50.4%	0.0%	23.6%	31.0%	0.0%	8.9%	16.3%	16.3%
Maximum Green (s)	6.4	61.0		9.0	63.6		25.6	36.0		5.0	15.4	15.4
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	6.2	61.5	127.5	9.1	70.0		21.5	28.1		5.0	10.3	10.3
Actuated g/C Ratio	0.05	0.48	1.00	0.07	0.55		0.17	0.22		0.04	0.08	0.08
v/c Ratio	0.28	0.96	0.62	0.90	0.36		0.78	0.53		0.34	0.27	0.02
Control Delay	70.5	48.1	2.0	119.1	19.7		58.8	27.2		76.9	63.3	39.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	70.5	48.1	2.0	119.1	19.7		58.8	27.2		76.9	63.3	39.5
LOS	E	D	A	F	B		E	C		E	E	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		31.1			33.4			50.4			67.3	
Approach LOS		C			C			D			E	
Queue Length 50th (m)	5.2	186.6	0.0	25.4	51.8		50.1	24.2		5.2	8.7	0.0
Queue Length 95th (m)	13.9	#250.9	0.0	#60.9	70.2		63.4	48.1		14.1	19.6	2.6
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	83	1588	1473	117	1805		940	519		65	211	181
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.27	0.96	0.62	0.90	0.36		0.65	0.43		0.34	0.18	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 127.5			
Natural Cycle: 115			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 36.0		Intersection LOS: D	
Intersection Capacity Utilization 82.5%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road

INPUT REPORT

Trim Road/ Ottawa Road 174 Roundabout
2021 Background Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ Ottawa Road 174 Roundabout 2021 Background Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Ottawa Road 174	Two-way	3	2	10.00	0.0
North	North Service Road	Two-way	2	2	5.00	0.0
West	Ottawa Road 174	Two-way	3	2	10.00	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None
North	North Service Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	North Service Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**North Service Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**North Service Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**Ottawa Road 174**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	North Service Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Ottawa Road 174	3.50	20.0	–	No
North	North Service Road	4.00	20.0	–	No
West	Ottawa Road 174	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	1163.0	5.00	92.0	1.20	100.00	2.00
North	43.0	5.00	92.0	1.20	100.00	2.00
East	81.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	85.0	5.00	92.0	1.20	100.00	2.00
West	1204.0	5.00	92.0	1.20	100.00	2.00
North	9.0	5.00	92.0	1.20	100.00	2.00
From: North	North Service Road					
East	7.0	5.00	92.0	1.20	100.00	2.00
South	17.0	5.00	92.0	1.20	100.00	2.00
West	9.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
North	15.0	5.00	92.0	1.20	100.00	2.00
East	583.0	5.00	92.0	1.20	100.00	2.00
South	189.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	North Service Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	Ottawa Road 174						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*
North	North Service Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Ottawa Road 174								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
North	North Service Road				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
West	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	North Service Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

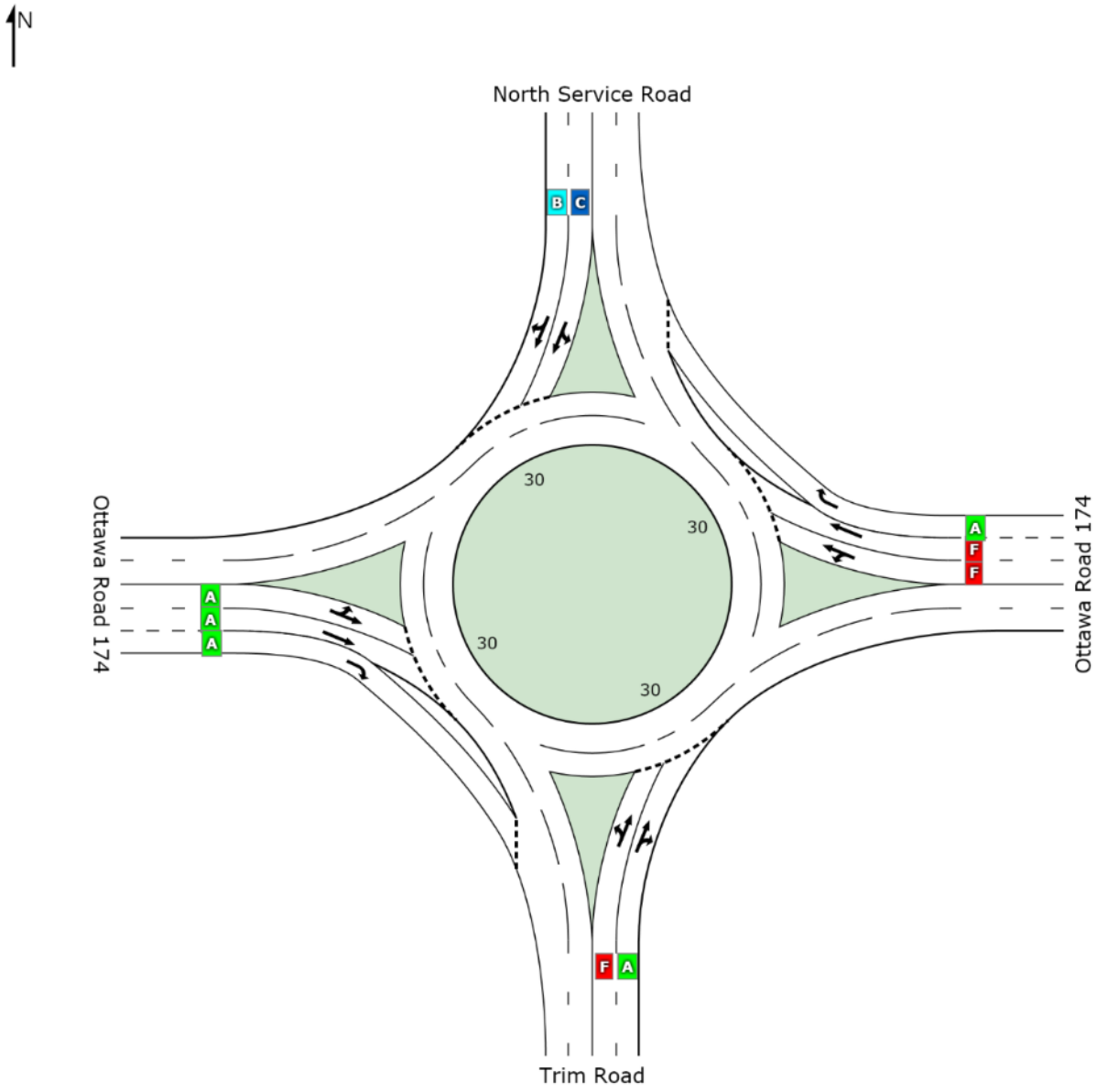
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-OR174 Roundabout - 2021 BK AM

Trim Road/ Ottawa Road 174 Roundabout
2021 Background Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	F	F	C	A	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-OR174 Roundabout - 2021 BK AM

Trim Road/ Ottawa Road 174 Roundabout
2021 Background Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	1264	5.0	1.945	446.7	LOS F	204.0	1615.3	1.00	6.89	4.8
8	T	47	5.0	0.215	8.4	LOS A	0.6	4.6	0.49	0.72	42.4
18	R	88	5.0	0.215	8.4	LOS A	0.6	4.6	0.49	0.77	40.3
Approach		1399	5.0	1.945	404.5	LOS F	204.0	1615.3	0.95	6.30	5.1
East: Ottawa Road 174											
1	L	92	5.0	1.138	105.4	LOS F	36.5	288.7	1.00	2.84	8.7
6	T	1309	5.0	1.138	104.8	LOS F	37.2	294.9	1.00	2.86	7.0
16	R	10	5.0	0.010	3.8	LOS A	0.0	0.2	0.11	0.48	39.2
Approach		1411	5.0	1.138	104.1	LOS F	37.2	294.9	0.99	2.85	7.2
North: North Service Road											
7	L	8	5.0	0.070	16.2	LOS C	0.2	1.3	0.78	0.97	31.7
4	T	18	5.0	0.070	15.4	LOS C	0.2	1.3	0.77	0.88	35.5
14	R	10	5.0	0.070	14.7	LOS B	0.2	1.3	0.76	0.89	34.5
Approach		36	5.0	0.070	15.4	LOS C	0.2	1.3	0.77	0.90	34.4
West: Ottawa Road 174											
5	L	16	5.0	0.347	7.6	LOS A	1.1	8.8	0.23	0.89	41.8
2	T	634	5.0	0.347	7.6	LOS A	1.1	8.8	0.22	0.44	45.2
12	R	205	5.0	0.218	6.0	LOS A	0.6	4.5	0.18	0.50	46.8
Approach		855	5.0	0.347	7.2	LOS A	1.1	8.8	0.21	0.46	45.5
All Vehicles		3701	5.0	1.945	194.4	LOS F	204.0	1615.3	0.79	3.58	7.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Trim Road/ Ottawa Road 174 Roundabout
2021 Background Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ Ottawa Road 174 Roundabout 2021 Background Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Ottawa Road 174	Two-way	3	2	10.00	0.0
North	North Service Road	Two-way	2	2	5.00	0.0
West	Ottawa Road 174	Two-way	3	2	10.00	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None
North	North Service Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	North Service Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**North Service Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**North Service Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**Ottawa Road 174**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	North Service Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Ottawa Road 174	3.50	20.0	–	No
North	North Service Road	4.00	20.0	–	No
West	Ottawa Road 174	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	564.0	5.00	92.0	1.20	100.00	2.00
North	50.0	5.00	92.0	1.20	100.00	2.00
East	156.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	103.0	5.00	92.0	1.20	100.00	2.00
West	597.0	5.00	92.0	1.20	100.00	2.00
North	7.0	5.00	92.0	1.20	100.00	2.00
From: North	North Service Road					
East	20.0	5.00	92.0	1.20	100.00	2.00
South	37.0	5.00	92.0	1.20	100.00	2.00
West	2.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
North	20.0	5.00	92.0	1.20	100.00	2.00
East	1400.0	5.00	92.0	1.20	100.00	2.00
South	904.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	North Service Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	Ottawa Road 174						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*
North	North Service Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Ottawa Road 174								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
North	North Service Road				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
West	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	North Service Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

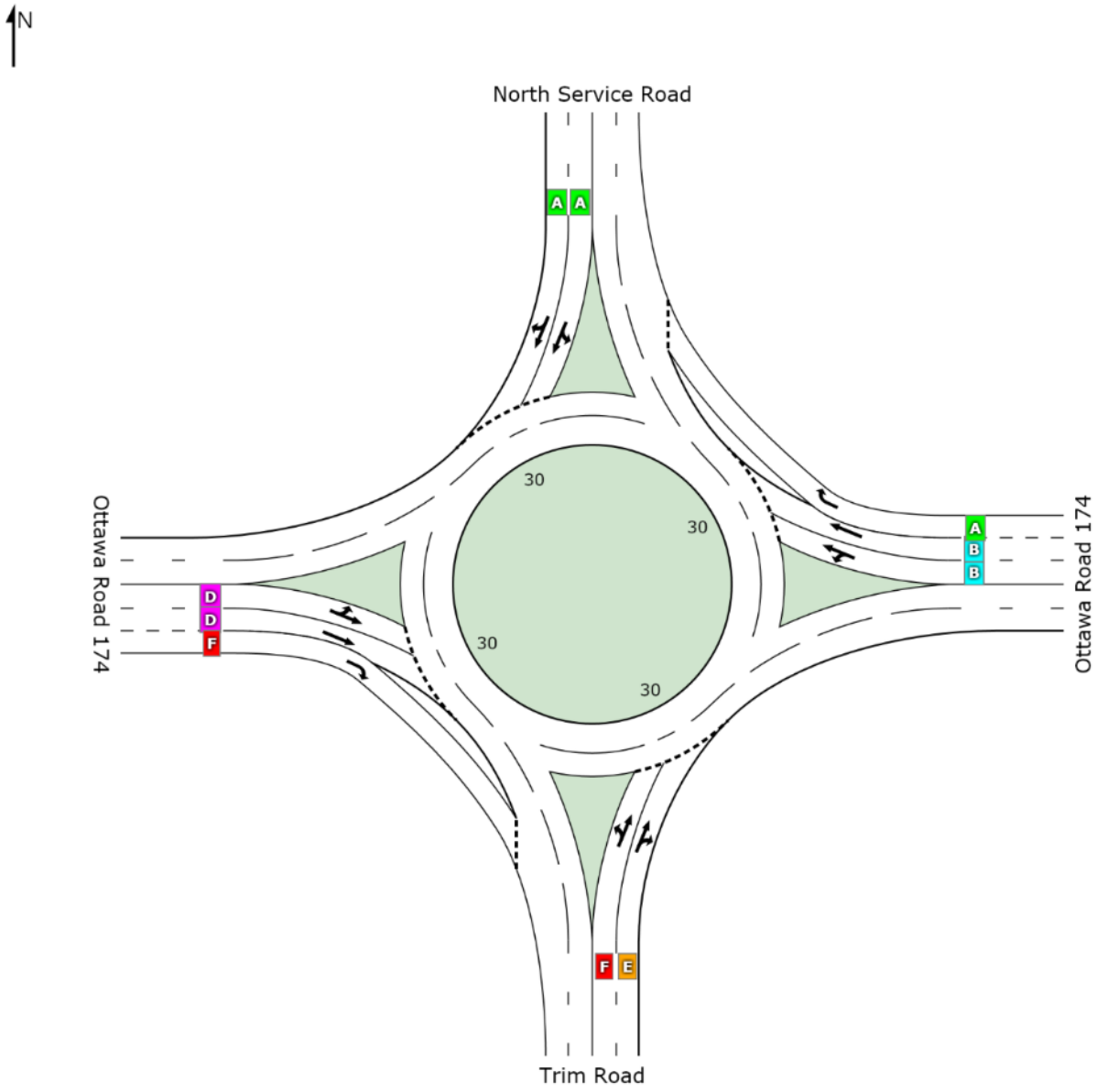
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-OR174 Roundabout - 2021 BK PM

Trim Road/ Ottawa Road 174 Roundabout
2021 Background Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	F	B	A	E	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Trim Road/ Ottawa Road 174 Roundabout
2021 Background Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	613	5.0	1.800	397.9	LOS F	91.8	726.7	1.00	4.89	5.3
8	T	54	5.0	0.714	39.1	LOS E	2.8	22.1	0.88	1.07	23.3
18	R	170	5.0	0.714	39.1	LOS E	2.8	22.1	0.88	1.08	21.8
Approach		837	5.0	1.800	301.9	LOS F	91.8	726.7	0.97	3.87	6.2
East: Ottawa Road 174											
1	L	112	5.0	0.505	12.2	LOS B	2.0	15.8	0.51	0.98	27.8
6	T	649	5.0	0.505	12.1	LOS B	2.0	15.8	0.50	0.72	28.0
16	R	8	5.0	0.008	3.8	LOS A	0.0	0.1	0.12	0.48	39.1
Approach		768	5.0	0.505	12.0	LOS B	2.0	15.8	0.50	0.75	28.1
North: North Service Road											
7	L	22	5.0	0.069	8.9	LOS A	0.2	1.4	0.60	0.92	36.4
4	T	40	5.0	0.069	8.5	LOS A	0.2	1.4	0.58	0.78	42.3
14	R	2	5.0	0.069	8.4	LOS A	0.2	1.3	0.57	0.82	40.7
Approach		64	5.0	0.069	8.6	LOS A	0.2	1.4	0.58	0.83	40.0
West: Ottawa Road 174											
5	L	22	5.0	0.868	28.4	LOS D	9.1	71.9	0.67	0.94	31.4
2	T	1522	5.0	0.868	28.4	LOS D	9.1	71.9	0.67	0.75	31.7
12	R	983	5.0	1.079	74.2	LOS F	50.7	401.8	1.00	1.61	19.7
Approach		2526	5.0	1.079	46.2	LOS E	50.7	401.8	0.80	1.08	25.5
All Vehicles		4196	5.0	1.800	90.4	LOS F	91.8	726.7	0.78	1.57	15.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2021 Background Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	102.0	5.00	92.0	1.20	100.00	2.00
North	1262.0	5.00	92.0	1.20	100.00	2.00
East	19.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	10.0	5.00	92.0	1.20	100.00	2.00
West	2.0	5.00	92.0	1.20	100.00	2.00
North	2.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	80.0	5.00	92.0	1.20	100.00	2.00
South	149.0	5.00	92.0	1.20	100.00	2.00
West	63.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	23.0	5.00	92.0	1.20	100.00	2.00
East	3.0	5.00	92.0	1.20	100.00	2.00
South	37.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

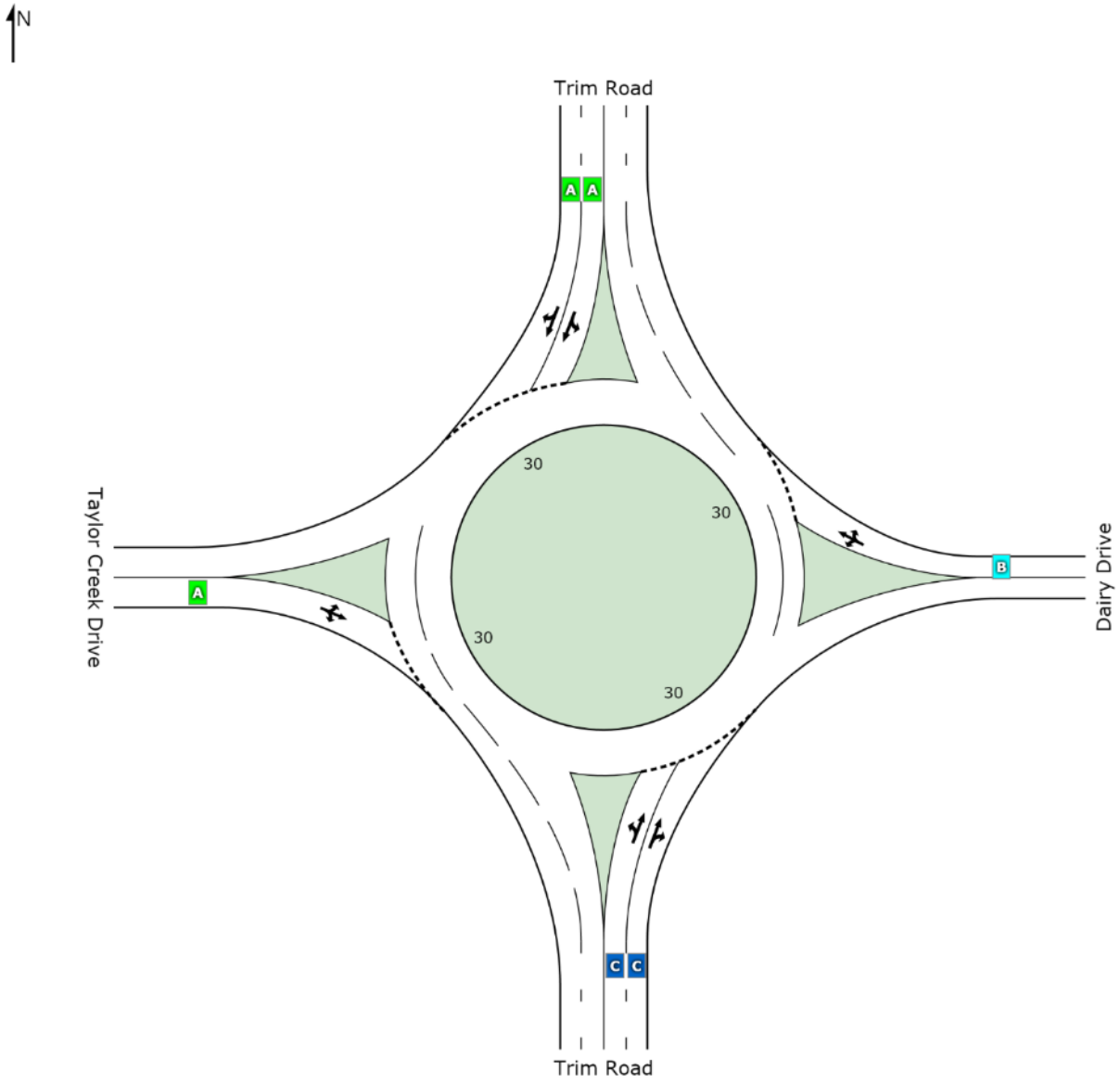
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	B	A	A	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	111	5.0	0.835	24.7	LOS C	9.1	72.4	0.66	0.81	26.4
8	T	1372	5.0	0.835	24.7	LOS C	9.1	72.4	0.66	0.64	29.7
18	R	21	5.0	0.835	24.7	LOS C	9.1	72.4	0.66	0.69	27.0
Approach		1503	5.0	0.835	24.7	LOS C	9.1	72.4	0.66	0.66	29.4
East: Dairy Drive											
1	L	11	5.0	0.043	10.8	LOS B	0.1	0.8	0.68	0.92	36.5
6	T	2	5.0	0.043	10.8	LOS B	0.1	0.8	0.68	0.74	37.1
16	R	2	5.0	0.043	10.8	LOS B	0.1	0.8	0.68	0.81	38.5
Approach		15	5.0	0.043	10.8	LOS B	0.1	0.8	0.68	0.88	36.9
North: Trim Road											
7	L	87	5.0	0.178	5.8	LOS A	0.6	4.9	0.27	0.77	40.8
4	T	162	5.0	0.178	5.8	LOS A	0.6	4.9	0.27	0.49	48.1
14	R	68	5.0	0.178	5.8	LOS A	0.6	4.9	0.27	0.58	45.3
Approach		317	5.0	0.178	5.8	LOS A	0.6	4.9	0.27	0.59	45.3
West: Taylor Creek Drive											
5	L	25	5.0	0.078	4.8	LOS A	0.2	1.5	0.27	0.78	40.0
2	T	3	5.0	0.078	4.8	LOS A	0.2	1.5	0.27	0.35	42.4
12	R	40	5.0	0.078	4.8	LOS A	0.2	1.5	0.27	0.51	43.0
Approach		68	5.0	0.078	4.8	LOS A	0.2	1.5	0.27	0.60	41.8
All Vehicles		1904	5.0	0.835	20.7	LOS C	9.1	72.4	0.58	0.64	32.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2021 Background Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	41.0	5.00	92.0	1.20	100.00	2.00
North	724.0	5.00	92.0	1.20	100.00	2.00
East	16.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	104.0	5.00	92.0	1.20	100.00	2.00
West	11.0	5.00	92.0	1.20	100.00	2.00
North	15.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	22.0	5.00	92.0	1.20	100.00	2.00
South	987.0	5.00	92.0	1.20	100.00	2.00
West	36.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	31.0	5.00	92.0	1.20	100.00	2.00
East	2.0	5.00	92.0	1.20	100.00	2.00
South	72.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

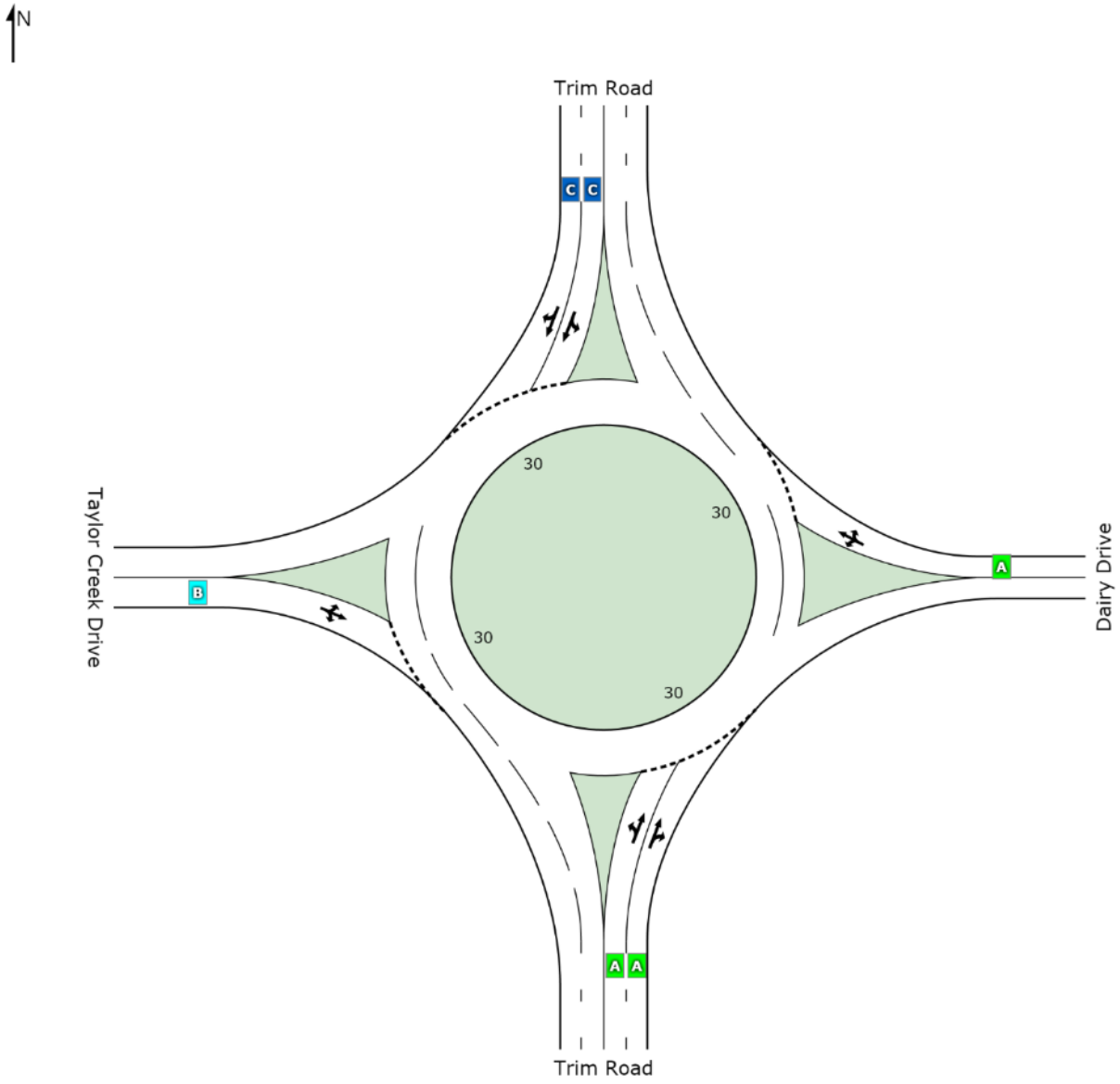
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	A	A	C	B	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	45	5.0	0.446	9.0	LOS A	2.2	17.0	0.24	0.88	35.4
8	T	787	5.0	0.446	9.0	LOS A	2.2	17.0	0.24	0.48	42.0
18	R	17	5.0	0.446	9.0	LOS A	2.2	17.0	0.24	0.58	38.5
Approach		849	5.0	0.446	9.0	LOS A	2.2	17.0	0.24	0.50	41.6
East: Dairy Drive											
1	L	113	5.0	0.248	9.6	LOS A	0.7	5.2	0.54	0.88	37.1
6	T	12	5.0	0.248	9.6	LOS A	0.7	5.2	0.54	0.63	38.0
16	R	16	5.0	0.248	9.6	LOS A	0.7	5.2	0.54	0.72	39.3
Approach		141	5.0	0.248	9.6	LOS A	0.7	5.2	0.54	0.84	37.4
North: Trim Road											
7	L	24	5.0	0.666	15.5	LOS C	4.5	35.7	0.55	0.90	34.1
4	T	1073	5.0	0.666	15.5	LOS C	4.5	35.7	0.55	0.66	38.6
14	R	39	5.0	0.666	15.5	LOS C	4.5	35.7	0.55	0.71	36.0
Approach		1136	5.0	0.666	15.5	LOS C	4.5	35.7	0.55	0.66	38.4
West: Taylor Creek Drive											
5	L	34	5.0	0.258	12.2	LOS B	0.7	5.4	0.66	0.95	35.9
2	T	2	5.0	0.258	12.2	LOS B	0.7	5.4	0.66	0.74	36.4
12	R	78	5.0	0.258	12.2	LOS B	0.7	5.4	0.66	0.82	37.7
Approach		114	5.0	0.258	12.2	LOS B	0.7	5.4	0.66	0.85	37.1
All Vehicles		2240	5.0	0.666	12.5	LOS B	4.5	35.7	0.44	0.62	39.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2021 Background Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	138.0	5.00	92.0	1.20	100.00	2.00
North	1067.0	5.00	92.0	1.20	100.00	2.00
East	25.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	72.0	5.00	92.0	1.20	100.00	2.00
West	214.0	5.00	92.0	1.20	100.00	2.00
North	298.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	22.0	5.00	92.0	1.20	100.00	2.00
South	161.0	5.00	92.0	1.20	100.00	2.00
West	12.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	19.0	5.00	92.0	1.20	100.00	2.00
East	21.0	5.00	92.0	1.20	100.00	2.00
South	41.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

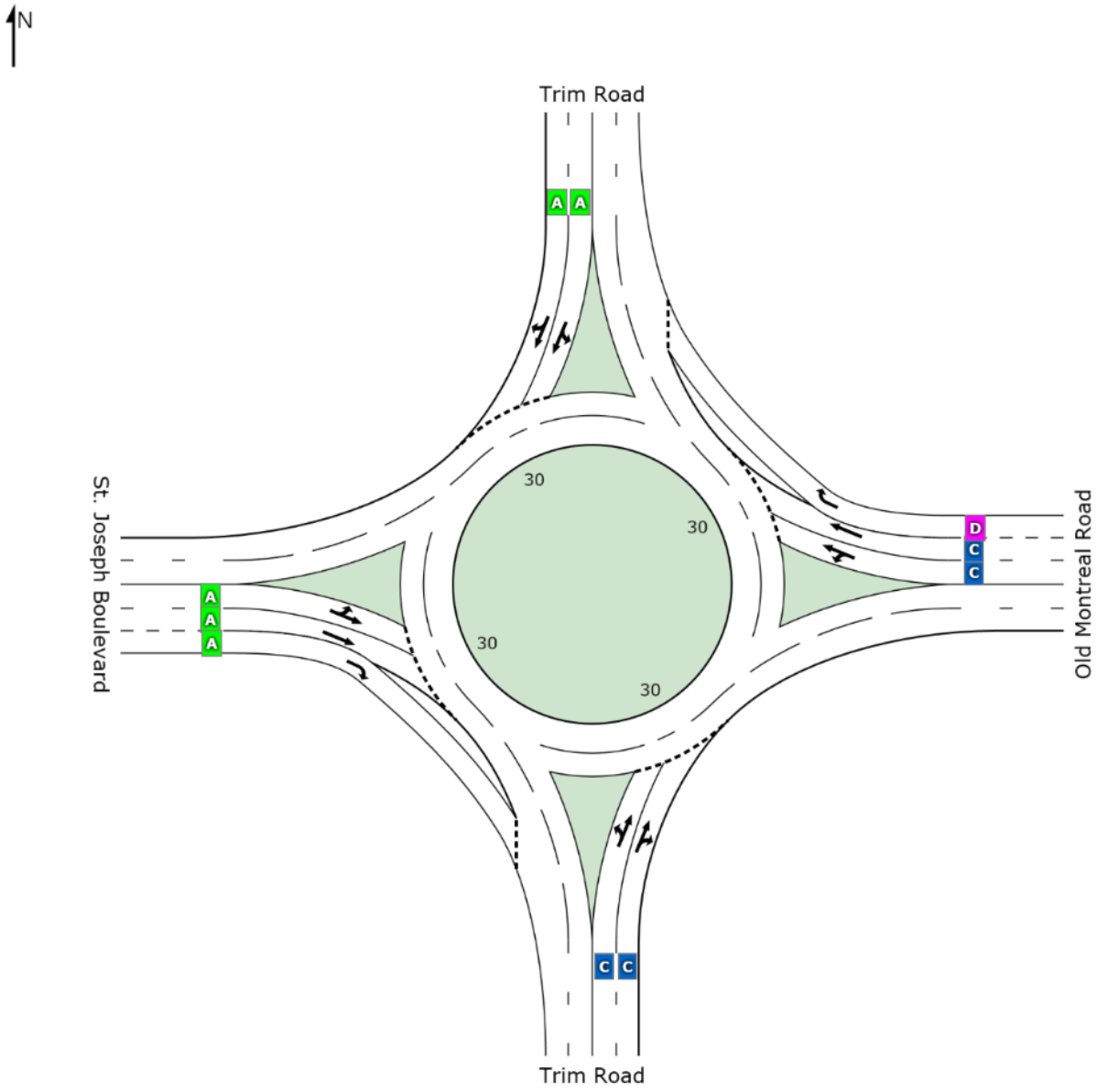
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	C	A	A	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	150	5.0	0.694	15.3	LOS C	3.9	30.6	0.30	0.81	38.3
8	T	1160	5.0	0.694	15.2	LOS C	3.9	30.6	0.29	0.50	36.1
18	R	27	5.0	0.694	15.2	LOS C	3.6	28.7	0.28	0.57	34.0
Approach		1337	5.0	0.694	15.2	LOS C	3.9	30.6	0.29	0.53	36.4
East: Old Montreal Road											
1	L	78	5.0	0.412	18.1	LOS C	1.3	10.1	0.75	1.01	24.3
6	T	233	5.0	0.412	18.1	LOS C	1.3	10.1	0.75	0.90	23.4
16	R	324	5.0	0.717	29.2	LOS D	3.1	24.7	0.81	1.04	19.4
Approach		635	5.0	0.717	23.8	LOS C	3.1	24.7	0.78	0.98	21.3
North: Trim Road											
7	L	24	5.0	0.145	6.6	LOS A	0.4	3.0	0.40	0.93	38.6
4	T	175	5.0	0.145	6.5	LOS A	0.4	3.0	0.39	0.65	44.9
14	R	13	5.0	0.145	6.4	LOS A	0.4	2.8	0.38	0.71	42.8
Approach		212	5.0	0.145	6.5	LOS A	0.4	3.0	0.39	0.69	43.9
West: St. Joseph Boulevard											
5	L	21	5.0	0.026	4.6	LOS A	0.1	0.5	0.28	0.71	43.6
2	T	23	5.0	0.026	4.6	LOS A	0.1	0.5	0.28	0.47	48.2
12	R	45	5.0	0.052	4.7	LOS A	0.1	0.9	0.26	0.54	48.0
Approach		88	5.0	0.052	4.7	LOS A	0.1	0.9	0.27	0.56	46.9
All Vehicles		2272	5.0	0.717	16.4	LOS C	3.9	30.6	0.44	0.67	33.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2021 Background Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	105.0	5.00	92.0	1.20	100.00	2.00
North	602.0	5.00	92.0	1.20	100.00	2.00
East	62.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	84.0	5.00	92.0	1.20	100.00	2.00
West	87.0	5.00	92.0	1.20	100.00	2.00
North	139.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	154.0	5.00	92.0	1.20	100.00	2.00
South	962.0	5.00	92.0	1.20	100.00	2.00
West	46.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	39.0	5.00	92.0	1.20	100.00	2.00
East	101.0	5.00	92.0	1.20	100.00	2.00
South	218.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

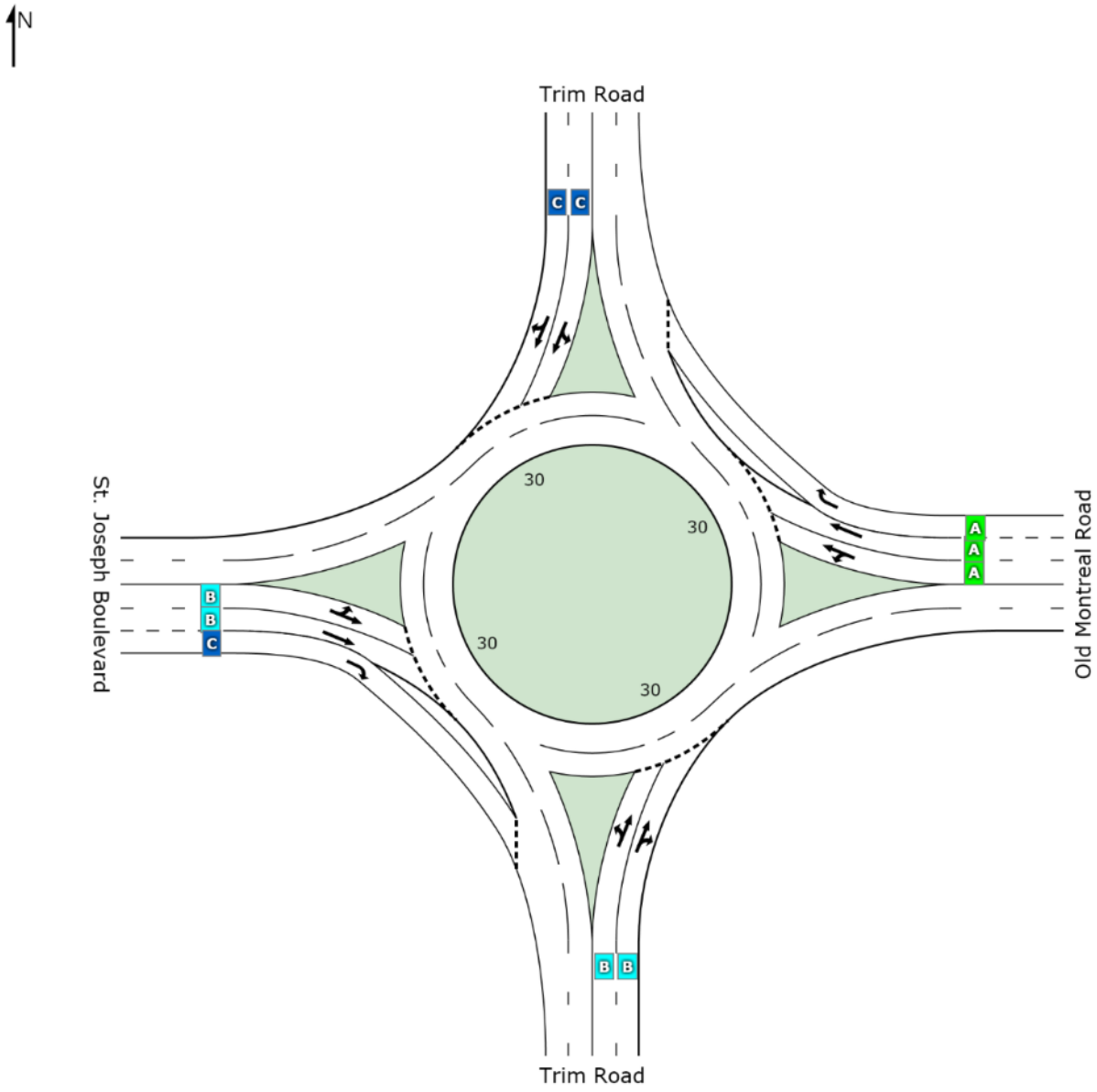
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	B	A	C	C	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK - PM

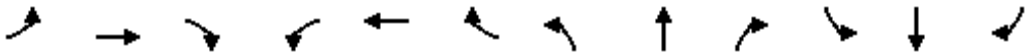
Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	114	5.0	0.518	11.8	LOS B	2.1	16.6	0.47	0.94	40.7
8	T	654	5.0	0.518	11.8	LOS B	2.1	16.6	0.46	0.70	39.1
18	R	67	5.0	0.518	11.7	LOS B	2.0	15.8	0.45	0.75	37.1
Approach		836	5.0	0.518	11.8	LOS B	2.1	16.6	0.46	0.74	39.2
East: Old Montreal Road											
1	L	91	5.0	0.165	8.5	LOS A	0.4	3.5	0.51	0.86	29.9
6	T	95	5.0	0.165	8.5	LOS A	0.4	3.5	0.51	0.71	31.9
16	R	151	5.0	0.238	8.6	LOS A	0.6	5.0	0.48	0.74	32.8
Approach		337	5.0	0.238	8.5	LOS A	0.6	5.0	0.50	0.76	31.6
North: Trim Road											
7	L	167	5.0	0.773	21.7	LOS C	5.5	43.8	0.65	1.01	28.7
4	T	1046	5.0	0.773	21.5	LOS C	5.5	43.8	0.63	0.85	31.6
14	R	50	5.0	0.773	21.4	LOS C	5.2	41.5	0.62	0.88	29.9
Approach		1263	5.0	0.773	21.5	LOS C	5.5	43.8	0.63	0.87	31.1
West: St. Joseph Boulevard											
5	L	42	5.0	0.197	12.6	LOS B	0.5	4.1	0.69	0.95	38.6
2	T	110	5.0	0.197	12.6	LOS B	0.5	4.1	0.69	0.81	40.8
12	R	237	5.0	0.508	17.9	LOS C	1.7	13.7	0.72	0.92	37.7
Approach		389	5.0	0.508	15.9	LOS C	1.7	13.7	0.71	0.89	38.6
All Vehicles		2825	5.0	0.773	16.3	LOS C	5.5	43.8	0.58	0.82	34.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	43	25	20	369	1	202	1	5	1	3	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	47	27	22	401	1	220	1	5	1	3	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	402			74			523	508	60	514	521	402
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	402			74			523	508	60	514	521	402
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	100			99			68	100	100	100	100	98
cM capacity (veh/h)	1140			1507			693	716	1132	710	706	808

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	424	226	18
Volume Left	1	22	220	1
Volume Right	27	1	5	14
cSH	1140	1507	699	782
Volume to Capacity	0.00	0.01	0.32	0.02
Queue Length 95th (m)	0.0	0.3	9.8	0.5
Control Delay (s)	0.1	0.5	12.6	9.7
Lane LOS	A	A	B	A
Approach Delay (s)	0.1	0.5	12.6	9.7
Approach LOS			B	A

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	53.9%	ICU Level of Service	A	
Analysis Period (min)	15			

* User Entered Value

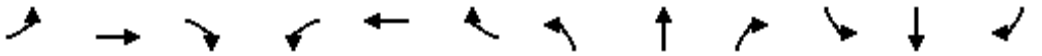
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	191	111	20	196	1	107	1	5	0	3	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	208	121	22	213	1	116	1	5	0	3	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	214			328			547	539	268	544	598	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			328			547	539	268	544	598	214
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	7.1	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	3.5	*3.0	*3.0
p0 queue free %	100			98			83	100	99	100	99	99
cM capacity (veh/h)	1338			1215			679	689	923	434	649	974

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	335	236	123	11
Volume Left	7	22	116	0
Volume Right	121	1	5	8
cSH	1338	1215	687	846
Volume to Capacity	0.00	0.02	0.18	0.01
Queue Length 95th (m)	0.1	0.4	4.5	0.3
Control Delay (s)	0.2	0.9	11.4	9.3
Lane LOS	A	A	B	A
Approach Delay (s)	0.2	0.9	11.4	9.3
Approach LOS			B	A

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Future (2031) Background Traffic



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	671	271	100	1202	9	1384	51	97	7	20	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999			0.902				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			295		1			105				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	21	729	295	109	1307	10	1504	55	105	8	22	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	729	295	109	1317	0	1504	160	0	8	22	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	17.2	32.1		17.2	32.0		17.4	43.4		17.4	17.4	17.4
Total Split (s)	19.2	38.2	0.0	25.8	44.8	0.0	43.0	46.0	0.0	20.0	23.0	23.0
Total Split (%)	14.8%	29.4%	0.0%	19.8%	34.5%	0.0%	33.1%	35.4%	0.0%	15.4%	17.7%	17.7%
Maximum Green (s)	12.0	31.2		18.6	37.8		35.6	38.6		12.6	15.6	15.6
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	10.0	30.3	118.6	13.6	44.5		35.6	49.8		10.0	10.0	10.0
Actuated g/C Ratio	0.08	0.26	1.00	0.11	0.38		0.30	0.42		0.08	0.08	0.08
v/c Ratio	0.15	0.86	0.20	0.58	1.07		1.57	0.12		0.06	0.15	0.07
Control Delay	55.1	54.3	0.3	62.7	81.5		290.6	10.2		53.3	54.9	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	55.1	54.3	0.3	62.7	81.5		290.6	10.2		53.3	54.9	27.6
LOS	E	D	A	E	F		F	B		D	D	C

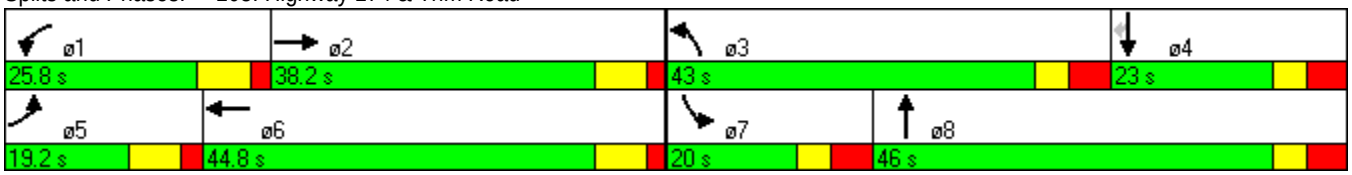
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		39.1			80.0			263.7			47.7	
Approach LOS		D			F			F			D	
Queue Length 50th (m)	4.3	78.4	0.0	22.6	138.0		~236.9	3.4		1.6	4.5	0.0
Queue Length 95th (m)	12.2	#112.9	0.0	39.5	#235.1		#290.9	12.4		6.4	12.7	5.2
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	167	874	1473	258	1235		960	1321		175	228	203
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.13	0.83	0.20	0.42	1.07		1.57	0.12		0.05	0.10	0.05

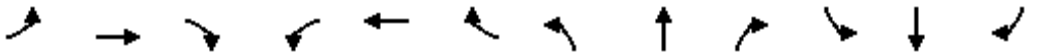
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 118.6			
Natural Cycle: 115			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.57			
Intersection Signal Delay: 142.7		Intersection LOS: F	
Intersection Capacity Utilization 110.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road



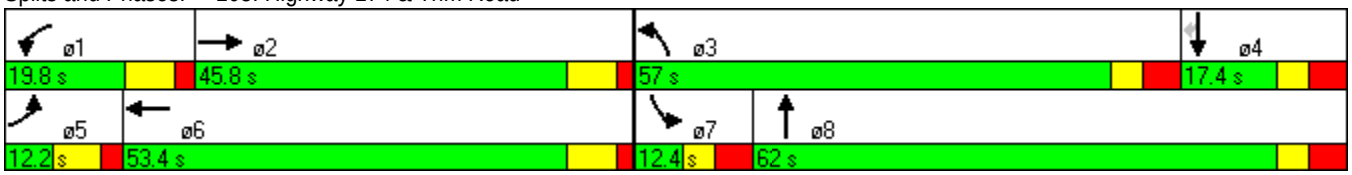


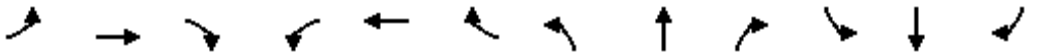
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	671	271	100	1202	9	1384	51	97	7	20	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999			0.902				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	3195	2971	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			274		1			105				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	21	729	295	109	1307	10	1504	55	105	8	22	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	729	295	109	1317	0	1504	160	0	8	22	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		12.4	17.4		12.4	17.4	17.4
Total Split (s)	12.2	45.8	0.0	19.8	53.4	0.0	57.0	62.0	0.0	12.4	17.4	17.4
Total Split (%)	8.7%	32.7%	0.0%	14.1%	38.1%	0.0%	40.7%	44.3%	0.0%	8.9%	12.4%	12.4%
Maximum Green (s)	5.0	38.8		12.6	46.4		49.6	54.6		5.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	5.1	35.1	128.4	11.6	47.3		50.2	57.5		5.1	10.1	10.1
Actuated g/C Ratio	0.04	0.27	1.00	0.09	0.37		0.39	0.45		0.04	0.08	0.08
v/c Ratio	0.32	0.81	0.20	0.73	1.09		1.20	0.12		0.12	0.16	0.08
Control Delay	78.3	52.5	0.3	86.5	91.5		134.7	8.9		69.7	63.2	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	78.3	52.5	0.3	86.5	91.5		134.7	8.9		69.7	63.2	30.8
LOS	E	D	A	F	F		F	A		E	E	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		38.3			91.2			122.6			56.4	
Approach LOS		D			F			F			E	
Queue Length 50th (m)	5.3	91.2	0.0	27.6	~215.6		~255.8	3.8		2.0	5.4	0.0
Queue Length 95th (m)	13.7	113.2	0.0	#53.9	#255.4		#294.2	11.4		7.4	13.7	5.4
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	65	1008	1473	164	1213		1250	1441		65	137	126
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.32	0.72	0.20	0.66	1.09		1.20	0.11		0.12	0.16	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 128.4			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.20			
Intersection Signal Delay: 90.1		Intersection LOS: F	
Intersection Capacity Utilization 105.9%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	671	271	100	1202	9	1384	51	97	7	20	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.902				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	4644	1563	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	4644	1563	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			274		1			74				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	21	729	295	109	1307	10	1504	55	105	8	22	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	729	295	109	1317	0	1504	160	0	8	22	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		43.4	43.4		12.4	17.4	17.4
Total Split (s)	12.3	52.4	0.0	20.1	60.2	0.0	50.1	55.1	0.0	12.4	17.4	17.4
Total Split (%)	8.8%	37.4%	0.0%	14.4%	43.0%	0.0%	35.8%	39.4%	0.0%	8.9%	12.4%	12.4%
Maximum Green (s)	5.1	45.4		12.9	53.2		42.7	47.7		5.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0		11.0	11.0				
Flash Dont Walk (s)		18.0			18.0		25.0	25.0				
Pedestrian Calls (#/hr)		0			0		0	0				
Act Effct Green (s)	5.2	41.7	128.1	11.7	53.9		43.3	50.6		5.1	10.1	10.1
Actuated g/C Ratio	0.04	0.33	1.00	0.09	0.42		0.34	0.40		0.04	0.08	0.08
v/c Ratio	0.32	0.68	0.20	0.73	0.95		0.96	0.24		0.12	0.16	0.08
Control Delay	77.6	42.1	0.3	85.6	52.5		57.5	16.0		69.7	63.1	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	77.6	42.1	0.3	85.6	52.5		57.5	16.0		69.7	63.1	30.8
LOS	E	D	A	F	D		E	B		E	E	C

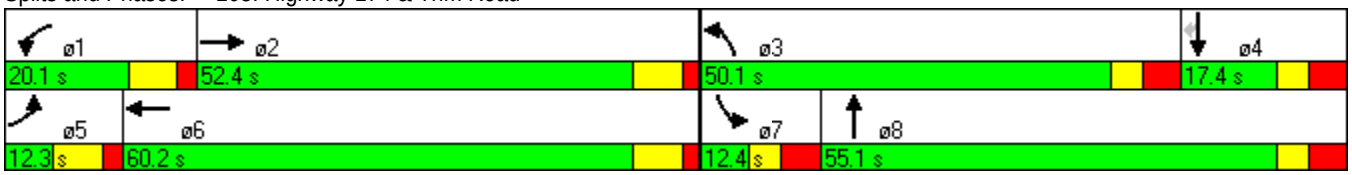
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		31.0			55.0			53.5			56.4	
Approach LOS		C			E			D			E	
Queue Length 50th (m)	5.3	84.8	0.0	27.5	~192.7		~149.2	13.1		2.0	5.4	0.0
Queue Length 95th (m)	13.7	105.3	0.0	#53.0	#232.5		#175.7	31.7		7.4	13.7	5.4
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	66	1183	1473	168	1385		1569	689		65	137	126
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.32	0.62	0.20	0.65	0.95		0.96	0.23		0.12	0.16	0.08

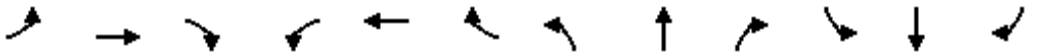
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 128.1			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 48.4		Intersection LOS: D	
Intersection Capacity Utilization 92.0%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road



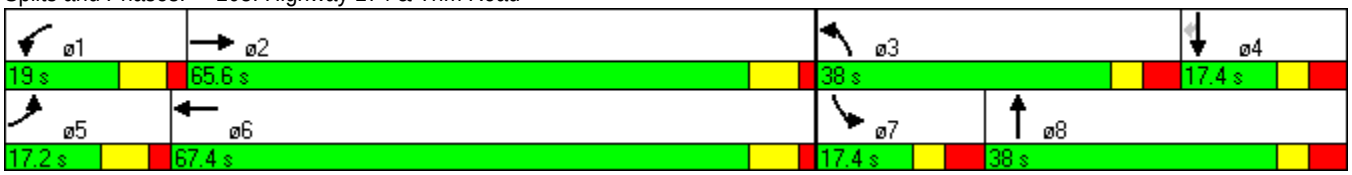


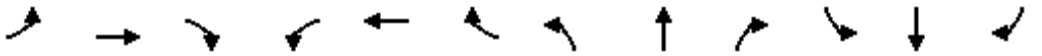
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	1520	1135	124	620	8	669	59	185	20	43	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.998			0.886				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			506		1			201				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	23	1652	1234	135	674	9	727	64	201	22	47	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	1652	1234	135	683	0	727	265	0	22	47	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	17.2	32.1		17.2	32.1		17.4	17.4		17.4	17.4	17.4
Total Split (s)	17.2	65.6	0.0	19.0	67.4	0.0	38.0	38.0	0.0	17.4	17.4	17.4
Total Split (%)	12.3%	46.9%	0.0%	13.6%	48.1%	0.0%	27.1%	27.1%	0.0%	12.4%	12.4%	12.4%
Maximum Green (s)	10.0	58.6		11.8	60.4		30.6	30.6		10.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	10.0	58.6	140.0	11.8	67.3		30.6	37.6		10.0	10.0	10.0
Actuated g/C Ratio	0.07	0.42	1.00	0.08	0.48		0.22	0.27		0.07	0.07	0.07
v/c Ratio	0.19	1.20	0.84	0.97	0.43		1.04	0.28		0.19	0.38	0.02
Control Delay	65.5	133.4	5.8	132.0	26.2		97.7	12.8		65.2	71.4	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	65.5	133.4	5.8	132.0	26.2		97.7	12.8		65.2	71.4	42.0
LOS	E	F	A	F	C		F	B		E	E	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		78.7			43.6			75.0			68.6	
Approach LOS		E			D			E			E	
Queue Length 50th (m)	5.6	~268.1	0.0	35.0	64.8		~103.0	6.9		5.4	11.7	0.0
Queue Length 95th (m)	14.2	#307.1	0.0	#73.9	81.0		#138.5	17.9		13.7	24.0	2.7
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	118	1378	1473	139	1580		698	930		118	124	107
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.19	1.20	0.84	0.97	0.43		1.04	0.28		0.19	0.38	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Natural Cycle: 115			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.20			
Intersection Signal Delay: 71.8		Intersection LOS: E	
Intersection Capacity Utilization 97.5%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	1520	1135	124	620	8	669	59	185	20	43	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.998			0.886				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3287	0	3195	2918	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			506		1			148				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	23	1652	1234	135	674	9	727	64	201	22	47	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	1652	1234	135	683	0	727	265	0	22	47	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		12.4	17.4		12.4	17.4	17.4
Total Split (s)	13.6	69.6	0.0	18.0	74.0	0.0	35.0	38.6	0.0	13.8	17.4	17.4
Total Split (%)	9.7%	49.7%	0.0%	12.9%	52.9%	0.0%	25.0%	27.6%	0.0%	9.9%	12.4%	12.4%
Maximum Green (s)	6.4	62.6		10.8	67.0		27.6	31.2		6.4	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	6.2	62.8	136.5	10.8	72.9		27.7	33.2		6.2	10.0	10.0
Actuated g/C Ratio	0.05	0.46	1.00	0.08	0.53		0.20	0.24		0.05	0.07	0.07
v/c Ratio	0.31	1.09	0.84	1.03	0.39		1.12	0.32		0.29	0.37	0.02
Control Delay	75.7	88.0	5.8	148.5	21.4		123.0	20.1		75.0	70.8	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.7	88.0	5.8	148.5	21.4		123.0	20.1		75.0	70.8	42.0
LOS	E	F	A	F	C		F	C		E	E	D

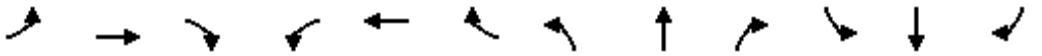
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		53.0			42.4			95.5			71.3	
Approach LOS		D			D			F			E	
Queue Length 50th (m)	5.8	~255.0	0.0	~37.8	59.0		~112.3	12.8		5.5	11.7	0.0
Queue Length 95th (m)	14.6	#294.0	0.0	#77.0	73.7		#147.8	24.5		14.1	24.0	2.7
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	77	1514	1473	131	1755		648	837		77	127	110
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.30	1.09	0.84	1.03	0.39		1.12	0.32		0.29	0.37	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 136.5			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 60.3		Intersection LOS: E	
Intersection Capacity Utilization 96.4%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	1520	1135	124	620	8	669	59	185	20	43	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.886				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3287	0	4644	1536	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3287	0	4644	1536	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			506		1			100				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	23	1652	1234	135	674	9	727	64	201	22	47	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	1652	1234	135	683	0	727	265	0	22	47	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		12.4	17.4		12.4	17.4	17.4
Total Split (s)	13.6	75.0	0.0	18.6	80.0	0.0	29.0	33.9	0.0	12.5	17.4	17.4
Total Split (%)	9.7%	53.6%	0.0%	13.3%	57.1%	0.0%	20.7%	24.2%	0.0%	8.9%	12.4%	12.4%
Maximum Green (s)	6.4	68.0		11.4	73.0		21.6	26.5		5.1	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	6.2	68.2	136.5	11.4	78.9		21.7	27.9		5.1	10.0	10.0
Actuated g/C Ratio	0.05	0.50	1.00	0.08	0.58		0.16	0.20		0.04	0.07	0.07
v/c Ratio	0.31	1.00	0.84	0.98	0.36		0.99	0.67		0.35	0.37	0.02
Control Delay	75.7	57.9	5.8	133.8	17.8		87.2	40.9		81.8	70.8	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.7	57.9	5.8	133.8	17.8		87.2	40.9		81.8	70.8	42.0
LOS	E	E	A	F	B		F	D		F	E	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		36.0			36.9			74.9			73.4	
Approach LOS		D			D			E			E	
Queue Length 50th (m)	5.8	~237.3	0.0	~35.3	53.7		~67.9	40.3		5.6	11.7	0.0
Queue Length 95th (m)	14.6	#276.3	0.0	#75.1	67.2		#93.5	69.9		14.3	24.0	2.7
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	77	1644	1473	138	1900		737	405		62	127	110
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.30	1.00	0.84	0.98	0.36		0.99	0.65		0.35	0.37	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 136.5			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 44.7		Intersection LOS: D	
Intersection Capacity Utilization 89.7%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road

INPUT REPORT

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2031 Background Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	122.0	5.00	92.0	1.20	100.00	2.00
North	1507.0	5.00	92.0	1.20	100.00	2.00
East	23.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	10.0	5.00	92.0	1.20	100.00	2.00
West	2.0	5.00	92.0	1.20	100.00	2.00
North	2.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	82.0	5.00	92.0	1.20	100.00	2.00
South	237.0	5.00	92.0	1.20	100.00	2.00
West	73.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	23.0	5.00	92.0	1.20	100.00	2.00
East	3.0	5.00	92.0	1.20	100.00	2.00
South	37.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

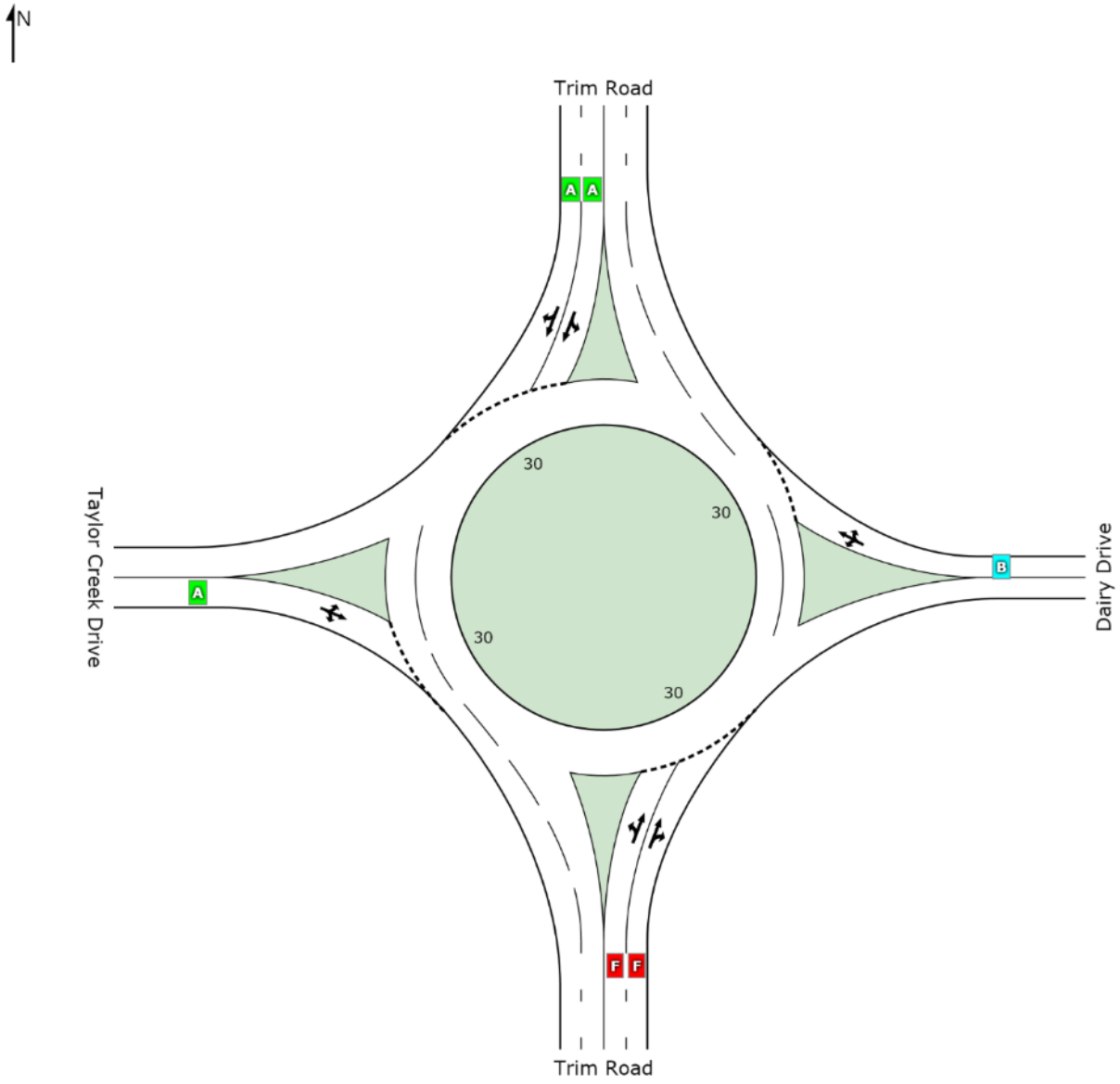
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	F	B	A	A	E

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	133	5.0	1.000	51.4	LOS F	28.6	226.8	1.00	0.98	18.2
8	T	1638	5.0	1.000	51.4	LOS F	28.6	226.8	1.00	0.98	19.9
18	R	25	5.0	1.000	51.4	LOS F	28.6	226.8	1.00	0.98	17.7
Approach		1796	5.0	1.000	51.4	LOS F	28.6	226.8	1.00	0.98	19.7
East: Dairy Drive											
1	L	11	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.94	35.1
6	T	2	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.80	35.3
16	R	2	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.85	36.8
Approach		15	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.90	35.4
North: Trim Road											
7	L	89	5.0	0.244	6.7	LOS A	0.9	7.2	0.31	0.81	40.1
4	T	258	5.0	0.244	6.7	LOS A	0.9	7.2	0.31	0.52	47.0
14	R	79	5.0	0.244	6.7	LOS A	0.9	7.2	0.31	0.60	44.3
Approach		426	5.0	0.244	6.7	LOS A	0.9	7.2	0.31	0.59	45.0
West: Taylor Creek Drive											
5	L	25	5.0	0.083	5.2	LOS A	0.2	1.6	0.32	0.80	39.8
2	T	3	5.0	0.083	5.2	LOS A	0.2	1.6	0.32	0.40	41.9
12	R	40	5.0	0.083	5.2	LOS A	0.2	1.6	0.32	0.55	42.7
Approach		68	5.0	0.083	5.2	LOS A	0.2	1.6	0.32	0.64	41.5
All Vehicles		2305	5.0	1.000	41.5	LOS E	28.6	226.8	0.85	0.90	22.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2031 Background Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	48.0	5.00	92.0	1.20	100.00	2.00
North	851.0	5.00	92.0	1.20	100.00	2.00
East	19.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	104.0	5.00	92.0	1.20	100.00	2.00
West	11.0	5.00	92.0	1.20	100.00	2.00
North	15.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	22.0	5.00	92.0	1.20	100.00	2.00
South	1235.0	5.00	92.0	1.20	100.00	2.00
West	45.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	47.0	5.00	92.0	1.20	100.00	2.00
East	3.0	5.00	92.0	1.20	100.00	2.00
South	107.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

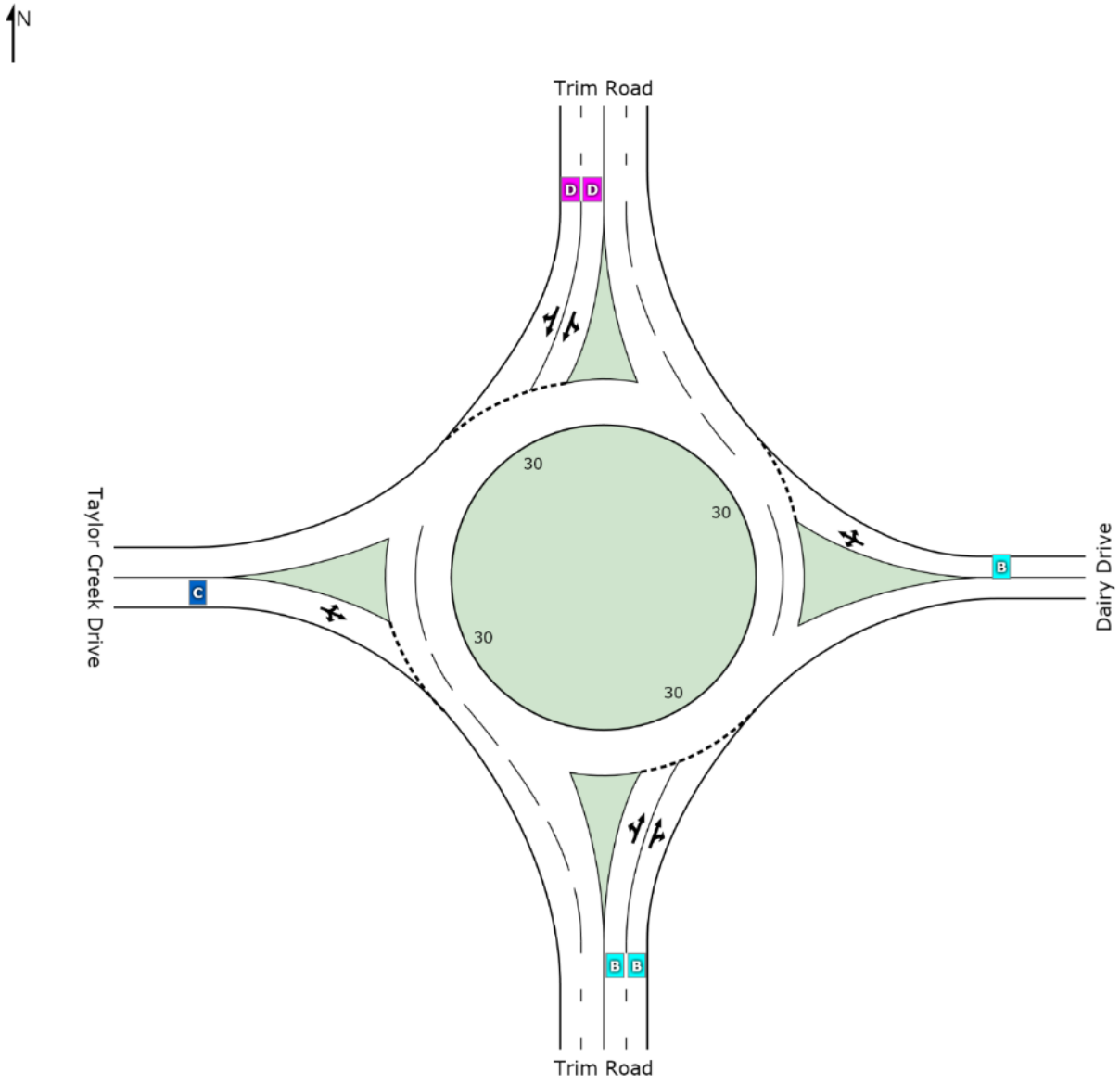
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	B	B	D	C	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	52	5.0	0.534	10.9	LOS B	2.9	22.8	0.32	0.86	34.1
8	T	925	5.0	0.534	10.9	LOS B	2.9	22.8	0.32	0.50	40.1
18	R	21	5.0	0.534	10.9	LOS B	2.9	22.8	0.32	0.59	36.8
Approach		998	5.0	0.534	10.9	LOS B	2.9	22.8	0.32	0.52	39.7
East: Dairy Drive											
1	L	113	5.0	0.280	11.3	LOS B	0.8	6.1	0.61	0.91	36.2
6	T	12	5.0	0.280	11.3	LOS B	0.8	6.1	0.61	0.70	36.8
16	R	16	5.0	0.280	11.3	LOS B	0.8	6.1	0.61	0.78	38.2
Approach		141	5.0	0.280	11.3	LOS B	0.8	6.1	0.61	0.88	36.5
North: Trim Road											
7	L	24	5.0	0.836	26.0	LOS D	9.7	76.5	0.75	0.94	28.7
4	T	1342	5.0	0.836	26.0	LOS D	9.7	76.5	0.75	0.80	31.8
14	R	49	5.0	0.836	26.0	LOS D	9.7	76.5	0.75	0.83	29.4
Approach		1415	5.0	0.836	26.0	LOS D	9.7	76.5	0.75	0.81	31.6
West: Taylor Creek Drive											
5	L	51	5.0	0.470	20.8	LOS C	1.4	11.4	0.78	1.03	32.0
2	T	3	5.0	0.470	20.8	LOS C	1.4	11.4	0.78	0.90	31.6
12	R	116	5.0	0.470	20.8	LOS C	1.4	11.4	0.78	0.95	33.1
Approach		171	5.0	0.470	20.8	LOS C	1.4	11.4	0.78	0.97	32.7
All Vehicles		2725	5.0	0.836	19.3	LOS C	9.7	76.5	0.59	0.72	34.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2031 Background Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	166.0	5.00	92.0	1.20	100.00	2.00
North	1289.0	5.00	92.0	1.20	100.00	2.00
East	31.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	83.0	5.00	92.0	1.20	100.00	2.00
West	248.0	5.00	92.0	1.20	100.00	2.00
North	344.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	33.0	5.00	92.0	1.20	100.00	2.00
South	234.0	5.00	92.0	1.20	100.00	2.00
West	17.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	19.0	5.00	92.0	1.20	100.00	2.00
East	21.0	5.00	92.0	1.20	100.00	2.00
South	41.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

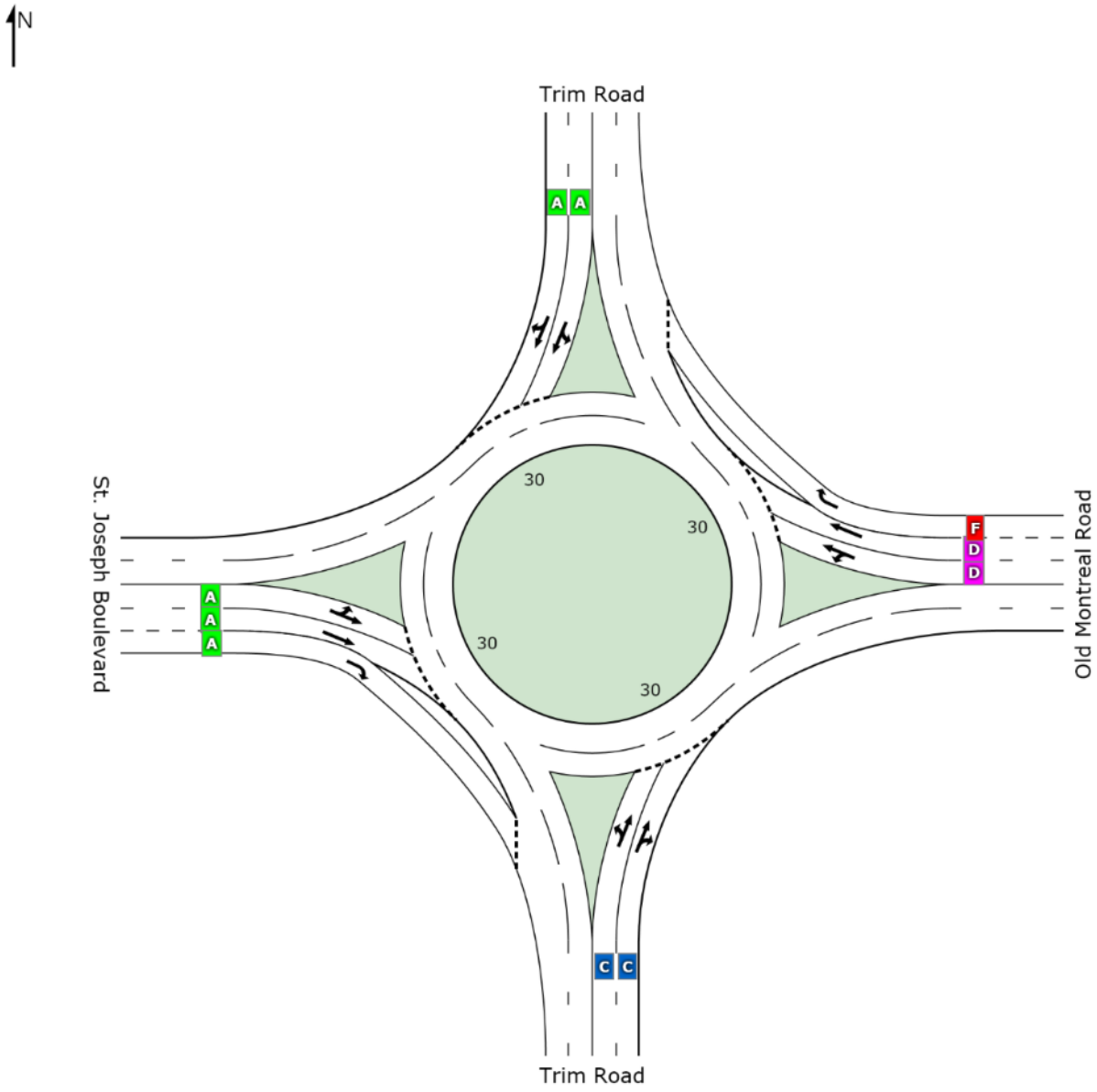
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	F	A	A	D

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	180	5.0	0.846	24.7	LOS C	6.7	53.3	0.47	0.77	33.3
8	T	1401	5.0	0.846	24.7	LOS C	6.7	53.3	0.46	0.53	29.8
18	R	34	5.0	0.846	24.7	LOS C	6.4	50.3	0.45	0.58	28.0
Approach		1615	5.0	0.846	24.7	LOS C	6.7	53.3	0.46	0.56	30.2
East: Old Montreal Road											
1	L	90	5.0	0.590	30.5	LOS D	2.0	15.8	0.85	1.08	19.4
6	T	270	5.0	0.590	30.5	LOS D	2.0	15.8	0.85	1.01	17.5
16	R	374	5.0	0.988	76.8	LOS F	9.2	72.6	0.97	1.63	10.0
Approach		734	5.0	0.988	54.1	LOS F	9.2	72.6	0.91	1.33	12.7
North: Trim Road											
7	L	36	5.0	0.223	7.9	LOS A	0.6	4.9	0.45	0.96	37.5
4	T	254	5.0	0.223	7.8	LOS A	0.6	4.9	0.44	0.70	43.3
14	R	18	5.0	0.223	7.7	LOS A	0.6	4.6	0.43	0.76	41.3
Approach		309	5.0	0.223	7.8	LOS A	0.6	4.9	0.44	0.74	42.4
West: St. Joseph Boulevard											
5	L	21	5.0	0.028	5.0	LOS A	0.1	0.5	0.33	0.73	43.4
2	T	23	5.0	0.028	5.0	LOS A	0.1	0.5	0.33	0.51	47.8
12	R	45	5.0	0.056	5.0	LOS A	0.1	1.0	0.30	0.58	47.7
Approach		88	5.0	0.056	5.0	LOS A	0.1	1.0	0.32	0.60	46.6
All Vehicles		2746	5.0	0.988	30.0	LOS D	9.2	72.6	0.57	0.78	25.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2031 Background Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	123.0	5.00	92.0	1.20	100.00	2.00
North	713.0	5.00	92.0	1.20	100.00	2.00
East	72.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	95.0	5.00	92.0	1.20	100.00	2.00
West	99.0	5.00	92.0	1.20	100.00	2.00
North	160.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	192.0	5.00	92.0	1.20	100.00	2.00
South	1196.0	5.00	92.0	1.20	100.00	2.00
West	58.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	45.0	5.00	92.0	1.20	100.00	2.00
East	116.0	5.00	92.0	1.20	100.00	2.00
South	250.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

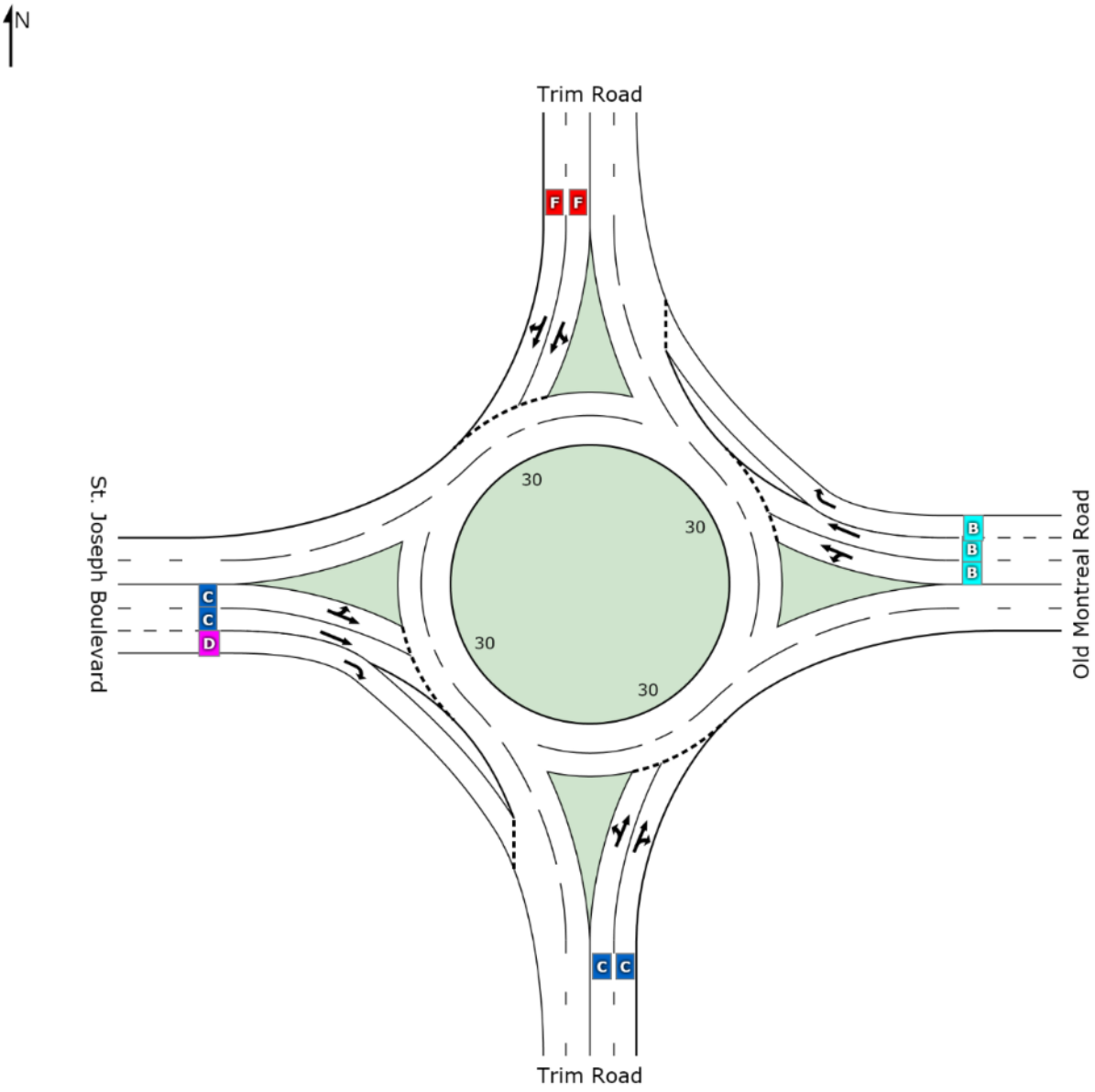
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	B	F	D	D

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	134	5.0	0.640	15.9	LOS C	3.3	25.8	0.58	1.01	38.2
8	T	775	5.0	0.640	15.8	LOS C	3.3	25.8	0.56	0.81	35.6
18	R	78	5.0	0.640	15.7	LOS C	3.1	24.5	0.55	0.85	33.8
Approach		987	5.0	0.640	15.8	LOS C	3.3	25.8	0.57	0.84	35.9
East: Old Montreal Road											
1	L	103	5.0	0.208	10.0	LOS B	0.6	4.4	0.58	0.88	28.8
6	T	108	5.0	0.208	10.0	LOS B	0.6	4.4	0.58	0.75	30.1
16	R	174	5.0	0.298	10.2	LOS B	0.8	6.6	0.54	0.78	31.2
Approach		385	5.0	0.298	10.1	LOS B	0.8	6.6	0.56	0.80	30.1
North: Trim Road											
7	L	209	5.0	0.992	53.0	LOS F	18.7	148.5	1.00	1.47	18.7
4	T	1300	5.0	0.992	52.7	LOS F	18.7	148.5	0.99	1.45	19.6
14	R	63	5.0	0.992	52.5	LOS F	18.2	144.2	0.98	1.44	18.4
Approach		1572	5.0	0.992	52.8	LOS F	18.7	148.5	0.99	1.45	19.4
West: St. Joseph Boulevard											
5	L	49	5.0	0.289	18.1	LOS C	0.8	6.2	0.78	0.99	35.6
2	T	126	5.0	0.289	18.1	LOS C	0.8	6.2	0.78	0.89	37.0
12	R	272	5.0	0.708	32.7	LOS D	2.8	22.4	0.85	1.06	30.4
Approach		447	5.0	0.708	27.0	LOS D	2.8	22.4	0.82	1.01	32.5
All Vehicles		3390	5.0	0.992	33.8	LOS D	18.7	148.5	0.79	1.14	25.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2031 Background Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	3	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Continuous	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
East	Old Montreal Road				
App. Lane 1		3.75	130.0	1.00	–
App. Lane 2		3.50	130.0	1.00	–
App. Lane 3		3.50	85.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
Exit Lane 3		3.50	300.0	-1.00	–
West	St. Joseph Boulevard				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
App. Lane 3		3.50	100.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Old Montreal Road		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	St. Joseph Boulevard		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	166.0	5.00	92.0	1.20	100.00	2.00
North	1289.0	5.00	92.0	1.20	100.00	2.00
East	31.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	83.0	5.00	92.0	1.20	100.00	2.00
West	248.0	5.00	92.0	1.20	100.00	2.00
North	344.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	33.0	5.00	92.0	1.20	100.00	2.00
South	234.0	5.00	92.0	1.20	100.00	2.00
West	17.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	19.0	5.00	92.0	1.20	100.00	2.00
East	21.0	5.00	92.0	1.20	100.00	2.00
South	41.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	0.850	*Cont.*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
East	Old Montreal Road				
L		–	–	2.50	0
T		–	–	2.50	0
North	Trim Road				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0
West	St. Joseph Boulevard				
L		–	–	2.50	0
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

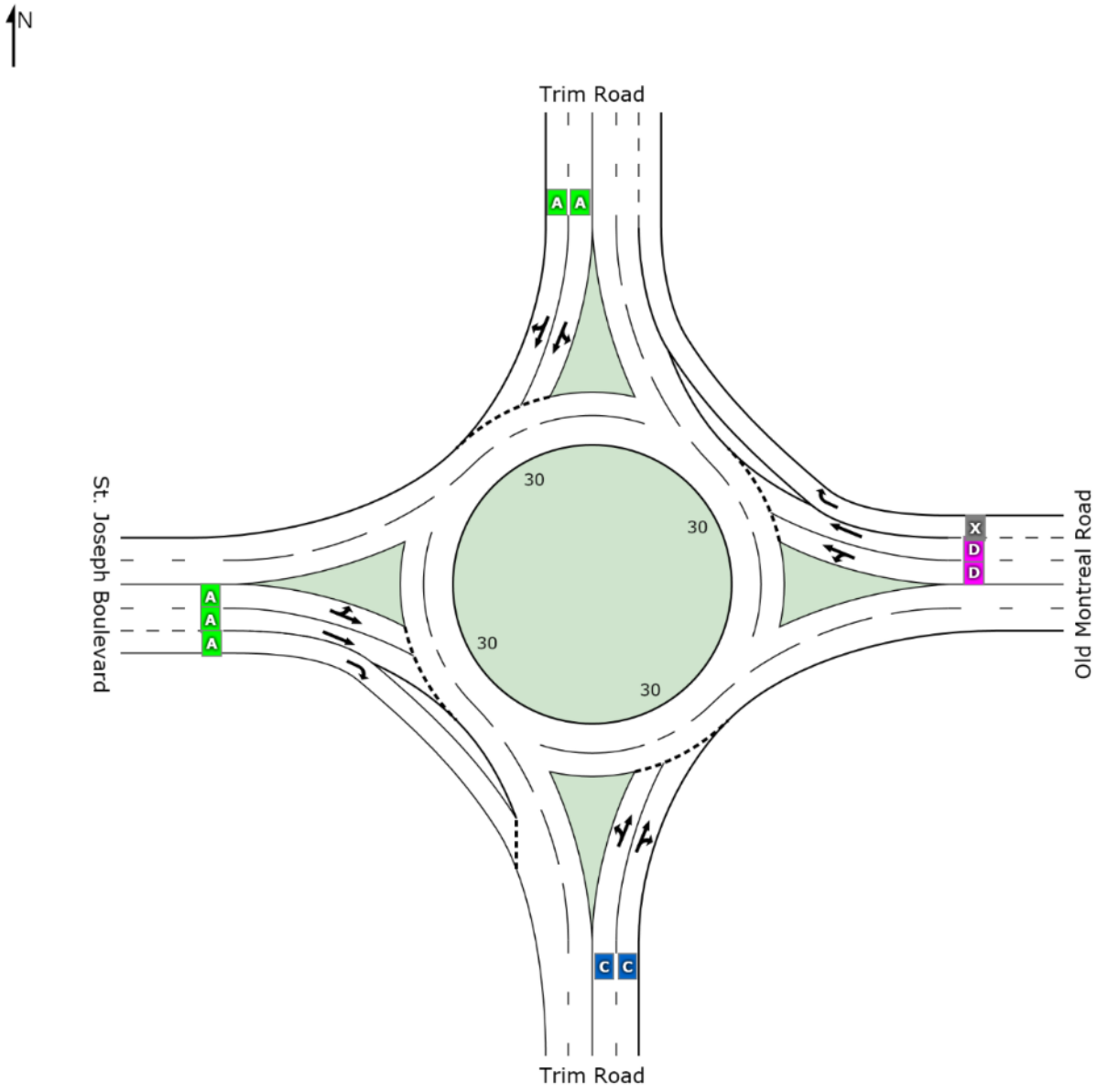
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	B	A	A	C

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	180	5.0	0.846	24.7	LOS C	6.7	53.3	0.47	0.77	33.3
8	T	1401	5.0	0.846	24.7	LOS C	6.7	53.3	0.46	0.53	29.8
18	R	34	5.0	0.846	24.7	LOS C	6.4	50.3	0.45	0.58	28.0
Approach		1615	5.0	0.846	24.7	LOS C	6.7	53.3	0.46	0.56	30.2
East: Old Montreal Road											
1	L	90	5.0	0.565	29.0	LOS D	1.9	14.8	0.85	1.07	19.8
6	T	270	5.0	0.565	27.5	LOS D	1.9	14.8	0.83	0.99	18.6
16	R	374	5.0	0.254	0.0	X	X	X	X	0.45	44.2
Approach		734	5.0	0.565	13.7	LOS B	1.9	14.8	0.41	0.73	26.3
North: Trim Road											
7	L	36	5.0	0.223	7.9	LOS A	0.6	4.9	0.45	0.96	37.5
4	T	254	5.0	0.223	7.8	LOS A	0.6	4.9	0.44	0.70	43.3
14	R	18	5.0	0.223	7.7	LOS A	0.6	4.6	0.43	0.76	41.3
Approach		309	5.0	0.223	7.8	LOS A	0.6	4.9	0.44	0.74	42.4
West: St. Joseph Boulevard											
5	L	21	5.0	0.028	5.0	LOS A	0.1	0.5	0.33	0.73	43.4
2	T	23	5.0	0.028	5.0	LOS A	0.1	0.5	0.33	0.51	47.8
12	R	45	5.0	0.056	5.0	LOS A	0.1	1.0	0.30	0.58	47.7
Approach		88	5.0	0.056	5.0	LOS A	0.1	1.0	0.32	0.60	46.6
All Vehicles		2746	5.0	0.846	19.2	LOS C	6.7	53.3	0.44	0.62	31.1

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2031 Background Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	3	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Continuous	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
East	Old Montreal Road				
App. Lane 1		3.75	130.0	1.00	–
App. Lane 2		3.50	130.0	1.00	–
App. Lane 3		3.50	85.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
Exit Lane 3		3.50	300.0	-1.00	–
West	St. Joseph Boulevard				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
App. Lane 3		3.50	100.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Old Montreal Road		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	St. Joseph Boulevard		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	123.0	5.00	92.0	1.20	100.00	2.00
North	713.0	5.00	92.0	1.20	100.00	2.00
East	72.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	95.0	5.00	92.0	1.20	100.00	2.00
West	99.0	5.00	92.0	1.20	100.00	2.00
North	160.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	192.0	5.00	92.0	1.20	100.00	2.00
South	1196.0	5.00	92.0	1.20	100.00	2.00
West	58.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	45.0	5.00	92.0	1.20	100.00	2.00
East	116.0	5.00	92.0	1.20	100.00	2.00
South	250.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Cont.*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

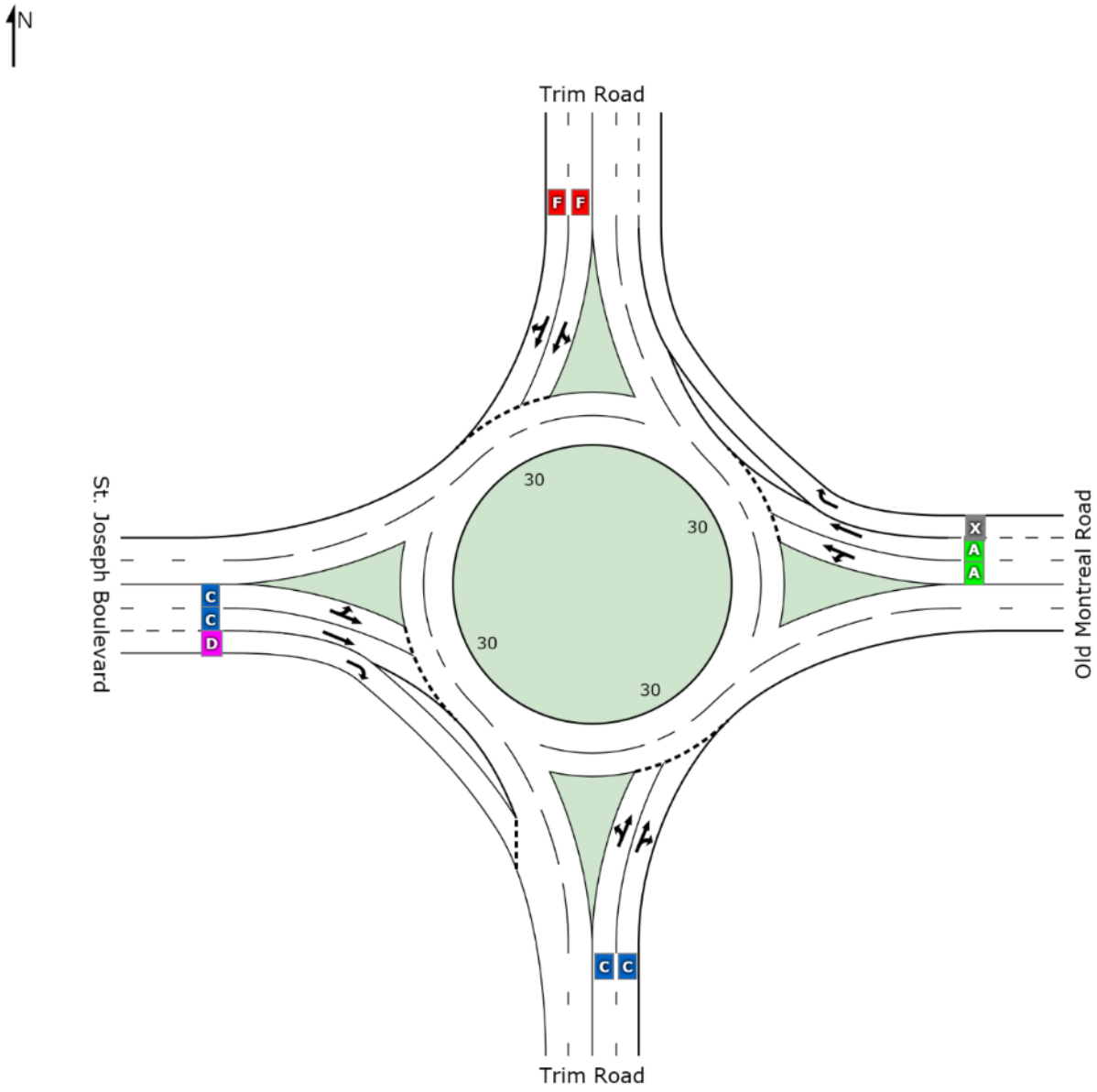
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	A	F	D	D

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK - PM

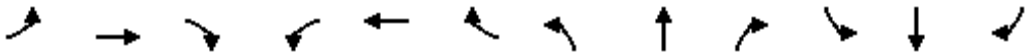
Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	134	5.0	0.640	15.9	LOS C	3.3	25.8	0.58	1.01	38.2
8	T	775	5.0	0.640	15.8	LOS C	3.3	25.8	0.56	0.81	35.6
18	R	78	5.0	0.640	15.7	LOS C	3.1	24.5	0.55	0.85	33.8
Approach		987	5.0	0.640	15.8	LOS C	3.3	25.8	0.57	0.84	35.9
East: Old Montreal Road											
1	L	103	5.0	0.204	9.9	LOS A	0.5	4.3	0.58	0.88	28.8
6	T	108	5.0	0.202	9.5	LOS A	0.5	4.1	0.56	0.73	30.7
16	R	174	5.0	0.118	0.0	X	X	X	X	0.45	44.2
Approach		385	5.0	0.204	5.3	LOS A	0.5	4.3	0.31	0.65	34.3
North: Trim Road											
7	L	209	5.0	0.992	53.0	LOS F	18.7	148.5	1.00	1.47	18.7
4	T	1300	5.0	0.992	52.7	LOS F	18.7	148.5	0.99	1.45	19.6
14	R	63	5.0	0.992	52.5	LOS F	18.2	144.2	0.98	1.44	18.4
Approach		1572	5.0	0.992	52.8	LOS F	18.7	148.5	0.99	1.45	19.4
West: St. Joseph Boulevard											
5	L	49	5.0	0.289	18.1	LOS C	0.8	6.2	0.78	0.99	35.6
2	T	126	5.0	0.289	18.1	LOS C	0.8	6.2	0.78	0.89	37.0
12	R	272	5.0	0.708	32.7	LOS D	2.8	22.4	0.85	1.06	30.4
Approach		447	5.0	0.708	27.0	LOS D	2.8	22.4	0.82	1.01	32.5
All Vehicles		3390	5.0	0.992	33.2	LOS D	18.7	148.5	0.77	1.12	25.5

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

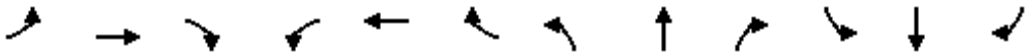


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	21	41	83	248	344	166	1289	31	33	234	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		60.0	60.0		100.0	60.0		0.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.996			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3293	1473	1647	3280	0	1647	3260	0
Flt Permitted	0.585			0.742			0.529			0.124		
Satd. Flow (perm)	1014	3293	1473	1286	3293	1473	917	3280	0	215	3260	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			45			152		4			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			486.2			309.0			349.1	
Travel Time (s)		25.8			35.0			22.2			25.1	
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
Adj. Flow (vph)	21	23	45	90	270	374	180	1401	34	36	254	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	23	45	90	270	374	180	1435	0	36	272	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	11.0	28.0		11.0	28.0	
Total Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	12.0	41.0	0.0	11.0	40.0	0.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	15.0%	51.3%	0.0%	13.8%	50.0%	0.0%
Maximum Green (s)	22.0	22.0	22.0	22.0	22.0	22.0	6.0	35.0		5.0	34.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0	15.0		15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)	17.1	17.1	17.1	17.1	17.1	17.1	38.9	35.7		34.4	29.3	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.55	0.50		0.48	0.41	
v/c Ratio	0.09	0.03	0.12	0.29	0.34	0.80	0.32	0.87		0.17	0.20	
Control Delay	22.7	21.4	8.2	25.5	23.8	28.9	9.6	26.2		9.5	13.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	22.7	21.4	8.2	25.5	23.8	28.9	9.6	26.2		9.5	13.7	
LOS	C	C	A	C	C	C	A	C		A	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		15.0			26.6			24.4			13.2	
Approach LOS		B			C			C			B	
Queue Length 50th (m)	2.2	1.2	0.0	9.8	15.6	27.8	10.3	96.6		1.9	11.0	
Queue Length 95th (m)	7.0	3.6	6.6	20.6	24.6	#59.6	19.6	#148.5		5.3	18.5	
Internal Link Dist (m)		333.9			462.2			285.0			325.1	
Turn Bay Length (m)	60.0		60.0	60.0		100.0	60.0			60.0		
Base Capacity (vph)	321	1044	498	408	1044	570	566	1656		207	1602	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.07	0.02	0.09	0.22	0.26	0.66	0.32	0.87		0.17	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 71			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 23.4		Intersection LOS: C	
Intersection Capacity Utilization 84.5%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 107: St. Joseph Blvd & Trim Road

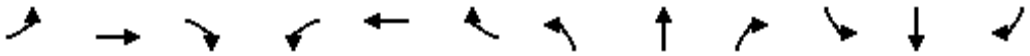


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	116	250	95	99	160	123	713	72	192	1196	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		60.0	60.0		100.0	60.0		0.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.986			0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3293	1473	1647	3247	0	1647	3270	0
Flt Permitted	0.684			0.672			0.130			0.227		
Satd. Flow (perm)	1186	3293	1473	1165	3293	1473	225	3247	0	393	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			172			174		15			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			486.2			309.0			349.1	
Travel Time (s)		25.8			35.0			22.2			25.1	
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
Adj. Flow (vph)	49	126	272	103	108	174	134	775	78	209	1300	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	126	272	103	108	174	134	853	0	209	1363	0
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	11.0	28.0		11.0	28.0	
Total Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	11.0	36.0	0.0	16.0	41.0	0.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	13.8%	45.0%	0.0%	20.0%	51.3%	0.0%
Maximum Green (s)	22.0	22.0	22.0	22.0	22.0	22.0	5.0	30.0		10.0	35.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0	15.0		15.0			15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0			0	
Act Effct Green (s)	13.3	13.3	13.3	13.3	13.3	13.3	35.8	30.8		42.9	34.3	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.51	0.44		0.61	0.49	
v/c Ratio	0.22	0.20	0.65	0.47	0.17	0.42	0.62	0.60		0.53	0.86	
Control Delay	26.5	24.8	18.3	33.1	24.5	7.5	25.9	18.2		11.3	23.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	26.5	24.8	18.3	33.1	24.5	7.5	25.9	18.2		11.3	23.9	
LOS	C	C	B	C	C	A	C	B		B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.0			19.1			19.2			22.2	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	5.2	7.0	10.9	11.4	5.9	0.0	4.9	37.2		8.1	67.3	
Queue Length 95th (m)	12.8	12.8	30.6	23.5	11.3	12.5	#28.7	68.5		22.1	#134.5	
Internal Link Dist (m)		333.9			462.2			285.0			325.1	
Turn Bay Length (m)	60.0		60.0	60.0		100.0	60.0			60.0		
Base Capacity (vph)	371	1029	579	364	1029	580	215	1425		425	1630	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.12	0.47	0.28	0.10	0.30	0.62	0.60		0.49	0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 70.7			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 20.8		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 107: St. Joseph Blvd & Trim Road

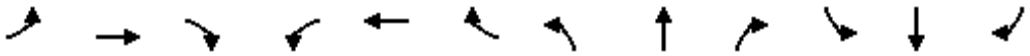


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	52	30	20	427	1	233	1	5	1	3	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	57	33	22	464	1	253	1	5	1	3	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	465			89			602	586	73	591	602	465
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	465			89			602	586	73	591	602	465
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	100			99			60	100	100	100	99	98
cM capacity (veh/h)	1081			1488			637	661	1118	656	651	759

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	91	487	260	20
Volume Left	2	22	253	1
Volume Right	33	1	5	15
cSH	1081	1488	643	732
Volume to Capacity	0.00	0.01	0.40	0.03
Queue Length 95th (m)	0.0	0.3	13.7	0.6
Control Delay (s)	0.2	0.5	14.3	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.5	14.3	10.1
Approach LOS			B	B

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	236	137	20	223	1	122	1	5	0	3	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	257	149	22	242	1	133	1	5	0	3	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	243			405			645	635	331	641	709	243
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243			405			645	635	331	641	709	243
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	7.1	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	3.5	*3.0	*3.0
p0 queue free %	99			98			78	100	99	100	99	99
cM capacity (veh/h)	1305			1137			613	623	867	373	578	946

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	414	265	139	12
Volume Left	9	22	133	0
Volume Right	149	1	5	9
cSH	1305	1137	620	806
Volume to Capacity	0.01	0.02	0.22	0.01
Queue Length 95th (m)	0.1	0.4	6.0	0.3
Control Delay (s)	0.2	0.8	12.5	9.5
Lane LOS	A	A	B	A
Approach Delay (s)	0.2	0.8	12.5	9.5
Approach LOS			B	A

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	44.9%	ICU Level of Service	A	
Analysis Period (min)	15			

* User Entered Value

Future (2021) Background Plus Site-Generated Traffic

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	669	31	0	1332	0	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	727	34	0	1448	0	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			761		1451	364
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			761		1451	364
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	97
cM capacity (veh/h)			828		118	839

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	364	364	34	724	724	25
Volume Left	0	0	0	0	0	0
Volume Right	0	0	34	0	0	25
cSH	1700	1700	1700	1700	1700	839
Volume to Capacity	0.21	0.21	0.02	0.43	0.43	0.03
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.4
Lane LOS						A
Approach Delay (s)	0.0			0.0		9.4
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1521	185	0	831	0	183
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1653	201	0	903	0	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	370					
pX, platoon unblocked			0.49		0.49	0.49
vC, conflicting volume			1854		2105	827
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			666		1176	0
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	66
cM capacity (veh/h)			442		88	589

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	827	827	201	452	452	199
Volume Left	0	0	0	0	0	0
Volume Right	0	0	201	0	0	199
cSH	1700	1700	1700	1700	1700	589
Volume to Capacity	0.49	0.49	0.12	0.27	0.27	0.34
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	10.4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	14.2
Lane LOS						B
Approach Delay (s)	0.0			0.0		14.2
Approach LOS						B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

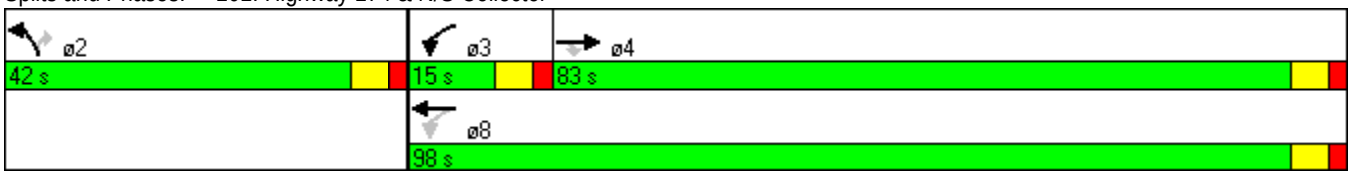
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	699	111	86	1246	447	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		0.0	30.0
Storage Lanes		1	1		1	1
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1733	1473	1647	1733	1647	1473
Flt Permitted			0.174		0.950	
Satd. Flow (perm)	1733	1473	302	1733	1647	1473
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		87				
Link Speed (k/h)	50			50	50	
Link Distance (m)	336.5			297.3	310.5	
Travel Time (s)	24.2			21.4	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	760	121	93	1354	486	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	760	121	93	1354	486	1
Turn Type		Perm	pm+pt			Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	64.0	64.0	11.0	24.0	24.0	24.0
Total Split (s)	83.0	83.0	15.0	98.0	42.0	42.0
Total Split (%)	59.3%	59.3%	10.7%	70.0%	30.0%	30.0%
Maximum Green (s)	77.0	77.0	9.0	92.0	36.0	36.0
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)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	None	Min	None	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	78.0	78.0	92.0	92.0	36.0	36.0
Actuated g/C Ratio	0.56	0.56	0.66	0.66	0.26	0.26
v/c Ratio	0.79	0.14	0.34	1.19	1.15	0.00
Control Delay	32.1	5.5	12.1	118.9	136.2	39.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	5.5	12.1	118.9	136.2	39.0
LOS	C	A	B	F	F	D

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	28.4			112.1	136.0	
Approach LOS	C			F	F	
Queue Length 50th (m)	148.3	3.8	8.1	~415.1	~145.1	0.2
Queue Length 95th (m)	203.3	12.5	14.1	#489.7	#207.0	1.5
Internal Link Dist (m)	312.5			273.3	286.5	
Turn Bay Length (m)		60.0	60.0			30.0
Base Capacity (vph)	965	859	285	1139	424	379
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.14	0.33	1.19	1.15	0.00

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.19			
Intersection Signal Delay: 90.0		Intersection LOS: F	
Intersection Capacity Utilization 105.4%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	699	111	86	1246	447	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	0.95
Frt		0.850				
Flt Protected			0.950		0.952	
Satd. Flow (prot)	3293	1473	1647	3293	3201	0
Flt Permitted			0.255		0.952	
Satd. Flow (perm)	3293	1473	442	3293	3201	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		121				
Link Speed (k/h)	50			50	50	
Link Distance (m)	478.0			445.3	310.5	
Travel Time (s)	34.4			32.1	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	760	121	93	1354	486	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	760	121	93	1354	487	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	64.0	64.0	11.0	24.0	24.0	
Total Split (s)	64.0	64.0	11.0	75.0	25.0	0.0
Total Split (%)	64.0%	64.0%	11.0%	75.0%	25.0%	0.0%
Maximum Green (s)	58.0	58.0	5.0	69.0	19.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	29.4	29.4	37.7	37.7	15.1	
Actuated g/C Ratio	0.45	0.45	0.58	0.58	0.23	
v/c Ratio	0.51	0.17	0.26	0.71	0.66	
Control Delay	15.1	3.2	8.2	12.3	29.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.1	3.2	8.2	12.3	29.1	
LOS	B	A	A	B	C	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	13.5			12.0	29.1	
Approach LOS	B			B	C	
Queue Length 50th (m)	32.6	0.0	4.1	50.2	25.2	
Queue Length 95th (m)	49.3	7.1	9.7	77.3	48.1	
Internal Link Dist (m)	454.0			421.3	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	2880	1303	351	3137	968	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.26	0.09	0.26	0.43	0.50	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 65.3			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 15.4		Intersection LOS: B	
Intersection Capacity Utilization 59.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 101: Highway 174 & N/S Collector

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	699	111	86	1246	447	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.91	1.00	1.00	0.91	0.97	0.95
Frt		0.850				
Flt Protected			0.950		0.952	
Satd. Flow (prot)	4732	1473	1647	4732	3201	0
Flt Permitted			0.263		0.952	
Satd. Flow (perm)	4732	1473	456	4732	3201	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		121				
Link Speed (k/h)	50			50	50	
Link Distance (m)	244.9			232.5	310.5	
Travel Time (s)	17.6			16.7	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	760	121	93	1354	486	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	760	121	93	1354	487	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	64.0	64.0	11.0	24.0	24.0	
Total Split (s)	64.0	64.0	11.0	75.0	25.0	0.0
Total Split (%)	64.0%	64.0%	11.0%	75.0%	25.0%	0.0%
Maximum Green (s)	58.0	58.0	5.0	69.0	19.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	19.7	19.7	28.1	28.1	13.9	
Actuated g/C Ratio	0.36	0.36	0.52	0.52	0.26	
v/c Ratio	0.44	0.20	0.27	0.55	0.60	
Control Delay	15.1	4.2	9.0	9.9	22.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.1	4.2	9.0	9.9	22.1	
LOS	B	A	A	A	C	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	13.6			9.8	22.1	
Approach LOS	B			A	C	
Queue Length 50th (m)	19.6	0.0	3.7	26.3	19.5	
Queue Length 95th (m)	31.5	8.0	10.2	43.2	37.1	
Internal Link Dist (m)	220.9			208.5	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	4575	1428	349	4732	1153	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.08	0.27	0.29	0.42	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 54.3			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 48.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 101: Highway 174 & N/S Collector

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1702	344	228	603	431	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		0.0	30.0
Storage Lanes		1	1		1	1
Taper Length (m)		10.0	10.0		10.0	10.0
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)	1733	1473	1647	1733	1647	1473
Flt Permitted			0.044		0.950	
Satd. Flow (perm)	1733	1473	76	1733	1647	1473
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		124				2
Link Speed (k/h)	50			50	50	
Link Distance (m)	351.5			222.3	310.5	
Travel Time (s)	25.3			16.0	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1850	374	248	655	468	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1850	374	248	655	468	5
Turn Type		Perm	pm+pt			Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	24.0
Total Split (s)	90.0	90.0	14.0	104.0	36.0	36.0
Total Split (%)	64.3%	64.3%	10.0%	74.3%	25.7%	25.7%
Maximum Green (s)	84.0	84.0	8.0	98.0	30.0	30.0
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)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Min	Min	None	Min	None	None
Walk Time (s)	7.0	7.0		7.0		
Flash Dont Walk (s)	11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	84.0	84.0	98.0	98.0	30.0	30.0
Actuated g/C Ratio	0.60	0.60	0.70	0.70	0.21	0.21
v/c Ratio	1.78	0.40	1.73	0.54	1.33	0.02
Control Delay	378.0	10.8	384.1	12.2	207.4	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	378.0	10.8	384.1	12.2	207.4	36.4
LOS	F	B	F	B	F	D

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	316.3			114.3	205.6	
Approach LOS	F			F	F	
Queue Length 50th (m)	~703.7	30.7	~80.9	73.8	~154.3	0.6
Queue Length 95th (m)	#776.8	49.6	#130.8	99.7	#215.1	4.1
Internal Link Dist (m)	327.5			198.3	286.5	
Turn Bay Length (m)		60.0	60.0			30.0
Base Capacity (vph)	1040	933	143	1213	353	317
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.78	0.40	1.73	0.54	1.33	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.78			
Intersection Signal Delay: 251.1		Intersection LOS: F	
Intersection Capacity Utilization 148.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector

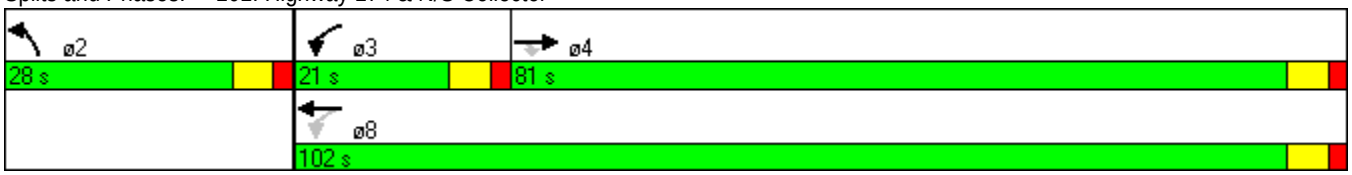
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1702	344	228	603	431	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	0.95
Frt		0.850			0.998	
Flt Protected			0.950		0.953	
Satd. Flow (prot)	3293	1473	1647	3293	3198	0
Flt Permitted			0.049		0.953	
Satd. Flow (perm)	3293	1473	85	3293	3198	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		241			1	
Link Speed (k/h)	50			50	50	
Link Distance (m)	478.0			370.3	310.5	
Travel Time (s)	34.4			26.7	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1850	374	248	655	468	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1850	374	248	655	473	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	
Total Split (s)	81.0	81.0	21.0	102.0	28.0	0.0
Total Split (%)	62.3%	62.3%	16.2%	78.5%	21.5%	0.0%
Maximum Green (s)	75.0	75.0	15.0	96.0	22.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0		
Flash Dont Walk (s)	11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	75.0	75.0	96.0	96.0	21.4	
Actuated g/C Ratio	0.58	0.58	0.74	0.74	0.17	
v/c Ratio	0.97	0.39	1.02	0.27	0.89	
Control Delay	41.1	6.1	100.8	5.8	73.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.1	6.1	100.8	5.8	73.0	
LOS	D	A	F	A	E	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	35.2			31.9	73.0	
Approach LOS	D			C	E	
Queue Length 50th (m)	211.7	13.9	~48.7	23.4	56.6	
Queue Length 95th (m)	#270.9	30.8	#97.5	29.7	#81.9	
Internal Link Dist (m)	454.0			346.3	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	1909	955	244	2443	545	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.97	0.39	1.02	0.27	0.87	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 129.4			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 39.3		Intersection LOS: D	
Intersection Capacity Utilization 91.1%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector



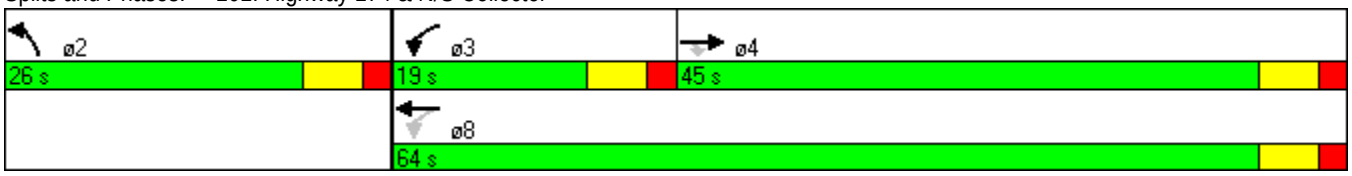
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1702	344	228	603	431	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.91	1.00	1.00	0.91	0.97	0.95
Frt		0.850			0.998	
Flt Protected			0.950		0.953	
Satd. Flow (prot)	4732	1473	1647	4732	3198	0
Flt Permitted			0.089		0.953	
Satd. Flow (perm)	4732	1473	154	4732	3198	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		373			1	
Link Speed (k/h)	50			50	50	
Link Distance (m)	254.7			194.0	310.5	
Travel Time (s)	18.3			14.0	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1850	374	248	655	468	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1850	374	248	655	473	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	
Total Split (s)	45.0	45.0	19.0	64.0	26.0	0.0
Total Split (%)	50.0%	50.0%	21.1%	71.1%	28.9%	0.0%
Maximum Green (s)	39.0	39.0	13.0	58.0	20.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0		
Flash Dont Walk (s)	11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	39.1	39.1	56.9	56.9	17.1	
Actuated g/C Ratio	0.45	0.45	0.66	0.66	0.20	
v/c Ratio	0.86	0.43	0.81	0.21	0.74	
Control Delay	27.0	3.5	40.8	6.2	40.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.0	3.5	40.8	6.2	40.2	
LOS	C	A	D	A	D	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	23.0			15.7	40.2	
Approach LOS	C			B	D	
Queue Length 50th (m)	93.1	0.1	23.3	13.0	35.5	
Queue Length 95th (m)	#119.3	14.1	#58.4	18.5	50.1	
Internal Link Dist (m)	230.7			170.0	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	2154	874	328	3203	747	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.86	0.43	0.76	0.20	0.63	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 86			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 23.5		Intersection LOS: C	
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector



INPUT REPORT

Site: Hwy174-Collector Roundabout - 2021 BK + Site - AM

Ottawa Road 174/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Ottawa Road 174/ Collector Road Roundabout 2021 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	1	1	–	0.0
East	Ottawa Road 174	Two-way	1	1	–	0.0
West	Ottawa Road 174	Two-way	2	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	5.00	1	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	LR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	T	1800	–	–	0.0
App. Lane 2	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	100.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
From: West	**Ottawa Road 174**	
West	Yes	–
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.75	20.0	–	No
East	Ottawa Road 174	3.75	20.0	–	No
West	Ottawa Road 174	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	447.0	5.00	92.0	1.20	100.00	2.00
East	1.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	86.0	5.00	92.0	1.20	100.00	2.00
West	1246.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
East	699.0	5.00	92.0	1.20	100.00	2.00
South	111.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	90.0	300.0	–	–	–	–
East	50.0	90.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	90.0	50.0	500.0	–	–	–	–
West	90.0	90.0	500.0	–	–	–	–
From: West	Ottawa Road 174						
East	90.0	90.0	500.0	–	–	–	–
South	90.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Ottawa Road 174								
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
West	Ottawa Road 174				
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									
4P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

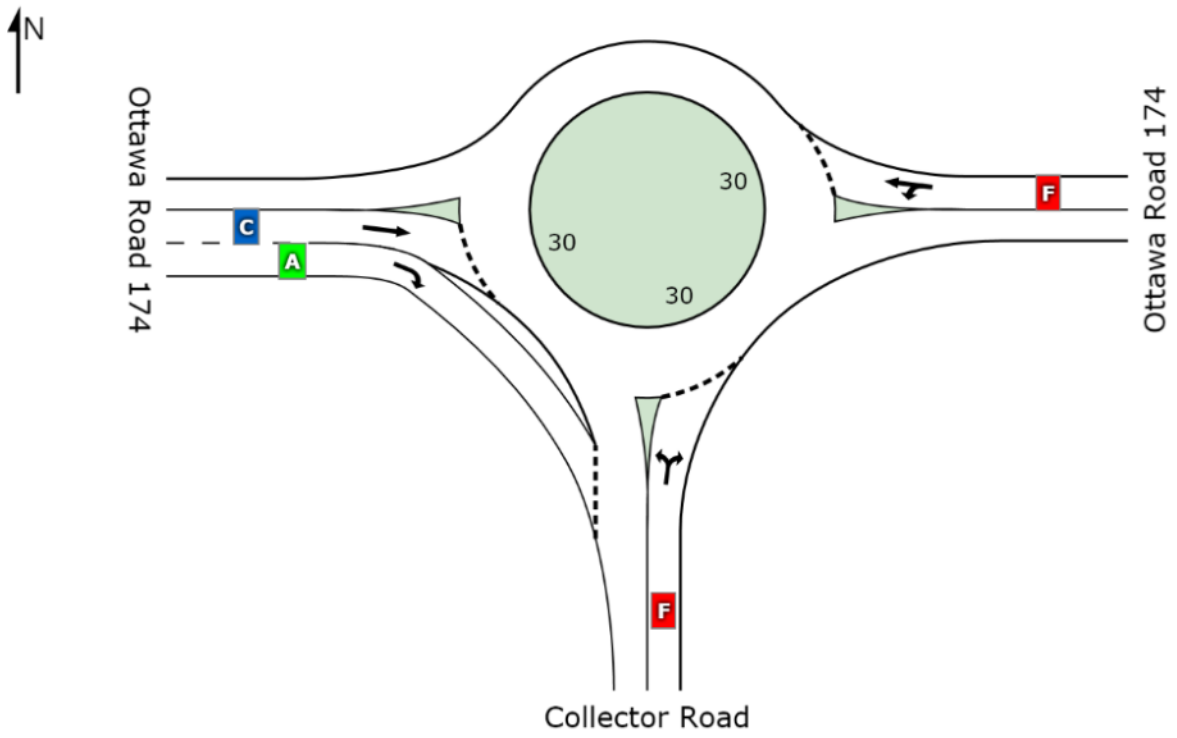
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Hwy174-Collector Roundabout - 2021 BK + Site - AM

Ottawa Road 174/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	West	Intersection
LOS	F	F	C	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Hwy174-Collector Roundabout - 2021 BK + Site - AM

Ottawa Road 174/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	486	5.0	1.006	71.9	LOS F	16.0	127.0	1.00	1.93	17.3
18	R	1	5.0	1.006	71.9	LOS F	16.0	127.0	1.00	1.93	16.9
Approach		487	5.0	1.006	71.9	LOS F	16.0	127.0	1.00	1.93	17.3
East: Ottawa Road 174											
1	L	93	5.0	2.237	577.1	LOS F	268.7	2127.9	1.00	5.69	3.6
6	T	1354	5.0	2.237	577.1	LOS F	268.7	2127.9	1.00	5.69	4.3
Approach		1448	5.0	2.237	577.1	LOS F	268.7	2127.9	1.00	5.69	4.2
West: Ottawa Road 174											
2	T	760	5.0	0.747	16.9	LOS C	7.2	57.1	0.38	0.54	47.1
12	R	121	5.0	0.119	4.6	LOS A	0.4	3.3	0.14	0.57	56.8
Approach		880	5.0	0.747	15.2	LOS C	7.2	57.1	0.34	0.54	48.0
All Vehicles		2815	5.0	2.237	314.0	LOS F	268.7	2127.9	0.80	3.43	7.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Ottawa Road 174/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Ottawa Road 174/ Collector Road Roundabout 2021 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	1	1	–	0.0
East	Ottawa Road 174	Two-way	1	1	–	0.0
West	Ottawa Road 174	Two-way	2	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	5.00	1	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	LR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	T	1800	–	–	0.0
App. Lane 2	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	100.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
From: West	**Ottawa Road 174**	
West	Yes	–
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.75	20.0	–	No
East	Ottawa Road 174	3.75	20.0	–	No
West	Ottawa Road 174	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	431.0	5.00	92.0	1.20	100.00	2.00
East	5.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	228.0	5.00	92.0	1.20	100.00	2.00
West	603.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
East	1702.0	5.00	92.0	1.20	100.00	2.00
South	344.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	90.0	300.0	–	–	–	–
East	50.0	90.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	90.0	50.0	500.0	–	–	–	–
West	90.0	90.0	500.0	–	–	–	–
From: West	Ottawa Road 174						
East	90.0	90.0	500.0	–	–	–	–
South	90.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Ottawa Road 174								
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
West	Ottawa Road 174				
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									
4P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

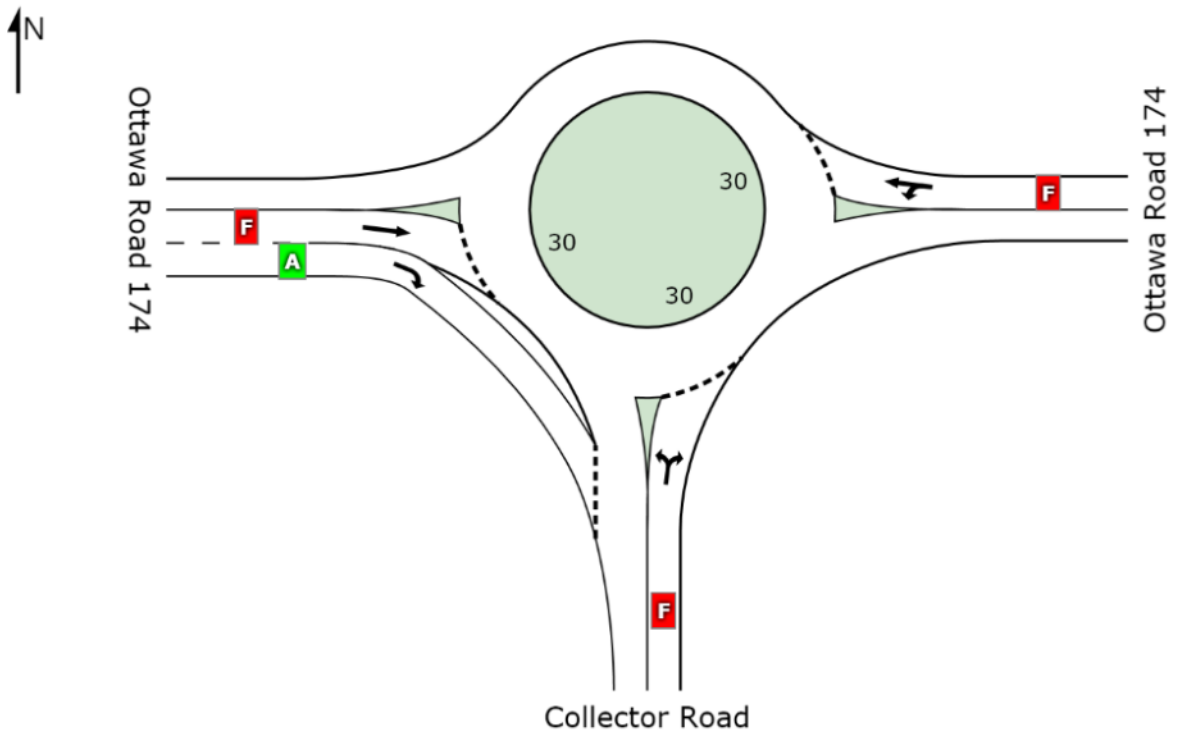
Demand & Sensitivity	
Analysis Method:	None

Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Ottawa Road 174/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	West	Intersection
LOS	F	F	F	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Hwy174-Collector Roundabout - 2021 BK + Site - PM

Ottawa Road 174/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	468	5.0	1.102	104.7	LOS F	24.2	191.6	1.00	2.54	13.5
18	R	5	5.0	1.102	104.7	LOS F	24.2	191.6	1.00	2.54	13.0
Approach		474	5.0	1.102	104.7	LOS F	24.2	191.6	1.00	2.54	13.5
East: Ottawa Road 174											
1	L	248	5.0	1.314	170.6	LOS F	82.6	654.3	1.00	3.12	10.7
6	T	655	5.0	1.314	170.6	LOS F	82.6	654.3	1.00	3.12	12.5
Approach		903	5.0	1.314	170.6	LOS F	82.6	654.3	1.00	3.12	12.0
West: Ottawa Road 174											
2	T	1850	5.0	2.119	520.3	LOS F	344.2	2726.3	1.00	4.69	4.7
12	R	374	5.0	0.428	9.3	LOS A	2.0	15.9	0.44	0.67	50.3
Approach		2224	5.0	2.119	434.4	LOS F	344.2	2726.3	0.91	4.01	5.4
All Vehicles		3601	5.0	2.119	324.8	LOS F	344.2	2726.3	0.94	3.59	6.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2021 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Ottawa Road 174/ Collector Road Roundabout (4-lanes) 2021 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	2	1	–	0.0
East	Ottawa Road 174	Two-way	2	2	–	0.0
West	Ottawa Road 174	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	L	1800	–	–	0.0
App. Lane 2	Normal	LR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	T	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.50	500.0	-8.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	8.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
App. Lane 3	3.75	100.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
From: West	**Ottawa Road 174**	
West	Yes	–
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	4.00	20.0	–	No
East	Ottawa Road 174	3.50	20.0	–	No
West	Ottawa Road 174	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	447.0	5.00	92.0	1.20	100.00	2.00
East	1.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	86.0	5.00	92.0	1.20	100.00	2.00
West	1246.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
East	699.0	5.00	92.0	1.20	100.00	2.00
South	111.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	90.0	300.0	–	–	–	–
East	50.0	90.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	90.0	50.0	500.0	–	–	–	–
West	90.0	90.0	500.0	–	–	–	–
From: West	Ottawa Road 174						
East	90.0	90.0	500.0	–	–	–	–
South	90.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
West	Ottawa Road 174								
T	2	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	0.850	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
West	Ottawa Road 174				
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									
4P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

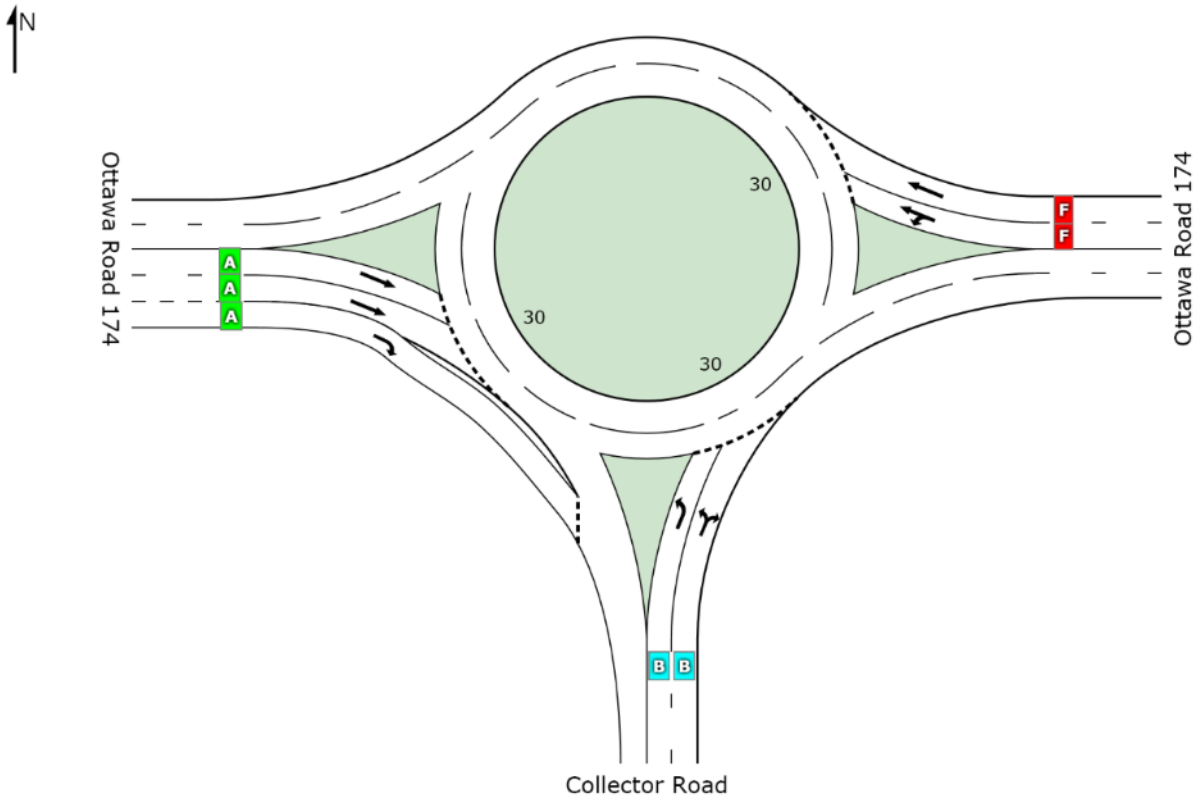
Demand & Sensitivity	
Analysis Method:	None

Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	West	Intersection
LOS	B	F	A	D

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	486	5.0	0.404	12.0	LOS B	1.4	10.8	0.57	0.91	35.3
18	R	1	5.0	0.404	11.8	LOS B	1.3	10.4	0.55	0.79	37.3
Approach		487	5.0	0.404	12.0	LOS B	1.4	10.8	0.57	0.91	35.3
East: Ottawa Road 174											
1	L	93	5.0	0.980	52.3	LOS F	16.0	127.0	1.00	1.39	24.9
6	T	1354	5.0	0.980	51.9	LOS F	16.0	127.0	1.00	1.39	28.8
Approach		1448	5.0	0.980	51.9	LOS F	16.0	127.0	1.00	1.39	28.6
West: Ottawa Road 174											
2	T	760	5.0	0.383	7.8	LOS A	1.4	10.9	0.22	0.59	56.1
12	R	121	5.0	0.121	4.7	LOS A	0.3	2.4	0.16	0.59	56.5
Approach		880	5.0	0.383	7.4	LOS A	1.4	10.9	0.21	0.59	56.2
All Vehicles		2815	5.0	0.980	31.1	LOS D	16.0	127.0	0.68	1.06	35.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2021 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Ottawa Road 174/ Collector Road Roundabout (4-lanes) 2021 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	2	1	–	0.0
East	Ottawa Road 174	Two-way	2	2	–	0.0
West	Ottawa Road 174	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	L	1800	–	–	0.0
App. Lane 2	Normal	LR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	T	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.50	500.0	-8.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	8.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
App. Lane 3	3.75	100.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
From: West	**Ottawa Road 174**	
West	Yes	–
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.75	20.0	–	No
East	Ottawa Road 174	3.75	20.0	–	No
West	Ottawa Road 174	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	431.0	5.00	92.0	1.20	100.00	2.00
East	5.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	228.0	5.00	92.0	1.20	100.00	2.00
West	603.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
East	1702.0	5.00	92.0	1.20	100.00	2.00
South	344.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	90.0	300.0	–	–	–	–
East	50.0	90.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	90.0	50.0	500.0	–	–	–	–
West	90.0	90.0	500.0	–	–	–	–
From: West	Ottawa Road 174						
East	90.0	90.0	500.0	–	–	–	–
South	90.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Ottawa Road 174								
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
West	Ottawa Road 174				
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									
4P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

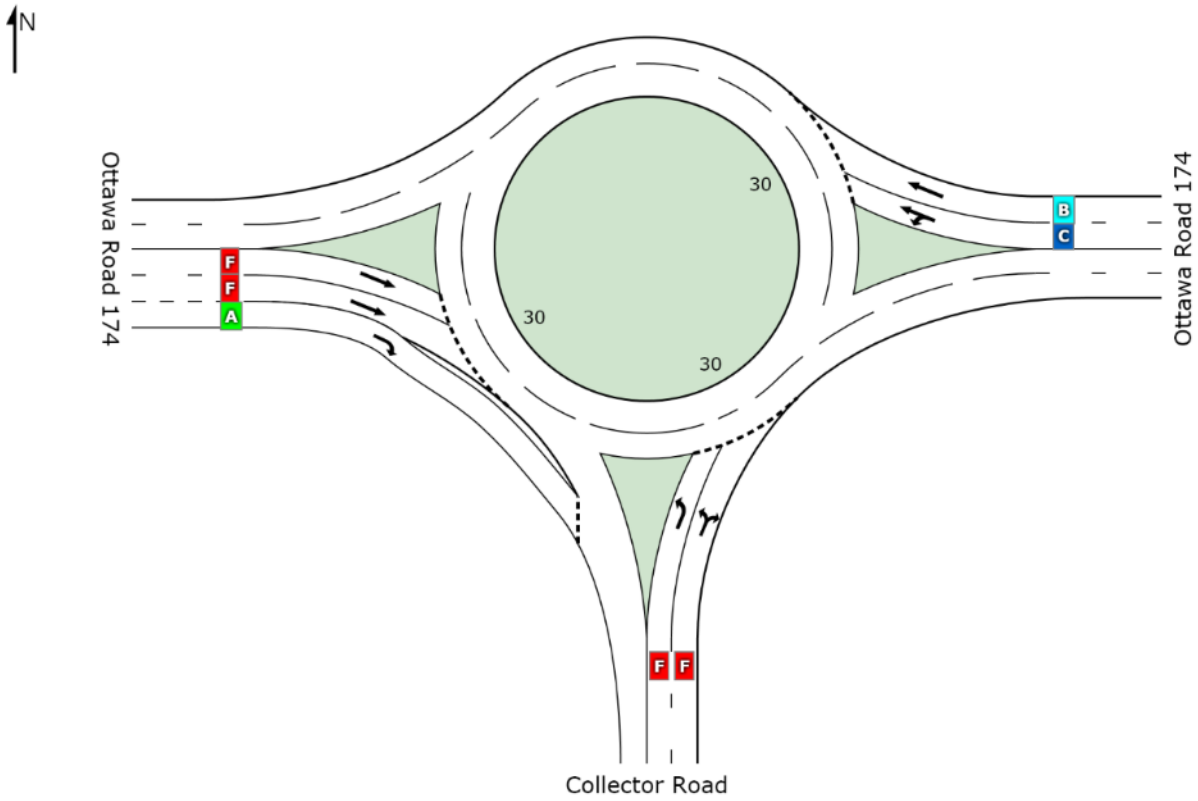
Demand & Sensitivity	
Analysis Method:	None

Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	West	Intersection
LOS	F	B	F	E

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	468	5.0	0.843	59.8	LOS F	3.8	30.4	0.93	1.28	19.4
18	R	5	5.0	0.843	57.8	LOS F	3.8	30.2	0.93	1.26	19.4
Approach		474	5.0	0.843	59.8	LOS F	3.8	30.4	0.93	1.28	19.4
East: Ottawa Road 174											
1	L	248	5.0	0.604	15.0	LOS C	2.9	23.3	0.60	0.98	41.1
6	T	655	5.0	0.604	14.8	LOS B	2.9	23.3	0.58	0.86	48.6
Approach		903	5.0	0.604	14.9	LOS B	2.9	23.3	0.59	0.90	46.5
West: Ottawa Road 174											
2	T	1850	5.0	1.048	65.2	LOS F	36.5	289.2	1.00	1.51	25.2
12	R	374	5.0	0.421	9.1	LOS A	1.4	11.3	0.36	0.69	50.6
Approach		2224	5.0	1.048	55.7	LOS F	36.5	289.2	0.89	1.37	27.1
All Vehicles		3601	5.0	1.048	46.0	LOS E	36.5	289.2	0.82	1.24	28.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	787	31	0	1693	0	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	855	34	0	1840	0	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			889		1776	428
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			889		1776	428
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	97
cM capacity (veh/h)			739		71	788

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	428	428	34	920	920	25
Volume Left	0	0	0	0	0	0
Volume Right	0	0	34	0	0	25
cSH	1700	1700	1700	1700	1700	788
Volume to Capacity	0.25	0.25	0.02	0.54	0.54	0.03
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.7
Lane LOS						A
Approach Delay (s)	0.0			0.0		9.7
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

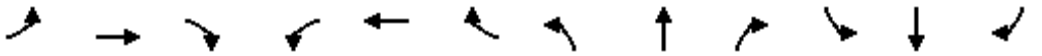
* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1864	185	0	1034	0	183
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2026	201	0	1124	0	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			2227		2588	1013
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2227		2588	1013
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	54
cM capacity (veh/h)			221		20	435

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	1013	1013	201	562	562	199
Volume Left	0	0	0	0	0	0
Volume Right	0	0	201	0	0	199
cSH	1700	1700	1700	1700	1700	435
Volume to Capacity	0.60	0.60	0.12	0.33	0.33	0.46
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	16.4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	20.1
Lane LOS						C
Approach Delay (s)	0.0			0.0		20.1
Approach LOS						C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

* User Entered Value

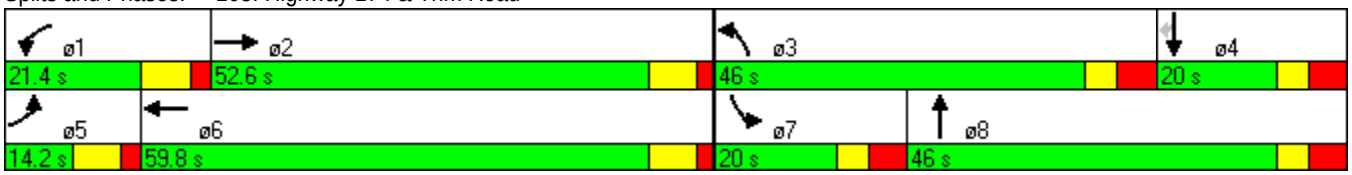


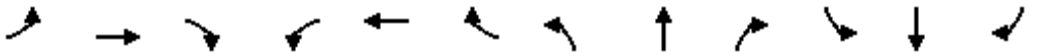
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	702	232	98	1581	14	1306	44	102	14	18	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999			0.895				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	3195	2948	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	3195	2948	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			223		1			111				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	16	763	252	107	1718	15	1420	48	111	15	20	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	763	252	107	1733	0	1420	159	0	15	20	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		17.4	43.4		17.4	17.4	17.4
Total Split (s)	14.2	52.6	0.0	21.4	59.8	0.0	46.0	46.0	0.0	20.0	20.0	20.0
Total Split (%)	10.1%	37.6%	0.0%	15.3%	42.7%	0.0%	32.9%	32.9%	0.0%	14.3%	14.3%	14.3%
Maximum Green (s)	7.0	45.6		14.2	52.9		38.6	38.6		12.6	12.6	12.6
Yellow Time (s)	5.1	5.1		5.1	5.0		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	6.9	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	6.4	39.6	129.7	12.3	53.9		38.7	49.6		10.0	10.0	10.0
Actuated g/C Ratio	0.05	0.31	1.00	0.09	0.42		0.30	0.38		0.08	0.08	0.08
v/c Ratio	0.20	0.76	0.17	0.69	1.27		1.49	0.13		0.12	0.15	0.08
Control Delay	67.2	46.4	0.2	79.6	160.1		259.4	11.7		60.7	61.2	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.2	46.4	0.2	79.6	160.1		259.4	11.7		60.7	61.2	30.2
LOS	E	D	A	E	F		F	B		E	E	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		35.5			155.4			234.4			54.2	
Approach LOS		D			F			F			D	
Queue Length 50th (m)	3.6	86.7	0.0	23.9	~252.4		~231.0	3.2		3.3	4.4	0.0
Queue Length 95th (m)	11.2	108.1	0.0	#46.7	#341.7		#298.0	12.7		10.4	12.7	5.5
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	89	1161	1473	181	1366		954	1196		160	169	153
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.18	0.66	0.17	0.59	1.27		1.49	0.13		0.09	0.12	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 129.7			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.49			
Intersection Signal Delay: 154.6		Intersection LOS: F	
Intersection Capacity Utilization 114.7%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road



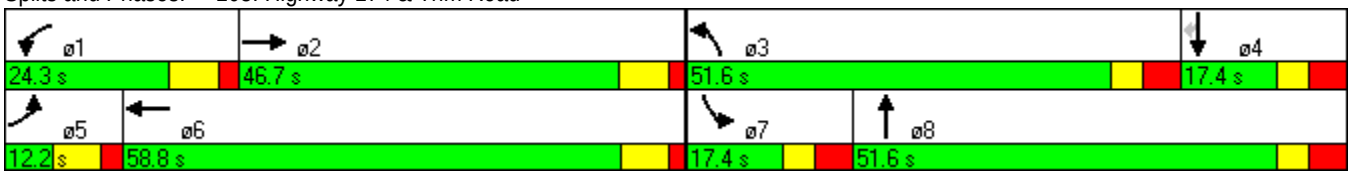


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	702	232	98	1581	14	1306	44	102	14	18	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.895				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	4732	1473	1647	4727	0	4644	1551	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	4732	1473	1647	4727	0	4644	1551	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			252		1			87				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			819.2			450.9			319.3	
Travel Time (s)		25.8			59.0			32.5			23.0	
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
Adj. Flow (vph)	16	763	252	107	1718	15	1420	48	111	15	20	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	763	252	107	1733	0	1420	159	0	15	20	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		12.4	17.4		17.4	17.4	17.4
Total Split (s)	12.2	46.7	0.0	24.3	58.8	0.0	51.6	51.6	0.0	17.4	17.4	17.4
Total Split (%)	8.7%	33.4%	0.0%	17.4%	42.0%	0.0%	36.9%	36.9%	0.0%	12.4%	12.4%	12.4%
Maximum Green (s)	5.0	39.7		17.1	51.9		44.2	44.2		10.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.0		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	6.9	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	5.1	36.8	123.0	12.9	52.9		41.8	45.2		10.2	10.2	10.2
Actuated g/C Ratio	0.04	0.30	1.00	0.10	0.43		0.34	0.37		0.08	0.08	0.08
v/c Ratio	0.24	0.54	0.17	0.62	0.85		0.90	0.25		0.11	0.14	0.08
Control Delay	72.4	39.6	0.2	71.3	39.0		48.5	15.6		61.4	61.6	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.4	39.6	0.2	71.3	39.0		48.5	15.6		61.4	61.6	31.1
LOS	E	D	A	E	D		D	B		E	E	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.5			40.9			45.2			54.7	
Approach LOS		C			D			D			D	
Queue Length 50th (m)	3.7	58.7	0.0	24.1	136.2		109.5	8.9		3.3	4.4	0.0
Queue Length 95th (m)	11.3	74.0	0.0	44.2	#193.2		#155.3	30.0		10.4	12.7	5.4
Internal Link Dist (m)		333.9			795.2			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	68	1558	1473	233	2032		1700	663		137	144	131
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.24	0.49	0.17	0.46	0.85		0.84	0.24		0.11	0.14	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 123			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 40.2		Intersection LOS: D	
Intersection Capacity Utilization 87.5%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1771	1037	182	818	34	639	55	232	46	42	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.994			0.879				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3274	0	3195	2895	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3274	0	3195	2895	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			396		4			114				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	22	1925	1127	198	889	37	695	60	252	50	46	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1925	1127	198	926	0	695	312	0	50	46	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		17.4	43.4		12.4	17.4	17.4
Total Split (s)	13.6	65.2	0.0	19.0	70.6	0.0	37.3	43.4	0.0	12.4	18.5	18.5
Total Split (%)	9.7%	46.6%	0.0%	13.6%	50.4%	0.0%	26.6%	31.0%	0.0%	8.9%	13.2%	13.2%
Maximum Green (s)	6.4	58.2		11.8	63.6		29.9	36.0		5.0	11.1	11.1
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	6.2	58.2	139.2	11.8	69.0		29.9	35.2		5.0	10.3	10.3
Actuated g/C Ratio	0.04	0.42	1.00	0.08	0.50		0.21	0.25		0.04	0.07	0.07
v/c Ratio	0.30	1.40	0.77	1.41	0.57		1.01	0.38		0.85	0.36	0.02
Control Delay	75.2	216.6	3.8	268.8	27.3		91.2	28.2		144.4	69.5	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.2	216.6	3.8	268.8	27.3		91.2	28.2		144.4	69.5	41.0
LOS	E	F	A	F	C		F	C		F	E	D

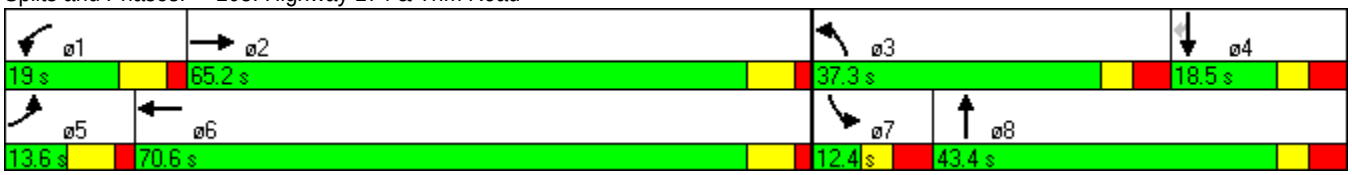
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		137.6			69.9			71.7			107.1	
Approach LOS		F			E			E			F	
Queue Length 50th (m)	5.5	~341.1	0.0	~67.2	91.2		~92.9	21.4		12.8	11.3	0.0
Queue Length 95th (m)	14.1	#383.5	0.0	#113.5	112.8		#131.7	34.1		#36.3	23.5	2.7
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	76	1377	1473	140	1626		686	833		59	138	120
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.29	1.40	0.77	1.41	0.57		1.01	0.37		0.85	0.33	0.02

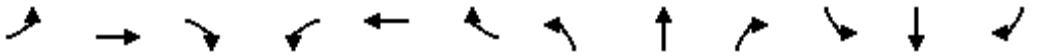
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 139.2			
Natural Cycle: 115			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.41			
Intersection Signal Delay: 110.2		Intersection LOS: F	
Intersection Capacity Utilization 114.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1771	1037	182	818	34	639	55	232	46	42	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.994			0.879				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	4732	1473	1647	4704	0	4644	1524	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	4732	1473	1647	4704	0	4644	1524	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			570		6			134				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			782.7			450.9			319.3	
Travel Time (s)		25.8			56.4			32.5			23.0	
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
Adj. Flow (vph)	22	1925	1127	198	889	37	695	60	252	50	46	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1925	1127	198	926	0	695	312	0	50	46	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		12.4	17.4		12.4	17.4	17.4
Total Split (s)	13.6	66.6	0.0	26.0	79.0	0.0	30.0	34.4	0.0	13.0	17.4	17.4
Total Split (%)	9.7%	47.6%	0.0%	18.6%	56.4%	0.0%	21.4%	24.6%	0.0%	9.3%	12.4%	12.4%
Maximum Green (s)	6.4	59.6		18.8	72.0		22.6	27.0		5.6	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	6.2	59.2	134.6	18.2	76.8		22.1	25.5		5.6	10.1	10.1
Actuated g/C Ratio	0.05	0.44	1.00	0.14	0.57		0.16	0.19		0.04	0.08	0.08
v/c Ratio	0.29	0.92	0.77	0.89	0.34		0.91	0.79		0.72	0.35	0.02
Control Delay	74.7	45.2	3.8	96.0	17.5		73.1	44.7		114.6	70.2	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	74.7	45.2	3.8	96.0	17.5		73.1	44.7		114.6	70.2	42.0
LOS	E	D	A	F	B		E	D		F	E	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.3			31.4			64.3			92.3	
Approach LOS		C			C			E			F	
Queue Length 50th (m)	5.5	172.0	0.0	50.4	50.5		62.8	44.6		12.9	11.4	0.0
Queue Length 95th (m)	14.1	#204.4	0.0	#91.8	60.2		#84.2	#82.8		#34.4	23.7	2.7
Internal Link Dist (m)		333.9			758.7			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	79	2110	1473	232	2686		786	415		69	130	112
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.28	0.91	0.77	0.85	0.34		0.88	0.75		0.72	0.35	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 134.6			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 38.1		Intersection LOS: D	
Intersection Capacity Utilization 93.2%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road

INPUT REPORT

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2021 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	102.0	5.00	92.0	1.20	100.00	2.00
North	1427.0	5.00	92.0	1.20	100.00	2.00
East	19.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	10.0	5.00	92.0	1.20	100.00	2.00
West	2.0	5.00	92.0	1.20	100.00	2.00
North	2.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	80.0	5.00	92.0	1.20	100.00	2.00
South	207.0	5.00	92.0	1.20	100.00	2.00
West	63.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	23.0	5.00	92.0	1.20	100.00	2.00
East	3.0	5.00	92.0	1.20	100.00	2.00
South	37.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

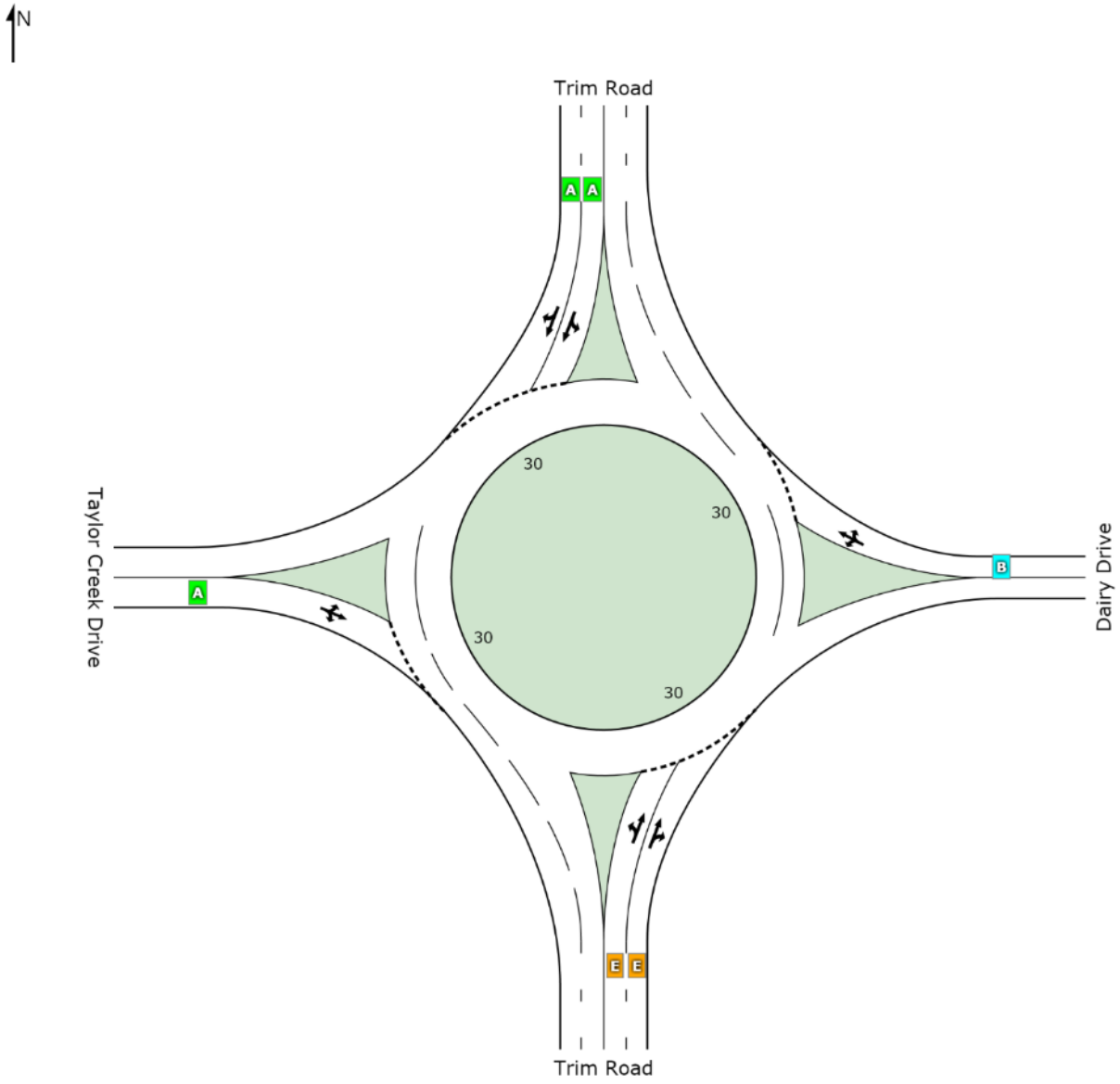
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK + Site - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	E	B	A	A	D

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK + Site - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	111	5.0	0.935	37.5	LOS E	17.1	135.0	0.87	0.84	21.8
8	T	1551	5.0	0.935	37.5	LOS E	17.1	135.0	0.87	0.77	24.0
18	R	21	5.0	0.935	37.5	LOS E	17.1	135.0	0.87	0.79	21.6
Approach		1683	5.0	0.935	37.5	LOS E	17.1	135.0	0.87	0.78	23.8
East: Dairy Drive											
1	L	11	5.0	0.049	12.4	LOS B	0.1	0.9	0.72	0.93	35.7
6	T	2	5.0	0.049	12.4	LOS B	0.1	0.9	0.72	0.78	36.0
16	R	2	5.0	0.049	12.4	LOS B	0.1	0.9	0.72	0.83	37.5
Approach		15	5.0	0.049	12.4	LOS B	0.1	0.9	0.72	0.90	36.0
North: Trim Road											
7	L	87	5.0	0.213	6.2	LOS A	0.8	6.1	0.28	0.79	40.5
4	T	225	5.0	0.213	6.2	LOS A	0.8	6.1	0.28	0.50	47.6
14	R	68	5.0	0.213	6.2	LOS A	0.8	6.1	0.28	0.58	44.8
Approach		380	5.0	0.213	6.2	LOS A	0.8	6.1	0.28	0.58	45.3
West: Taylor Creek Drive											
5	L	25	5.0	0.081	5.1	LOS A	0.2	1.6	0.30	0.80	39.8
2	T	3	5.0	0.081	5.1	LOS A	0.2	1.6	0.30	0.38	42.1
12	R	40	5.0	0.081	5.1	LOS A	0.2	1.6	0.30	0.53	42.8
Approach		68	5.0	0.081	5.1	LOS A	0.2	1.6	0.30	0.62	41.6
All Vehicles		2147	5.0	0.935	30.8	LOS D	17.1	135.0	0.74	0.74	26.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK + Site - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2021 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	41.0	5.00	92.0	1.20	100.00	2.00
North	880.0	5.00	92.0	1.20	100.00	2.00
East	16.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	104.0	5.00	92.0	1.20	100.00	2.00
West	11.0	5.00	92.0	1.20	100.00	2.00
North	15.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	22.0	5.00	92.0	1.20	100.00	2.00
South	1203.0	5.00	92.0	1.20	100.00	2.00
West	36.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	31.0	5.00	92.0	1.20	100.00	2.00
East	2.0	5.00	92.0	1.20	100.00	2.00
South	72.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

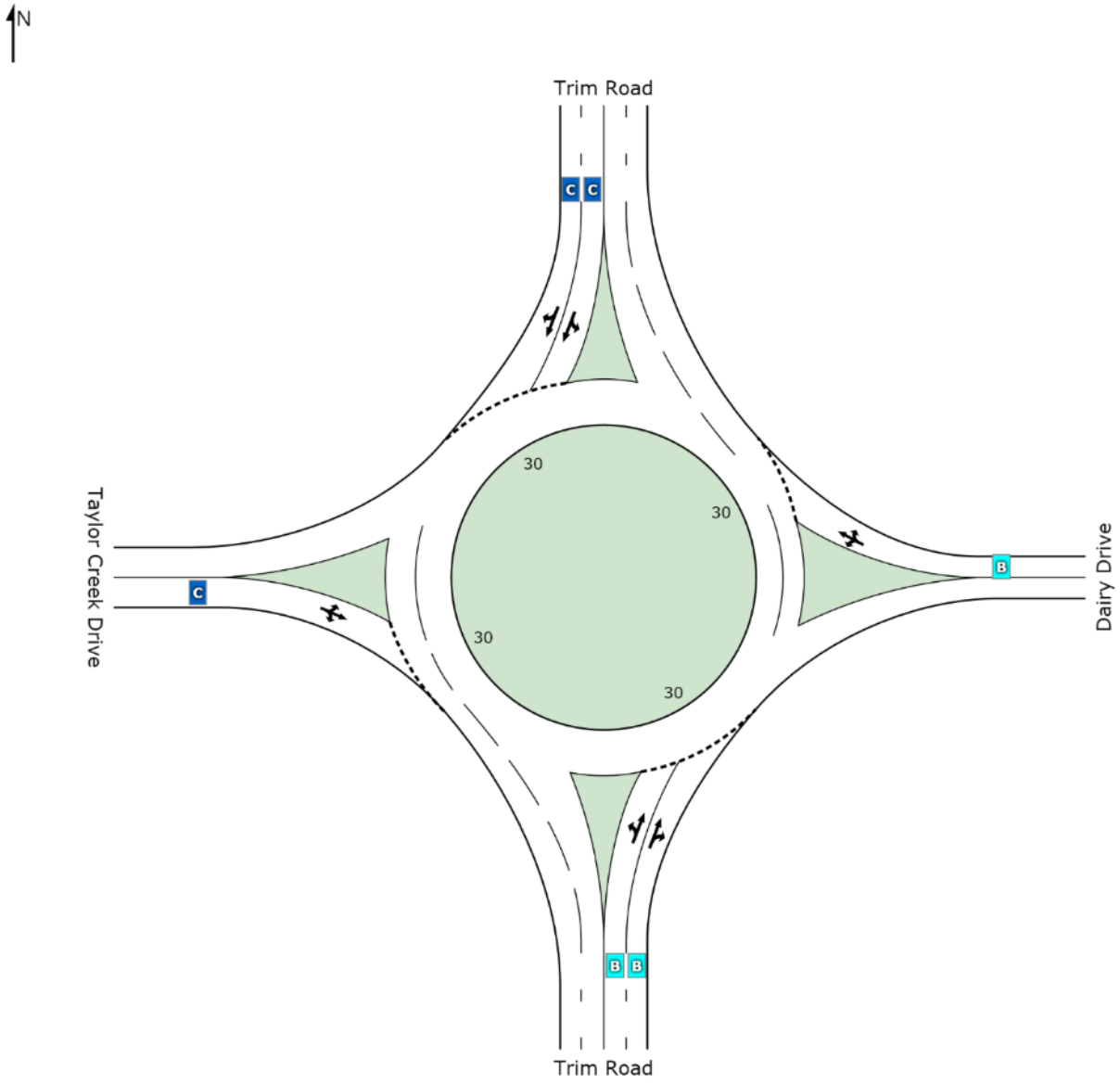
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK + Site - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	B	B	C	C	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2021 BK + Site - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	45	5.0	0.535	10.7	LOS B	2.9	23.2	0.28	0.87	34.1
8	T	957	5.0	0.535	10.7	LOS B	2.9	23.2	0.28	0.48	40.2
18	R	17	5.0	0.535	10.7	LOS B	2.9	23.2	0.28	0.57	36.8
Approach		1018	5.0	0.535	10.7	LOS B	2.9	23.2	0.28	0.50	39.9
East: Dairy Drive											
1	L	113	5.0	0.281	11.3	LOS B	0.8	6.1	0.61	0.91	36.2
6	T	12	5.0	0.281	11.3	LOS B	0.8	6.1	0.61	0.70	36.8
16	R	16	5.0	0.281	11.3	LOS B	0.8	6.1	0.61	0.78	38.1
Approach		141	5.0	0.281	11.3	LOS B	0.8	6.1	0.61	0.88	36.4
North: Trim Road											
7	L	24	5.0	0.804	23.0	LOS C	8.2	65.3	0.70	0.92	30.1
4	T	1308	5.0	0.804	23.0	LOS C	8.2	65.3	0.70	0.75	33.4
14	R	39	5.0	0.804	23.0	LOS C	8.2	65.3	0.70	0.79	31.0
Approach		1371	5.0	0.804	23.0	LOS C	8.2	65.3	0.70	0.76	33.3
West: Taylor Creek Drive											
5	L	34	5.0	0.307	15.4	LOS C	0.8	6.6	0.73	0.98	34.3
2	T	2	5.0	0.307	15.4	LOS C	0.8	6.6	0.73	0.82	34.4
12	R	78	5.0	0.307	15.4	LOS C	0.8	6.6	0.73	0.88	35.9
Approach		114	5.0	0.307	15.4	LOS C	0.8	6.6	0.73	0.91	35.3
All Vehicles		2645	5.0	0.804	17.3	LOS C	8.2	65.3	0.53	0.67	35.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2021 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	138.0	5.00	92.0	1.20	100.00	2.00
North	1081.0	5.00	92.0	1.20	100.00	2.00
East	37.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	103.0	5.00	92.0	1.20	100.00	2.00
West	319.0	5.00	92.0	1.20	100.00	2.00
North	442.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	66.0	5.00	92.0	1.20	100.00	2.00
South	170.0	5.00	92.0	1.20	100.00	2.00
West	17.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	26.0	5.00	92.0	1.20	100.00	2.00
East	53.0	5.00	92.0	1.20	100.00	2.00
South	41.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

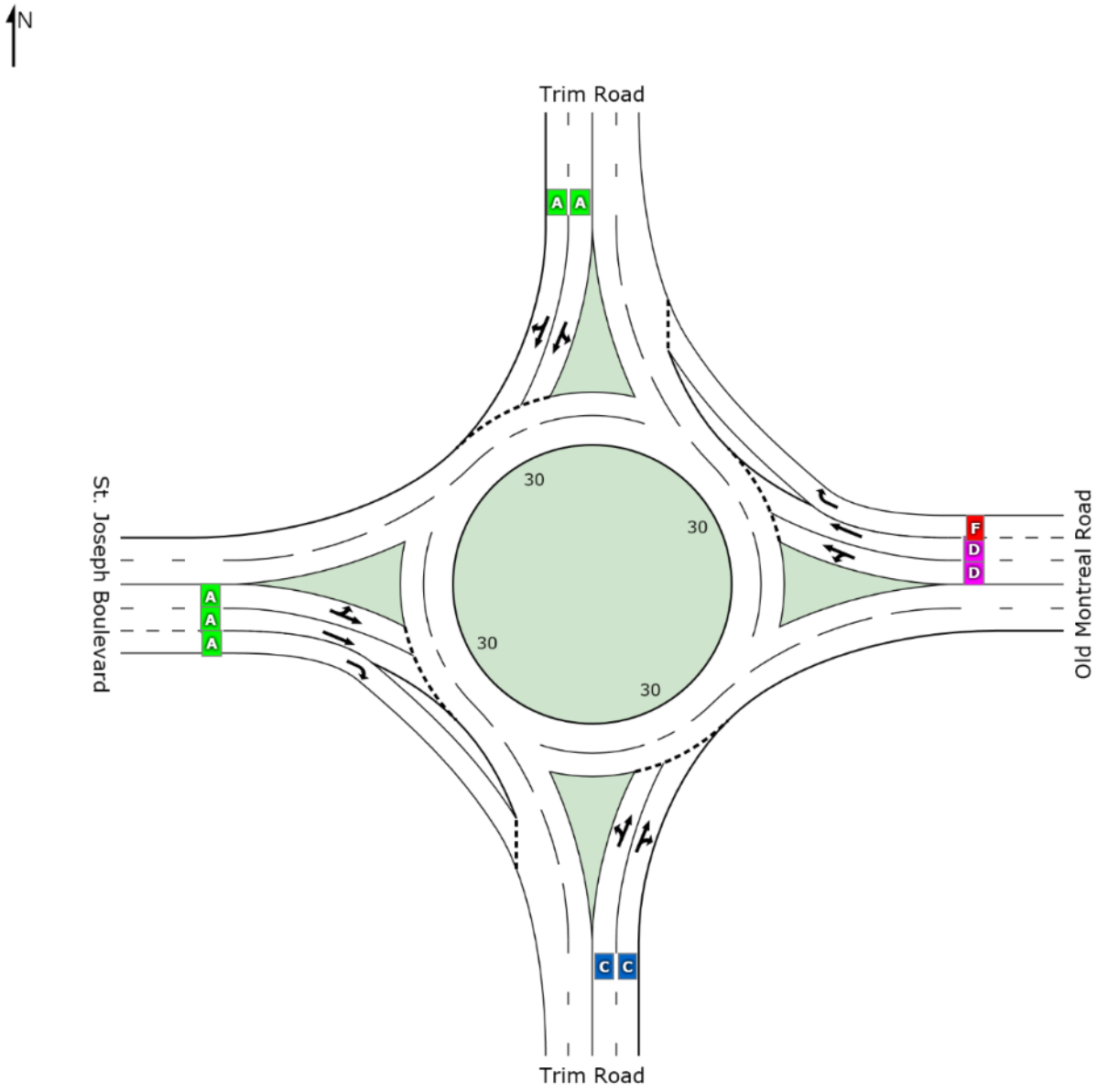
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	F	A	A	D

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	150	5.0	0.756	19.0	LOS C	5.2	41.1	0.51	0.87	36.3
8	T	1175	5.0	0.756	19.0	LOS C	5.2	41.1	0.49	0.64	33.3
18	R	40	5.0	0.756	18.9	LOS C	4.9	38.8	0.48	0.69	31.5
Approach		1365	5.0	0.756	19.0	LOS C	5.2	41.1	0.49	0.66	33.7
East: Old Montreal Road											
1	L	112	5.0	0.619	27.3	LOS D	2.3	18.2	0.82	1.08	20.4
6	T	347	5.0	0.619	27.3	LOS D	2.3	18.2	0.82	1.00	18.7
16	R	480	5.0	1.081	96.7	LOS F	19.6	155.0	1.00	2.26	8.3
Approach		939	5.0	1.081	62.8	LOS F	19.6	155.0	0.91	1.65	11.4
North: Trim Road											
7	L	72	5.0	0.208	8.0	LOS A	0.6	4.5	0.47	0.91	37.1
4	T	185	5.0	0.208	7.9	LOS A	0.6	4.5	0.45	0.71	43.1
14	R	18	5.0	0.208	7.8	LOS A	0.5	4.3	0.45	0.76	41.2
Approach		275	5.0	0.208	7.9	LOS A	0.6	4.5	0.46	0.77	41.2
West: St. Joseph Boulevard											
5	L	28	5.0	0.056	5.2	LOS A	0.1	1.1	0.33	0.80	43.3
2	T	58	5.0	0.056	5.2	LOS A	0.1	1.1	0.33	0.52	47.5
12	R	45	5.0	0.054	4.9	LOS A	0.1	1.0	0.28	0.56	47.9
Approach		130	5.0	0.056	5.1	LOS A	0.1	1.1	0.32	0.59	46.6
All Vehicles		2710	5.0	1.081	32.4	LOS D	19.6	155.0	0.63	1.01	24.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2021 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Trim Road**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
App. Lane 3	3.50	85.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
North	**Trim Road**			
App. Lane 1	3.75	300.0	1.00	–
App. Lane 2	3.50	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
Exit Lane 2	3.50	300.0	-1.00	–
West	**St. Joseph Boulevard**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.50	500.0	1.00	–
App. Lane 3	3.50	100.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Trim Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Trim Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**St. Joseph Boulevard**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	105.0	5.00	92.0	1.20	100.00	2.00
North	652.0	5.00	92.0	1.20	100.00	2.00
East	99.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	109.0	5.00	92.0	1.20	100.00	2.00
West	146.0	5.00	92.0	1.20	100.00	2.00
North	219.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	291.0	5.00	92.0	1.20	100.00	2.00
South	1013.0	5.00	92.0	1.20	100.00	2.00
West	73.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	65.0	5.00	92.0	1.20	100.00	2.00
East	202.0	5.00	92.0	1.20	100.00	2.00
South	218.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

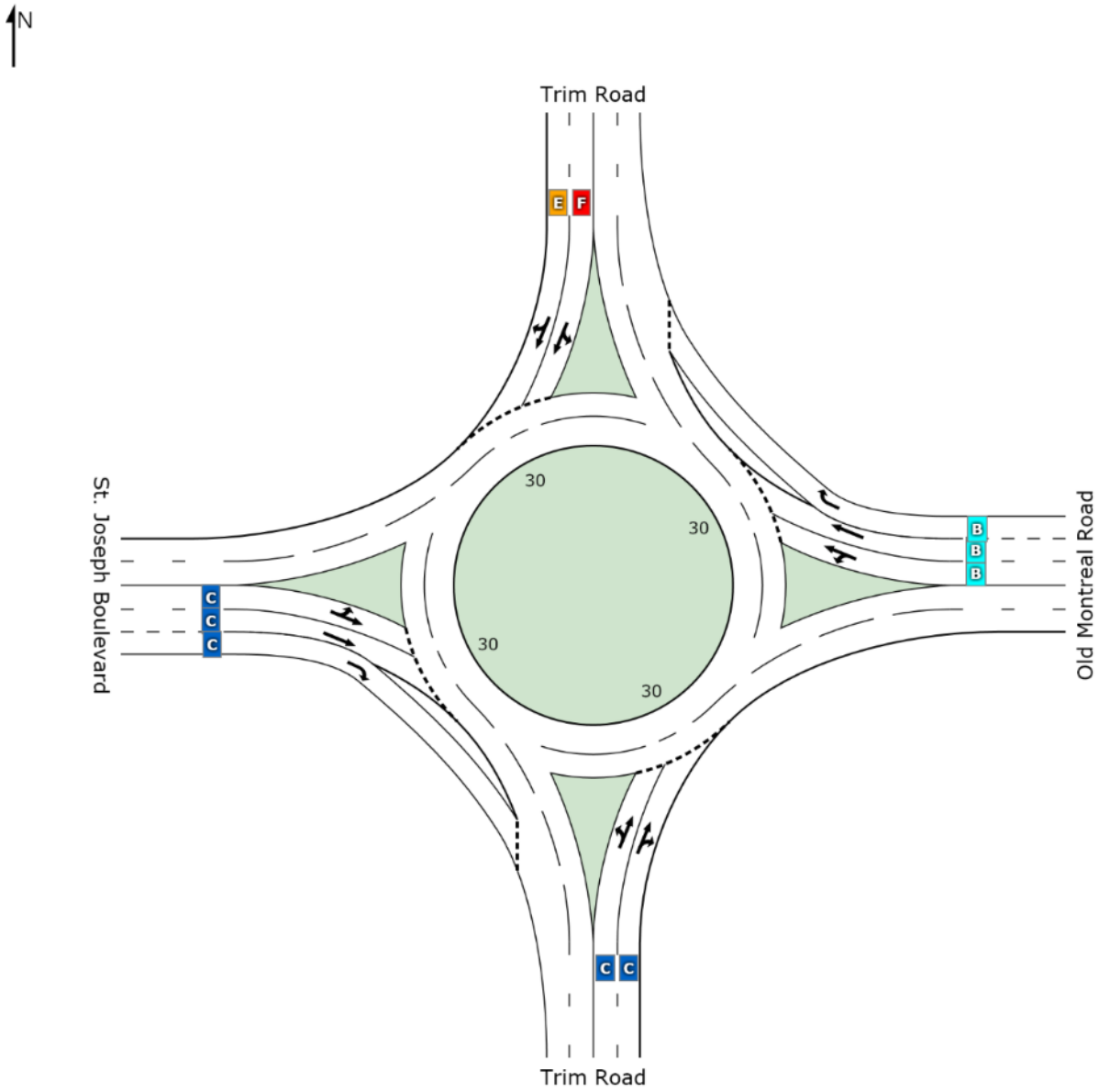
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	B	E	C	D

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	114	5.0	0.703	21.1	LOS C	3.8	29.8	0.69	1.06	35.3
8	T	709	5.0	0.703	20.8	LOS C	3.8	29.8	0.68	0.92	32.0
18	R	108	5.0	0.703	20.5	LOS C	3.6	28.6	0.67	0.94	30.4
Approach		930	5.0	0.703	20.8	LOS C	3.8	29.8	0.68	0.94	32.4
East: Old Montreal Road											
1	L	118	5.0	0.260	10.4	LOS B	0.7	5.8	0.58	0.90	28.6
6	T	159	5.0	0.260	10.4	LOS B	0.7	5.8	0.58	0.74	29.6
16	R	238	5.0	0.396	11.8	LOS B	1.3	10.0	0.55	0.80	29.7
Approach		515	5.0	0.396	11.1	LOS B	1.3	10.0	0.57	0.81	29.3
North: Trim Road											
7	L	316	5.0	0.976	50.1	LOS F	15.9	125.7	0.96	1.41	19.2
4	T	1101	5.0	0.976	49.8	LOS E	15.9	125.7	0.95	1.38	20.3
14	R	79	5.0	0.976	49.6	LOS E	15.4	121.8	0.94	1.38	19.1
Approach		1497	5.0	0.976	49.8	LOS E	15.9	125.7	0.95	1.39	20.0
West: St. Joseph Boulevard											
5	L	71	5.0	0.452	22.4	LOS C	1.4	11.0	0.81	1.03	33.6
2	T	220	5.0	0.452	22.4	LOS C	1.4	11.0	0.81	0.94	34.5
12	R	237	5.0	0.540	20.1	LOS C	1.9	14.7	0.75	0.95	36.4
Approach		527	5.0	0.540	21.4	LOS C	1.9	14.7	0.78	0.96	35.2
All Vehicles		3470	5.0	0.976	32.0	LOS D	15.9	125.7	0.80	1.12	25.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - AM - Free-FlowWBRT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
(Free-Flow WBRT)

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2021 Background plus Site Generated Traffic - AM Peak Hour (Free-Flow WBRT)
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	3	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Continuous	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
East	Old Montreal Road				
App. Lane 1		3.75	130.0	1.00	–
App. Lane 2		3.50	130.0	1.00	–
App. Lane 3		3.50	85.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
Exit Lane 3		3.50	300.0	-1.00	–
West	St. Joseph Boulevard				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
App. Lane 3		3.50	100.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Old Montreal Road		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	St. Joseph Boulevard		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	138.0	5.00	92.0	1.20	100.00	2.00
North	1081.0	5.00	92.0	1.20	100.00	2.00
East	37.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	103.0	5.00	92.0	1.20	100.00	2.00
West	319.0	5.00	92.0	1.20	100.00	2.00
North	442.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	66.0	5.00	92.0	1.20	100.00	2.00
South	170.0	5.00	92.0	1.20	100.00	2.00
West	17.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	26.0	5.00	92.0	1.20	100.00	2.00
East	53.0	5.00	92.0	1.20	100.00	2.00
South	41.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Cont.*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

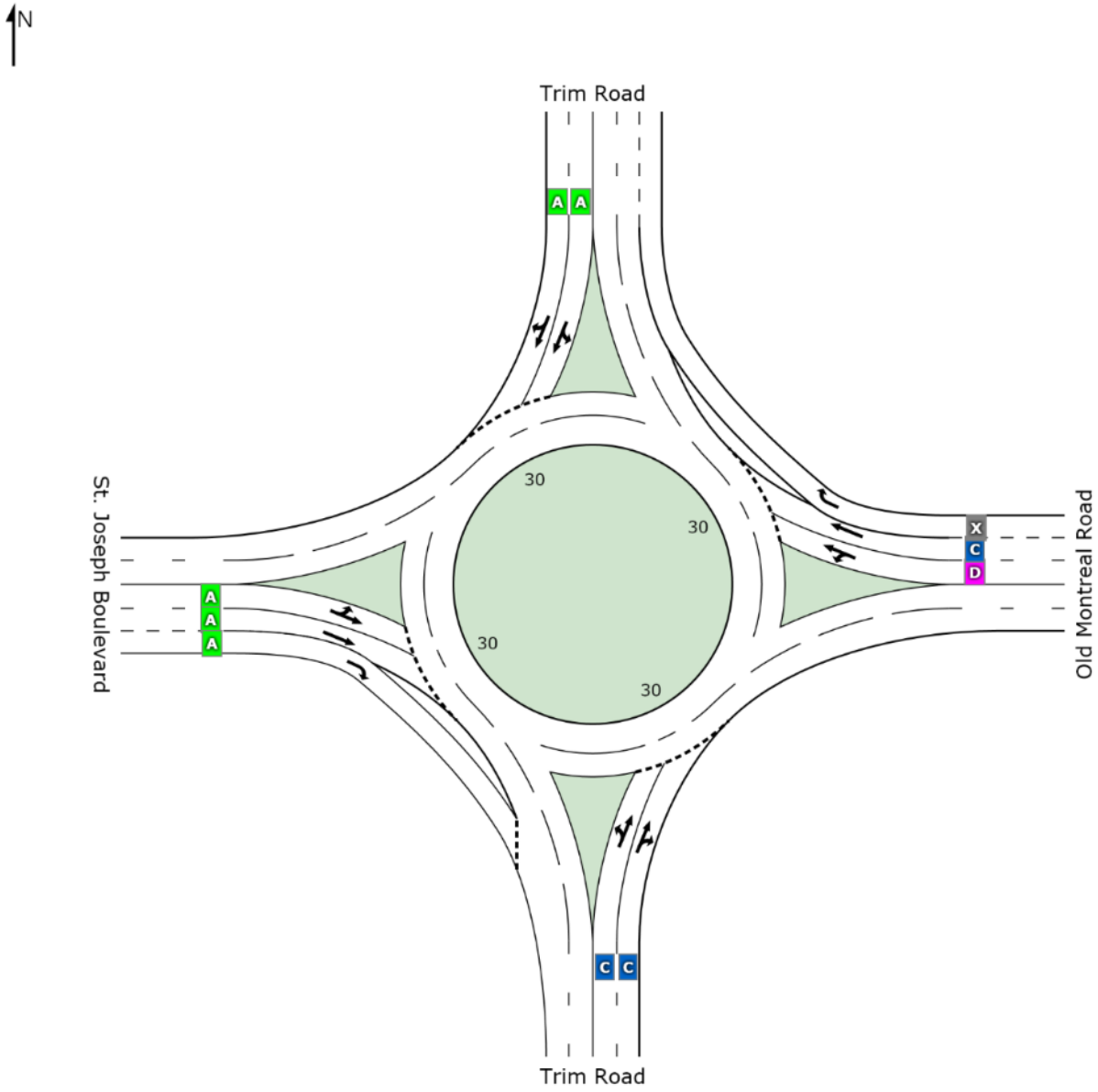
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - AM - Free-FlowWBRT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
(Free-Flow WBRT)
Roundabout



	South	East	North	West	Intersection
LOS	C	B	A	A	B

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - AM - Free-FlowWBRT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
(Free-Flow WBRT)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	150	5.0	0.756	19.0	LOS C	5.2	41.1	0.51	0.87	36.3
8	T	1175	5.0	0.756	19.0	LOS C	5.2	41.1	0.49	0.64	33.3
18	R	40	5.0	0.756	18.9	LOS C	4.9	38.8	0.48	0.69	31.5
Approach		1365	5.0	0.756	19.0	LOS C	5.2	41.1	0.49	0.66	33.7
East: Old Montreal Road											
1	L	112	5.0	0.597	26.1	LOS D	2.2	17.1	0.82	1.07	20.9
6	T	347	5.0	0.597	25.0	LOS D	2.2	17.1	0.80	0.97	19.7
16	R	480	5.0	0.326	0.0	X	X	X	X	0.45	44.2
Approach		939	5.0	0.597	12.4	LOS B	2.2	17.1	0.39	0.72	27.3
North: Trim Road											
7	L	72	5.0	0.208	8.0	LOS A	0.6	4.5	0.47	0.91	37.1
4	T	185	5.0	0.208	7.9	LOS A	0.6	4.5	0.45	0.71	43.1
14	R	18	5.0	0.208	7.8	LOS A	0.5	4.3	0.45	0.76	41.2
Approach		275	5.0	0.208	7.9	LOS A	0.6	4.5	0.46	0.77	41.2
West: St. Joseph Boulevard											
5	L	28	5.0	0.056	5.2	LOS A	0.1	1.1	0.33	0.80	43.3
2	T	58	5.0	0.056	5.2	LOS A	0.1	1.1	0.33	0.52	47.5
12	R	45	5.0	0.054	4.9	LOS A	0.1	1.0	0.28	0.56	47.9
Approach		130	5.0	0.056	5.1	LOS A	0.1	1.1	0.32	0.59	46.6
All Vehicles		2710	5.0	0.756	14.9	LOS B	5.2	41.1	0.45	0.69	33.4

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - PM - Free-FlowWBRT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
(Free-Flow WBRT)

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2021 Background plus Site Generated Traffic - PM Peak Hour (Free-Flow WBRT)
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	3	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Continuous	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
East	Old Montreal Road				
App. Lane 1		3.75	130.0	1.00	–
App. Lane 2		3.50	130.0	1.00	–
App. Lane 3		3.50	85.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
Exit Lane 3		3.50	300.0	-1.00	–
West	St. Joseph Boulevard				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
App. Lane 3		3.50	100.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Old Montreal Road		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	St. Joseph Boulevard		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	105.0	5.00	92.0	1.20	100.00	2.00
North	652.0	5.00	92.0	1.20	100.00	2.00
East	99.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	109.0	5.00	92.0	1.20	100.00	2.00
West	146.0	5.00	92.0	1.20	100.00	2.00
North	219.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	291.0	5.00	92.0	1.20	100.00	2.00
South	1013.0	5.00	92.0	1.20	100.00	2.00
West	73.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	65.0	5.00	92.0	1.20	100.00	2.00
East	202.0	5.00	92.0	1.20	100.00	2.00
South	218.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Cont.*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

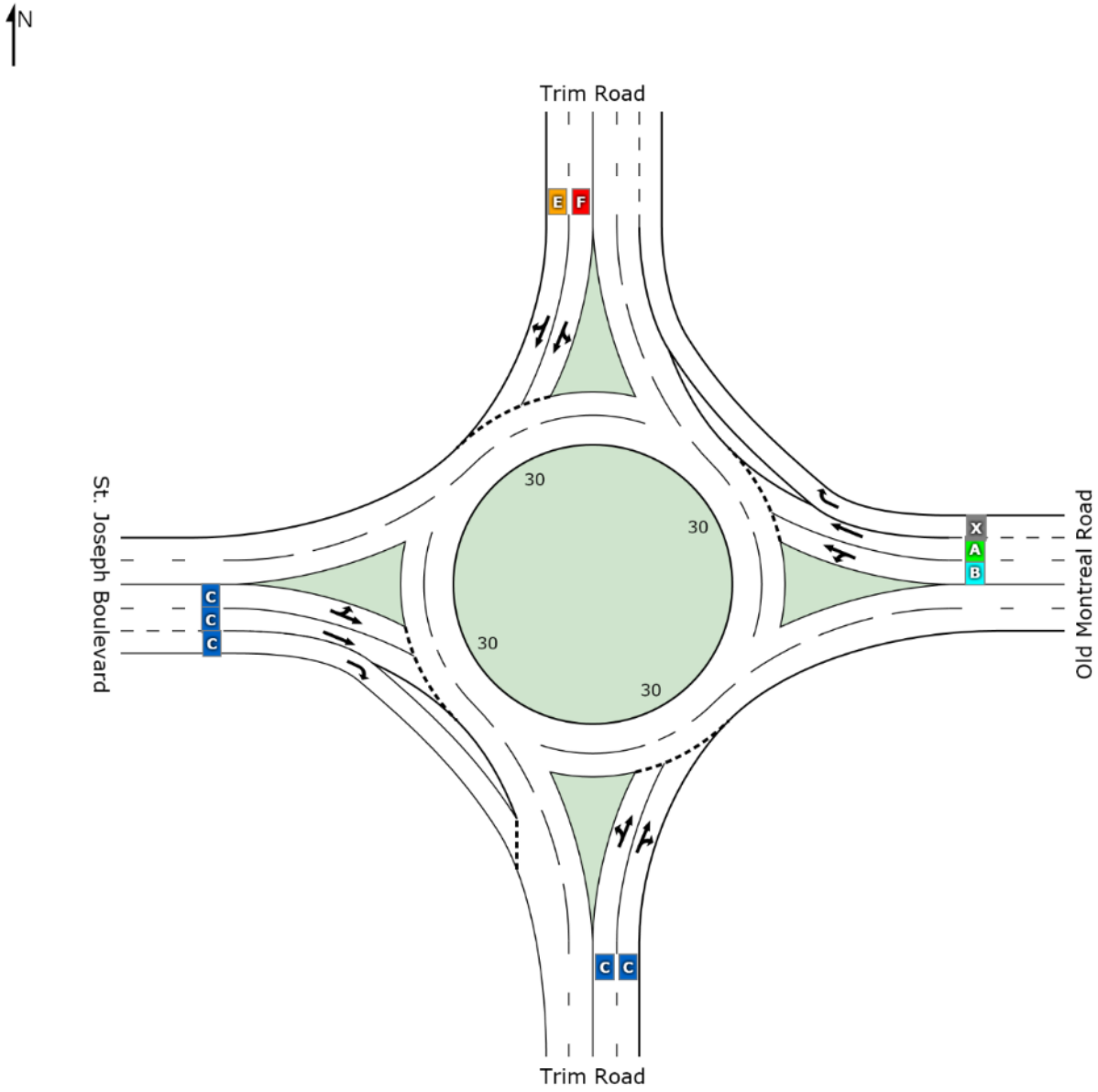
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - PM - Free-FlowWBRT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
(Free-Flow WBRT)
Roundabout



	South	East	North	West	Intersection
LOS	C	A	E	C	D

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2021 BK +Site - PM - Free-FlowWBRT

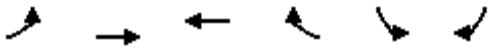
Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
(Free-Flow WBRT)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	114	5.0	0.703	21.1	LOS C	3.8	29.8	0.69	1.06	35.3
8	T	709	5.0	0.703	20.8	LOS C	3.8	29.8	0.68	0.92	32.0
18	R	108	5.0	0.703	20.5	LOS C	3.6	28.6	0.67	0.94	30.4
Approach		930	5.0	0.703	20.8	LOS C	3.8	29.8	0.68	0.94	32.4
East: Old Montreal Road											
1	L	118	5.0	0.254	10.3	LOS B	0.7	5.6	0.57	0.89	28.6
6	T	159	5.0	0.254	9.9	LOS A	0.7	5.6	0.55	0.73	30.1
16	R	238	5.0	0.161	0.0	X	X	X	X	0.45	44.2
Approach		515	5.0	0.254	5.4	LOS A	0.7	5.6	0.30	0.64	34.2
North: Trim Road											
7	L	316	5.0	0.976	50.1	LOS F	15.9	125.7	0.96	1.41	19.2
4	T	1101	5.0	0.976	49.8	LOS E	15.9	125.7	0.95	1.38	20.3
14	R	79	5.0	0.976	49.6	LOS E	15.4	121.8	0.94	1.38	19.1
Approach		1497	5.0	0.976	49.8	LOS E	15.9	125.7	0.95	1.39	20.0
West: St. Joseph Boulevard											
5	L	71	5.0	0.452	22.4	LOS C	1.4	11.0	0.81	1.03	33.6
2	T	220	5.0	0.452	22.4	LOS C	1.4	11.0	0.81	0.94	34.5
12	R	237	5.0	0.540	20.1	LOS C	1.9	14.7	0.75	0.95	36.4
Approach		527	5.0	0.540	21.4	LOS C	1.9	14.7	0.78	0.96	35.2
All Vehicles		3470	5.0	0.976	31.1	LOS D	15.9	125.7	0.76	1.09	26.1

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

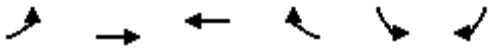


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	39	118	732	5	8	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	128	796	5	9	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	801				1011	798
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	801				1011	798
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	95				98	74
cM capacity (veh/h)	809				413	542

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	171	801	151
Volume Left	42	0	9
Volume Right	0	5	142
cSH	809	1700	533
Volume to Capacity	0.05	0.47	0.28
Queue Length 95th (m)	1.2	0.0	8.1
Control Delay (s)	2.8	0.0	14.4
Lane LOS	A		B
Approach Delay (s)	2.8	0.0	14.4
Approach LOS			B

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

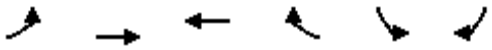


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	122	470	405	29	28	68
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	133	511	440	32	30	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	472				1232	456
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	472				1232	456
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	88				90	90
cM capacity (veh/h)	1075				304	766

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	643	472	104
Volume Left	133	0	30
Volume Right	0	32	74
cSH	1075	1700	531
Volume to Capacity	0.12	0.28	0.20
Queue Length 95th (m)	2.9	0.0	5.1
Control Delay (s)	3.1	0.0	13.4
Lane LOS	A		B
Approach Delay (s)	3.1	0.0	13.4
Approach LOS			B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

* User Entered Value

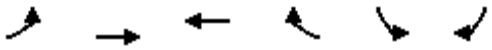


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	61	65	590	0	9	148
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	71	641	0	10	161
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	641				845	641
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	641				845	641
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	93				98	75
cM capacity (veh/h)	929				480	636

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	137	641	171
Volume Left	66	0	10
Volume Right	0	0	161
cSH	929	1700	624
Volume to Capacity	0.07	0.38	0.27
Queue Length 95th (m)	1.6	0.0	7.8
Control Delay (s)	4.8	0.0	12.9
Lane LOS	A		B
Approach Delay (s)	4.8	0.0	12.9
Approach LOS			B

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	249	249	338	0	93	92
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	271	271	367	0	101	100
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	367				1179	367
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	367				1179	367
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	77				64	88
cM capacity (veh/h)	1175				282	836

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	541	367	201
Volume Left	271	0	101
Volume Right	0	0	100
cSH	1175	1700	421
Volume to Capacity	0.23	0.22	0.48
Queue Length 95th (m)	6.2	0.0	17.6
Control Delay (s)	5.7	0.0	21.2
Lane LOS	A		C
Approach Delay (s)	5.7	0.0	21.2
Approach LOS			C

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

INPUT REPORT

Site: old_montreal-collector Roundabout - 2021 BK + Site - AM

Old Montreal Road/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Old Montreal Road/ Collector Road Roundabout 2021 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
East	Old Montreal Road	Two-way	1	1	–	0.0
North	Collector Road	Two-way	1	1	–	0.0
West	Old Montreal Road	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
East	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None
North	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
East	Old Montreal Road					
App. Lane 1	Normal	TR	1800	–	–	0.0
North	Collector Road					
App. Lane 1	Normal	LR	1800	–	–	0.0
West	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
East	Old Montreal Road			
App. Lane 1	3.75	130.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
North	Collector Road			
App. Lane 1	3.75	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
West	Old Montreal Road			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: East	Old Montreal Road	
East	Yes	–
West	No	T
North	No	R
From: North	Collector Road	
North	Yes	–
East	No	L
West	No	R
From: West	Old Montreal Road	
West	Yes	–
North	No	L
East	No	T

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
East	Old Montreal Road	3.75	20.0	–	No
North	Collector Road	3.75	20.0	–	No
West	Old Montreal Road	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: East	Old Montreal Road					
West	732.0	5.00	92.0	1.20	100.00	2.00
North	5.0	5.00	92.0	1.20	100.00	2.00
From: North	Collector Road					
East	8.0	5.00	92.0	1.20	100.00	2.00
West	131.0	5.00	92.0	1.20	100.00	2.00
From: West	Old Montreal Road					
North	39.0	5.00	92.0	1.20	100.00	2.00
East	118.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: East	Old Montreal Road						
West	80.0	50.0	130.0	–	–	–	–
North	80.0	80.0	400.0	–	–	–	–
From: North	Collector Road						
East	50.0	50.0	300.0	–	–	–	–
West	50.0	50.0	300.0	–	–	–	–
From: West	Old Montreal Road						
North	80.0	80.0	500.0	–	–	–	–
East	80.0	80.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
East	Old Montreal Road								
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Collector Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Old Montreal Road								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
East	Old Montreal Road				
T		–	–	2.50	0
R		–	–	2.50	0
North	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
West	Old Montreal Road				
L		–	–	2.50	0
T		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Collector Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Old Montreal Road									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

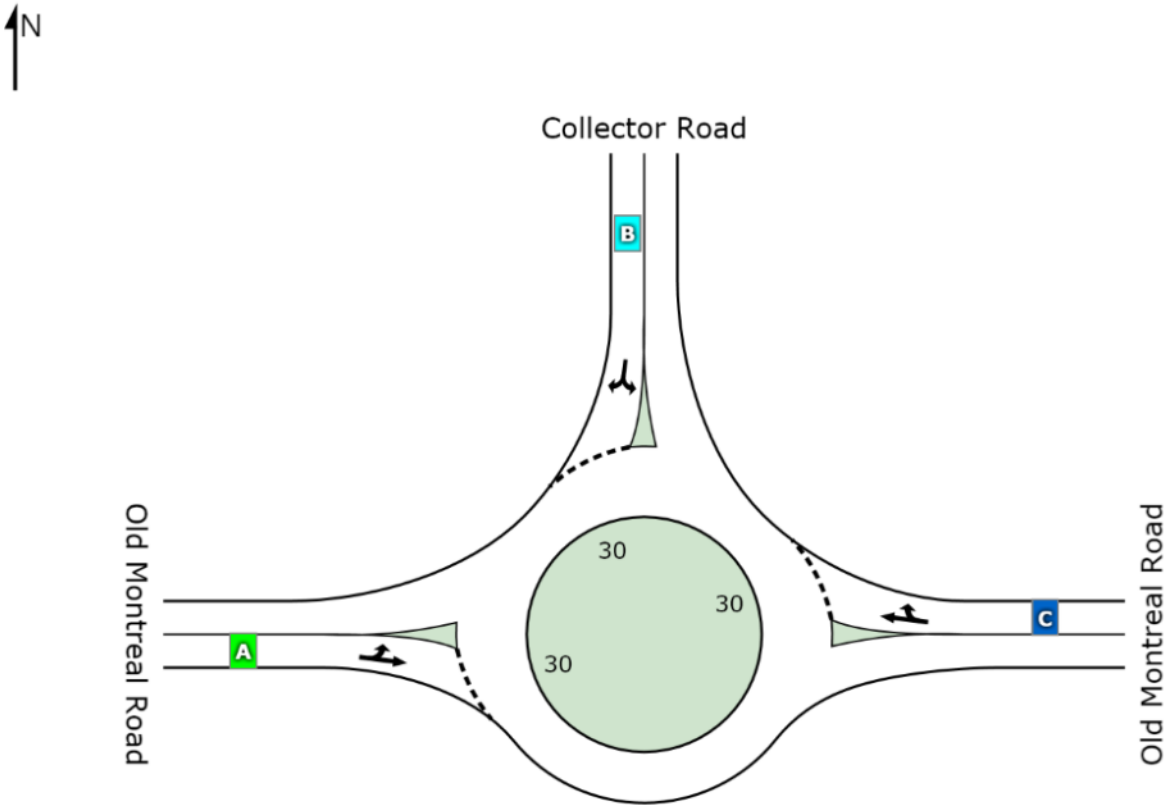
Demand & Sensitivity	
Analysis Method:	None

Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Old Montreal Road/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	East	North	West	Intersection
LOS	C	B	A	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: old_montreal-collector Roundabout - 2021 BK + Site - AM

Old Montreal Road/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Old Montreal Road											
6	T	796	5.0	0.784	18.9	LOS C	8.6	67.8	0.43	0.48	23.5
16	R	5	5.0	0.784	18.9	LOS C	8.6	67.8	0.43	0.57	38.9
Approach		801	5.0	0.784	18.9	LOS C	8.6	67.8	0.43	0.48	23.6
North: Collector Road											
7	L	9	5.0	0.326	13.1	LOS B	1.2	9.2	0.65	0.97	29.6
14	R	142	5.0	0.326	13.1	LOS B	1.2	9.2	0.65	0.81	30.9
Approach		151	5.0	0.326	13.1	LOS B	1.2	9.2	0.65	0.82	30.8
West: Old Montreal Road											
5	L	42	5.0	0.161	4.9	LOS A	0.6	4.8	0.06	0.90	49.6
2	T	128	5.0	0.161	4.9	LOS A	0.6	4.8	0.06	0.50	56.6
Approach		171	5.0	0.161	4.9	LOS A	0.6	4.8	0.06	0.60	54.6
All Vehicles		1123	5.0	0.784	16.0	LOS C	8.6	67.8	0.40	0.54	30.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Old Montreal Road/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Old Montreal Road/ Collector Road Roundabout 2021 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
East	Old Montreal Road	Two-way	1	1	–	0.0
North	Collector Road	Two-way	1	1	–	0.0
West	Old Montreal Road	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
East	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None
North	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
East	Old Montreal Road					
App. Lane 1	Normal	TR	1800	–	–	0.0
North	Collector Road					
App. Lane 1	Normal	LR	1800	–	–	0.0
West	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
East	Old Montreal Road			
App. Lane 1	3.75	130.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
North	Collector Road			
App. Lane 1	3.75	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
West	Old Montreal Road			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: East	Old Montreal Road	
East	Yes	–
West	No	T
North	No	R
From: North	Collector Road	
North	Yes	–
East	No	L
West	No	R
From: West	Old Montreal Road	
West	Yes	–
North	No	L
East	No	T

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
East	Old Montreal Road	3.75	20.0	–	No
North	Collector Road	3.75	20.0	–	No
West	Old Montreal Road	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: East	Old Montreal Road					
West	405.0	5.00	92.0	1.20	100.00	2.00
North	29.0	5.00	92.0	1.20	100.00	2.00
From: North	Collector Road					
East	28.0	5.00	92.0	1.20	100.00	2.00
West	68.0	5.00	92.0	1.20	100.00	2.00
From: West	Old Montreal Road					
North	122.0	5.00	92.0	1.20	100.00	2.00
East	470.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: East	Old Montreal Road						
West	80.0	50.0	130.0	–	–	–	–
North	80.0	80.0	400.0	–	–	–	–
From: North	Collector Road						
East	50.0	50.0	300.0	–	–	–	–
West	50.0	50.0	300.0	–	–	–	–
From: West	Old Montreal Road						
North	80.0	80.0	500.0	–	–	–	–
East	80.0	80.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
East	Old Montreal Road								
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Collector Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Old Montreal Road								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
East	Old Montreal Road				
T		–	–	2.50	0
R		–	–	2.50	0
North	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
West	Old Montreal Road				
L		–	–	2.50	0
T		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Collector Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Old Montreal Road									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

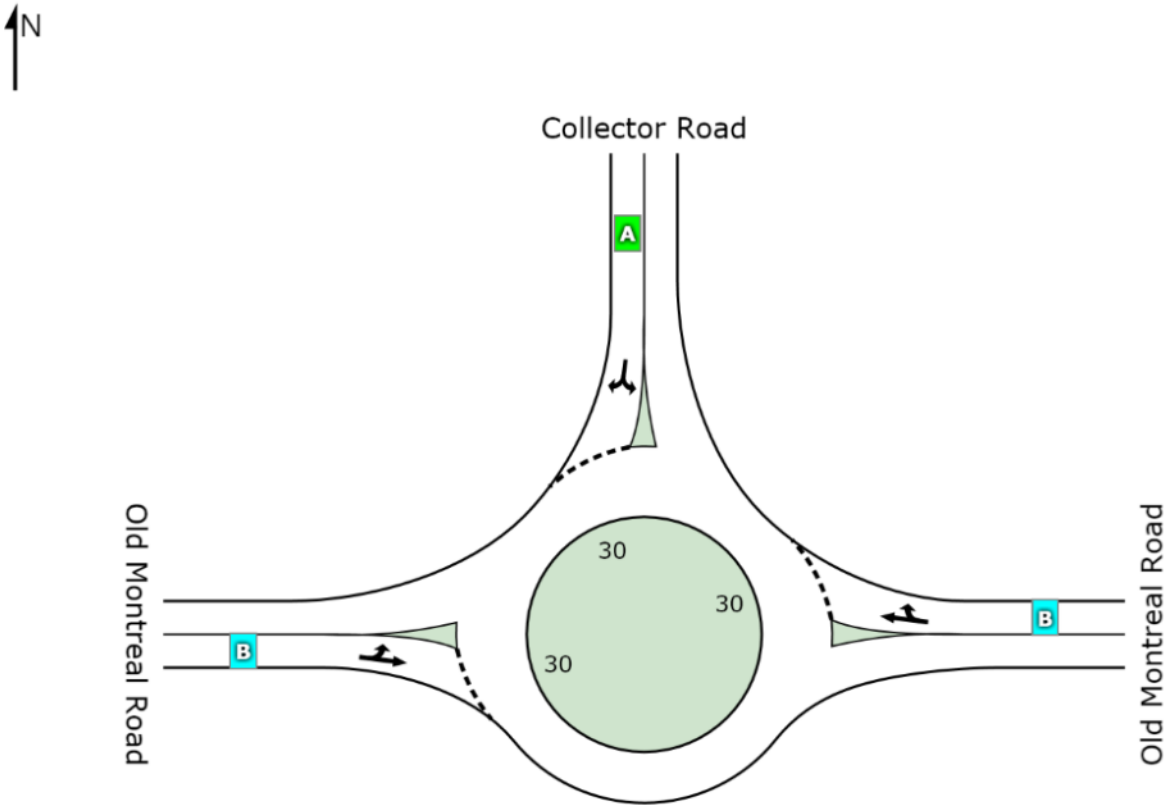
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: old_montreal-collector Roundabout - 2021 BK + Site - PM

Old Montreal Road/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	East	North	West	Intersection
LOS	B	A	B	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

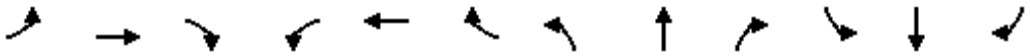
Site: old_montreal-collector Roundabout - 2021 BK + Site - PM

Old Montreal Road/ Collector Road Roundabout
2021 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Old Montreal Road											
6	T	440	5.0	0.508	10.3	LOS B	2.8	21.8	0.41	0.57	30.7
16	R	32	5.0	0.508	10.3	LOS B	2.8	21.8	0.41	0.66	46.3
Approach		472	5.0	0.508	10.3	LOS B	2.8	21.8	0.41	0.57	32.3
North: Collector Road											
7	L	30	5.0	0.155	7.1	LOS A	0.5	4.2	0.49	0.85	33.2
14	R	74	5.0	0.155	7.1	LOS A	0.5	4.2	0.49	0.64	35.7
Approach		104	5.0	0.155	7.1	LOS A	0.5	4.2	0.49	0.70	34.9
West: Old Montreal Road											
5	L	133	5.0	0.622	12.1	LOS B	4.6	36.4	0.24	0.82	43.8
2	T	511	5.0	0.622	12.1	LOS B	4.6	36.4	0.24	0.49	48.4
Approach		643	5.0	0.622	12.1	LOS B	4.6	36.4	0.24	0.56	47.3
All Vehicles		1220	5.0	0.622	11.0	LOS B	4.6	36.4	0.33	0.58	42.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

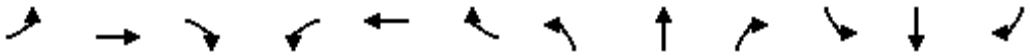


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	47	26	20	375	0	203	1	5	0	3	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	51	28	22	408	0	221	1	5	0	3	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	408			79			534	518	65	524	533	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	408			79			534	518	65	524	533	408
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	100			99			68	100	100	100	100	98
cM capacity (veh/h)	1135			1500			685	708	1126	702	698	804

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	80	429	227	17
Volume Left	1	22	221	0
Volume Right	28	0	5	14
cSH	1135	1500	691	781
Volume to Capacity	0.00	0.01	0.33	0.02
Queue Length 95th (m)	0.0	0.3	10.0	0.5
Control Delay (s)	0.1	0.5	12.7	9.7
Lane LOS	A	A	B	A
Approach Delay (s)	0.1	0.5	12.7	9.7
Approach LOS			B	A

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	216	119	20	215	0	112	1	5	0	3	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	235	129	22	234	0	122	1	5	0	3	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	234			364			599	590	299	596	654	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	234			364			599	590	299	596	654	234
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	100			98			81	100	99	100	99	99
cM capacity (veh/h)	1316			1178			644	654	895	649	613	955

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	371	255	128	11
Volume Left	7	22	122	0
Volume Right	129	0	5	8
cSH	1316	1178	652	818
Volume to Capacity	0.00	0.02	0.20	0.01
Queue Length 95th (m)	0.1	0.4	5.1	0.3
Control Delay (s)	0.2	0.8	11.9	9.5
Lane LOS	A	A	B	A
Approach Delay (s)	0.2	0.8	11.9	9.5
Approach LOS			B	A

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	44.0%	ICU Level of Service	A	
Analysis Period (min)	15			

* User Entered Value

Future (2031) Background Plus Site-Generated Traffic

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	774	31	0	1346	0	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	841	34	0	1463	0	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			875		1573	421
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			875		1573	421
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	97
cM capacity (veh/h)			748		98	793

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	421	421	34	732	732	25
Volume Left	0	0	0	0	0	0
Volume Right	0	0	34	0	0	25
cSH	1700	1700	1700	1700	1700	793
Volume to Capacity	0.25	0.25	0.02	0.43	0.43	0.03
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.7
Lane LOS						A
Approach Delay (s)	0.0			0.0		9.7
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1675	185	0	879	0	183
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1821	201	0	955	0	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	370					
pX, platoon unblocked			0.46		0.46	0.46
vC, conflicting volume			2022		2298	910
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			872		1474	0
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	64
cM capacity (veh/h)			345		52	552

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	910	910	201	478	478	199
Volume Left	0	0	0	0	0	0
Volume Right	0	0	201	0	0	199
cSH	1700	1700	1700	1700	1700	552
Volume to Capacity	0.54	0.54	0.12	0.28	0.28	0.36
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	11.4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	15.2
Lane LOS						C
Approach Delay (s)	0.0			0.0		15.2
Approach LOS						C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	803	179	87	1259	673	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	0.95
Frt		0.850				
Flt Protected			0.950		0.953	
Satd. Flow (prot)	3293	1473	1647	3293	3205	0
Flt Permitted			0.199		0.953	
Satd. Flow (perm)	3293	1473	345	3293	3205	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		195				
Link Speed (k/h)	50			50	50	
Link Distance (m)	478.0			445.3	310.5	
Travel Time (s)	34.4			32.1	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	873	195	95	1368	732	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	873	195	95	1368	734	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	64.0	64.0	11.0	24.0	24.0	
Total Split (s)	64.0	64.0	11.0	75.0	25.0	0.0
Total Split (%)	64.0%	64.0%	11.0%	75.0%	25.0%	0.0%
Maximum Green (s)	58.0	58.0	5.0	69.0	19.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	30.5	30.5	39.0	39.0	19.3	
Actuated g/C Ratio	0.43	0.43	0.55	0.55	0.27	
v/c Ratio	0.61	0.26	0.33	0.75	0.84	
Control Delay	17.8	2.9	10.0	14.6	36.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.8	2.9	10.0	14.6	36.8	
LOS	B	A	A	B	D	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	15.1			14.3	36.8	
Approach LOS	B			B	D	
Queue Length 50th (m)	43.8	0.0	4.9	60.0	42.2	
Queue Length 95th (m)	58.4	8.7	9.8	78.5	#91.9	
Internal Link Dist (m)	454.0			421.3	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	2753	1263	285	3165	878	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.32	0.15	0.33	0.43	0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 70.5			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 67.1%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	803	179	87	1259	673	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.91	1.00	1.00	0.91	0.97	0.95
Frt		0.850				
Flt Protected			0.950		0.953	
Satd. Flow (prot)	4732	1473	1647	4732	3205	0
Flt Permitted			0.215		0.953	
Satd. Flow (perm)	4732	1473	373	4732	3205	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		195				
Link Speed (k/h)	50			50	50	
Link Distance (m)	268.4			231.4	310.5	
Travel Time (s)	19.3			16.7	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	873	195	95	1368	732	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	873	195	95	1368	734	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	64.0	64.0	11.0	24.0	24.0	
Total Split (s)	64.0	64.0	11.0	75.0	25.0	0.0
Total Split (%)	64.0%	64.0%	11.0%	75.0%	25.0%	0.0%
Maximum Green (s)	58.0	58.0	5.0	69.0	19.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	22.4	22.4	30.8	30.8	19.2	
Actuated g/C Ratio	0.36	0.36	0.50	0.50	0.31	
v/c Ratio	0.51	0.30	0.33	0.58	0.74	
Control Delay	17.2	3.8	10.9	11.9	26.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.2	3.8	10.9	11.9	26.8	
LOS	B	A	B	B	C	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	14.8			11.9	26.8	
Approach LOS	B			B	C	
Queue Length 50th (m)	27.4	0.0	4.9	34.3	35.7	
Queue Length 95th (m)	36.5	9.8	10.3	43.9	#69.4	
Internal Link Dist (m)	244.4			207.4	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	4344	1368	289	4707	991	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.14	0.33	0.29	0.74	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 62.2			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector

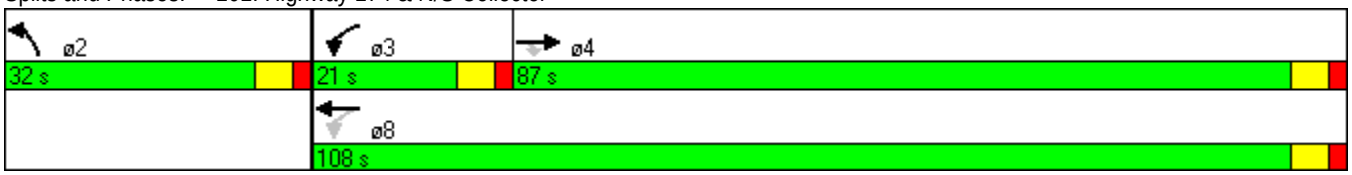
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1851	555	232	647	549	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	0.95
Frt		0.850			0.997	
Flt Protected			0.950		0.953	
Satd. Flow (prot)	3293	1473	1647	3293	3195	0
Flt Permitted			0.046		0.953	
Satd. Flow (perm)	3293	1473	80	3293	3195	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		333			1	
Link Speed (k/h)	50			50	50	
Link Distance (m)	478.0			370.3	310.5	
Travel Time (s)	34.4			26.7	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2012	603	252	703	597	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2012	603	252	703	608	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	
Total Split (s)	87.0	87.0	21.0	108.0	32.0	0.0
Total Split (%)	62.1%	62.1%	15.0%	77.1%	22.9%	0.0%
Maximum Green (s)	81.0	81.0	15.0	102.0	26.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0		
Flash Dont Walk (s)	11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	81.0	81.0	102.0	102.0	26.0	
Actuated g/C Ratio	0.58	0.58	0.73	0.73	0.19	
v/c Ratio	1.06	0.61	1.12	0.29	1.02	
Control Delay	66.7	10.6	133.8	6.9	98.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	66.7	10.6	133.8	6.9	98.2	
LOS	E	B	F	A	F	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	53.8			40.4	98.2	
Approach LOS	D			D	F	
Queue Length 50th (m)	~295.0	40.7	~60.2	29.3	~84.7	
Queue Length 95th (m)	#332.5	72.6	#110.6	36.4	#119.3	
Internal Link Dist (m)	454.0			346.3	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	1905	993	226	2399	594	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	1.06	0.61	1.12	0.29	1.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 57.2		Intersection LOS: E	
Intersection Capacity Utilization 99.4%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector



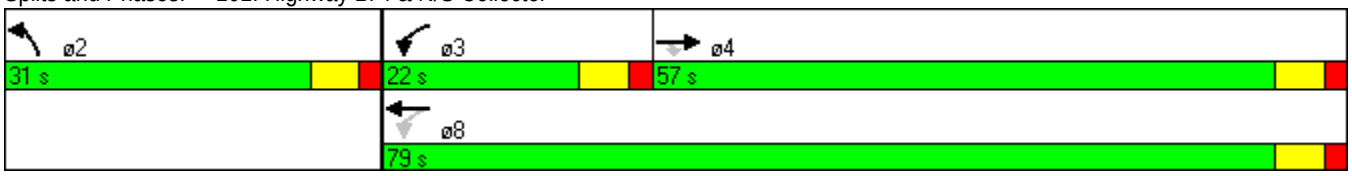
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1851	555	232	647	549	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		60.0	60.0		100.0	0.0
Storage Lanes		1	1		2	0
Taper Length (m)		10.0	10.0		10.0	10.0
Lane Util. Factor	0.91	1.00	1.00	0.91	0.97	0.95
Frt		0.850			0.997	
Flt Protected			0.950		0.953	
Satd. Flow (prot)	4732	1473	1647	4732	3195	0
Flt Permitted			0.070		0.953	
Satd. Flow (perm)	4732	1473	121	4732	3195	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		478			2	
Link Speed (k/h)	50			50	50	
Link Distance (m)	275.8			205.1	310.5	
Travel Time (s)	19.9			14.8	22.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2012	603	252	703	597	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2012	603	252	703	608	0
Turn Type		Perm	pm+pt			
Protected Phases	4		3	8	2	
Permitted Phases		4	8			
Detector Phase	4	4	3	8	2	
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	
Total Split (s)	57.0	57.0	22.0	79.0	31.0	0.0
Total Split (%)	51.8%	51.8%	20.0%	71.8%	28.2%	0.0%
Maximum Green (s)	51.0	51.0	16.0	73.0	25.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	Min	Min	None	Min	None	
Walk Time (s)	7.0	7.0		7.0		
Flash Dont Walk (s)	11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	51.1	51.1	71.8	71.8	23.4	
Actuated g/C Ratio	0.48	0.48	0.67	0.67	0.22	
v/c Ratio	0.89	0.63	0.87	0.22	0.87	
Control Delay	32.4	7.8	56.0	7.2	54.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.4	7.8	56.0	7.2	54.9	
LOS	C	A	E	A	D	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach Delay	26.8			20.1	54.9	
Approach LOS	C			C	D	
Queue Length 50th (m)	132.1	14.1	35.1	18.2	59.2	
Queue Length 95th (m)	153.9	46.3	#73.6	23.1	#83.2	
Internal Link Dist (m)	251.8			181.1	286.5	
Turn Bay Length (m)		60.0	60.0		100.0	
Base Capacity (vph)	2256	952	309	3229	748	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.89	0.63	0.82	0.22	0.81	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 107.2			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 29.3		Intersection LOS: C	
Intersection Capacity Utilization 83.2%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Highway 174 & N/S Collector



INPUT REPORT

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2031 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Ottawa Road 174/ Collector Road Roundabout (4-lanes) 2031 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	2	1	–	0.0
East	Ottawa Road 174	Two-way	2	2	–	0.0
West	Ottawa Road 174	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	L	1800	–	–	0.0
App. Lane 2	Normal	LR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	T	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.50	500.0	-8.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	8.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
App. Lane 3	3.75	100.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
From: West	**Ottawa Road 174**	
West	Yes	–
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	4.00	20.0	–	No
East	Ottawa Road 174	3.50	20.0	–	No
West	Ottawa Road 174	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	673.0	5.00	92.0	1.20	100.00	2.00
East	2.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	87.0	5.00	92.0	1.20	100.00	2.00
West	1259.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
East	803.0	5.00	92.0	1.20	100.00	2.00
South	179.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	90.0	300.0	–	–	–	–
East	50.0	90.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	90.0	50.0	500.0	–	–	–	–
West	90.0	90.0	500.0	–	–	–	–
From: West	Ottawa Road 174						
East	90.0	90.0	500.0	–	–	–	–
South	90.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Ottawa Road 174								
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
West	Ottawa Road 174				
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									
4P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

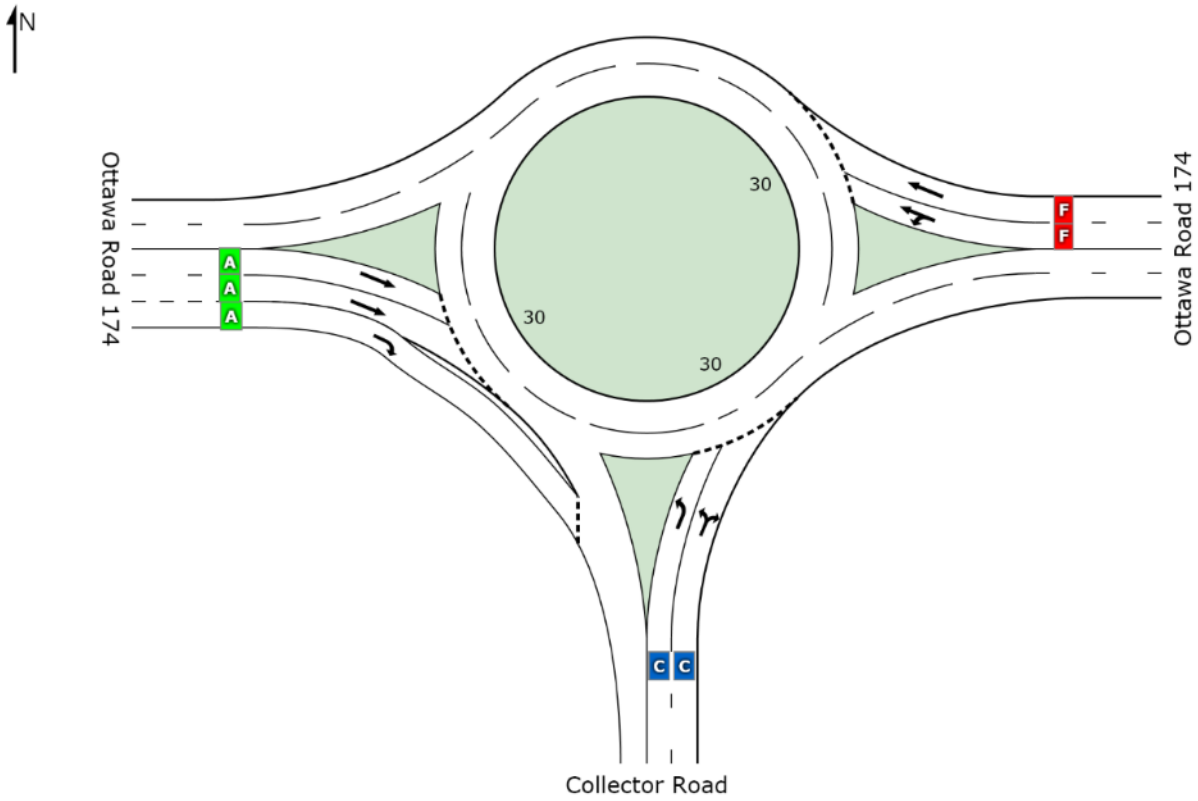
Demand & Sensitivity	
Analysis Method:	None

Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	West	Intersection
LOS	C	F	A	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	732	5.0	0.662	21.6	LOS C	3.1	24.2	0.72	1.03	30.3
18	R	2	5.0	0.662	21.2	LOS C	3.0	23.4	0.71	0.95	31.3
Approach		734	5.0	0.662	21.6	LOS C	3.1	24.2	0.72	1.03	30.3
East: Ottawa Road 174											
1	L	95	5.0	1.189	124.4	LOS F	45.6	361.4	1.00	2.65	13.9
6	T	1368	5.0	1.189	123.8	LOS F	46.8	370.9	1.00	2.68	16.1
Approach		1463	5.0	1.189	123.9	LOS F	46.8	370.9	1.00	2.68	16.0
West: Ottawa Road 174											
2	T	873	5.0	0.436	8.5	LOS A	1.7	13.4	0.21	0.59	55.3
12	R	195	5.0	0.194	5.4	LOS A	0.5	4.1	0.15	0.59	55.5
Approach		1067	5.0	0.436	8.0	LOS A	1.7	13.4	0.20	0.59	55.3
All Vehicles		3264	5.0	1.189	63.0	LOS F	46.8	370.9	0.68	1.63	23.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2031 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Ottawa Road 174/ Collector Road Roundabout (4-lanes) 2031 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	2	1	–	0.0
East	Ottawa Road 174	Two-way	2	2	–	0.0
West	Ottawa Road 174	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None
West	Ottawa Road 174	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	L	1800	–	–	0.0
App. Lane 2	Normal	LR	1800	–	–	0.0
East	Ottawa Road 174					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
West	Ottawa Road 174					
App. Lane 1	Normal	T	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.50	500.0	-8.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	8.00	–
East	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–
West	**Ottawa Road 174**			
App. Lane 1	3.75	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
App. Lane 3	3.75	100.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
East	No	R
From: East	**Ottawa Road 174**	
East	Yes	–
South	No	L
West	No	T
From: West	**Ottawa Road 174**	
West	Yes	–
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Ottawa Road 174	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.75	20.0	–	No
East	Ottawa Road 174	3.75	20.0	–	No
West	Ottawa Road 174	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	549.0	5.00	92.0	1.20	100.00	2.00
East	10.0	5.00	92.0	1.20	100.00	2.00
From: East	Ottawa Road 174					
South	232.0	5.00	92.0	1.20	100.00	2.00
West	647.0	5.00	92.0	1.20	100.00	2.00
From: West	Ottawa Road 174					
East	1851.0	5.00	92.0	1.20	100.00	2.00
South	555.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	90.0	300.0	–	–	–	–
East	50.0	90.0	300.0	–	–	–	–
From: East	Ottawa Road 174						
South	90.0	50.0	500.0	–	–	–	–
West	90.0	90.0	500.0	–	–	–	–
From: West	Ottawa Road 174						
East	90.0	90.0	500.0	–	–	–	–
South	90.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Ottawa Road 174								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Ottawa Road 174								
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement		Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road				
L		–	–	2.50	0
R		–	–	2.50	0
East	Ottawa Road 174				
L		–	–	2.50	0
T		–	–	2.50	0
West	Ottawa Road 174				
T		–	–	2.50	0
R		–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Ottawa Road 174									
8P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Ottawa Road 174									
4P	10.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

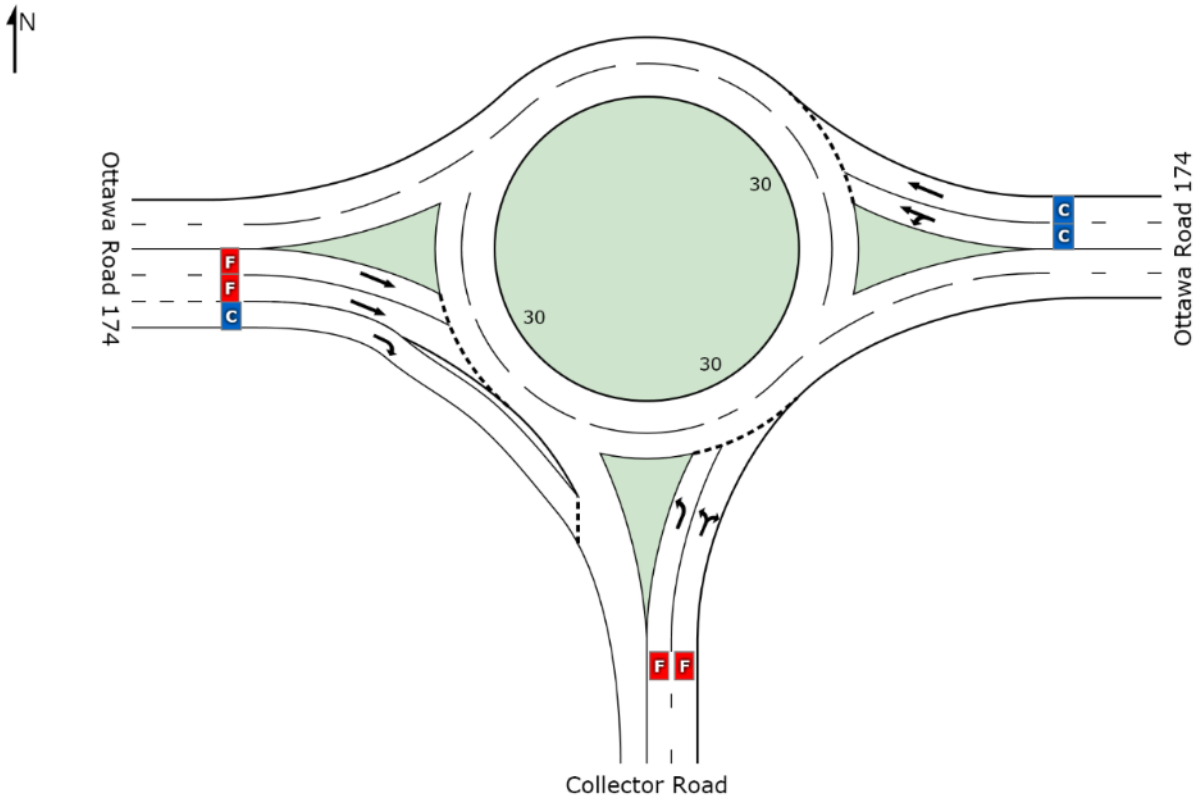
Demand & Sensitivity	
Analysis Method:	None

Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	West	Intersection
LOS	F	C	F	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Ottawa Road 174/ Collector Road Roundabout (4-lanes)
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	597	5.0	1.076	115.2	LOS F	13.5	106.8	1.00	2.15	12.8
18	R	11	5.0	1.076	112.9	LOS F	13.5	106.8	1.00	2.17	12.3
Approach		608	5.0	1.076	115.2	LOS F	13.5	106.8	1.00	2.15	12.7
East: Ottawa Road 174											
1	L	252	5.0	0.681	19.0	LOS C	3.7	29.2	0.68	1.02	38.4
6	T	703	5.0	0.681	18.7	LOS C	3.7	29.2	0.66	0.92	45.3
Approach		955	5.0	0.681	18.8	LOS C	3.7	29.2	0.66	0.95	43.5
West: Ottawa Road 174											
2	T	2012	5.0	1.144	97.6	LOS F	59.9	474.8	1.00	2.09	19.2
12	R	603	5.0	0.681	15.7	LOS C	4.0	31.6	0.53	0.78	43.5
Approach		2615	5.0	1.144	78.7	LOS F	59.9	474.8	0.89	1.79	21.5
All Vehicles		4178	5.0	1.144	70.3	LOS F	59.9	474.8	0.86	1.65	22.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	958	31	0	1932	0	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1041	34	0	2100	0	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			1075		2091	521
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1075		2091	521
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	97
cM capacity (veh/h)			627		44	718

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	521	521	34	1050	1050	25
Volume Left	0	0	0	0	0	0
Volume Right	0	0	34	0	0	25
cSH	1700	1700	1700	1700	1700	718
Volume to Capacity	0.31	0.31	0.02	0.62	0.62	0.03
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.8
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.2
Lane LOS						B
Approach Delay (s)	0.0			0.0		10.2
Approach LOS						B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

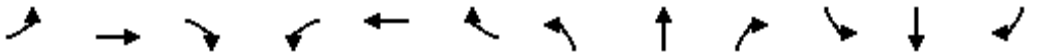
* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2223	185	0	1196	0	183
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2416	201	0	1300	0	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			2617		3066	1208
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2617		3066	1208
tC, single (s)			4.2		6.9	*5.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	*3.0
p0 queue free %			100		100	44
cM capacity (veh/h)			153		9	356

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	1208	1208	201	650	650	199
Volume Left	0	0	0	0	0	0
Volume Right	0	0	201	0	0	199
cSH	1700	1700	1700	1700	1700	356
Volume to Capacity	0.71	0.71	0.12	0.38	0.38	0.56
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	22.9
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	27.2
Lane LOS						D
Approach Delay (s)	0.0			0.0		27.2
Approach LOS						D

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

* User Entered Value

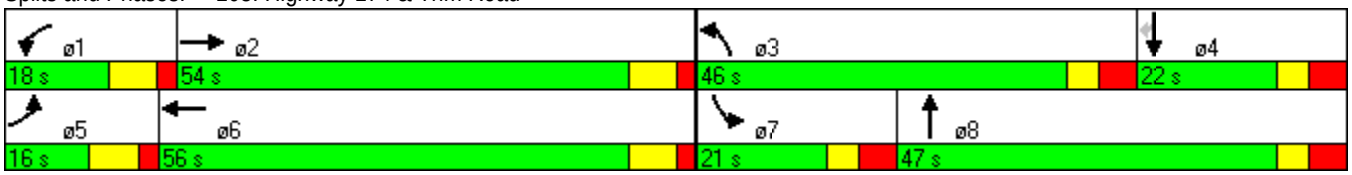


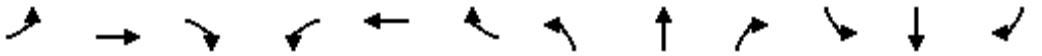
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	857	373	113	1805	14	1725	53	118	14	23	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.999			0.897				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3290	0	3195	2954	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3290	0	3195	2954	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			294		1			128				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	21	932	405	123	1962	15	1875	58	128	15	25	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	932	405	123	1977	0	1875	186	0	15	25	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		17.4	43.4		17.4	17.4	17.4
Total Split (s)	16.0	54.0	0.0	18.0	56.0	0.0	46.0	47.0	0.0	21.0	22.0	22.0
Total Split (%)	11.4%	38.6%	0.0%	12.9%	40.0%	0.0%	32.9%	33.6%	0.0%	15.0%	15.7%	15.7%
Maximum Green (s)	8.8	47.0		10.8	49.1		38.6	39.6		13.6	14.6	14.6
Yellow Time (s)	5.1	5.1		5.1	5.0		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	6.9	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	7.1	42.7	131.2	10.8	51.9		38.7	49.3		10.0	10.0	10.0
Actuated g/C Ratio	0.05	0.33	1.00	0.08	0.40		0.29	0.38		0.08	0.08	0.08
v/c Ratio	0.24	0.87	0.27	0.90	1.52		1.99	0.16		0.12	0.19	0.08
Control Delay	67.0	51.4	0.5	115.8	267.3		476.7	11.7		60.8	62.3	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.0	51.4	0.5	115.8	267.3		476.7	11.7		60.8	62.3	30.2
LOS	E	D	A	F	F		F	B		E	E	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		36.5			258.4			434.8			55.4	
Approach LOS		D			F			F			E	
Queue Length 50th (m)	5.0	109.6	0.0	30.3	~367.7		~369.2	4.3		3.5	5.8	0.0
Queue Length 95th (m)	13.1	134.0	0.0	#66.1	#413.2		#411.7	14.0		10.3	14.4	5.4
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	111	1181	1473	136	1303		941	1199		171	193	173
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.19	0.79	0.27	0.90	1.52		1.99	0.16		0.09	0.13	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 131.2			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.99			
Intersection Signal Delay: 267.7		Intersection LOS: F	
Intersection Capacity Utilization 133.8%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	857	373	113	1805	14	1725	53	118	14	23	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.897				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	4732	1473	1647	4727	0	4644	1555	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	4732	1473	1647	4727	0	4644	1555	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			405		1			84				10
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			535.4			450.9			319.3	
Travel Time (s)		25.8			38.5			32.5			23.0	
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
Adj. Flow (vph)	21	932	405	123	1962	15	1875	58	128	15	25	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	932	405	123	1977	0	1875	186	0	15	25	10
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.0		12.4	17.4		17.4	17.4	17.4
Total Split (s)	12.2	48.2	0.0	21.4	57.4	0.0	53.0	53.0	0.0	17.4	17.4	17.4
Total Split (%)	8.7%	34.4%	0.0%	15.3%	41.0%	0.0%	37.9%	37.9%	0.0%	12.4%	12.4%	12.4%
Maximum Green (s)	5.0	41.2		14.2	50.5		45.6	45.6		10.0	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.0		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	6.9	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	5.1	37.7	128.2	12.8	51.2		46.2	49.4		10.1	10.1	10.1
Actuated g/C Ratio	0.04	0.29	1.00	0.10	0.40		0.36	0.39		0.08	0.08	0.08
v/c Ratio	0.32	0.67	0.27	0.75	1.05		1.12	0.29		0.12	0.18	0.08
Control Delay	78.2	43.3	0.5	85.2	72.3		100.8	17.9		62.7	63.7	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	78.2	43.3	0.5	85.2	72.3		100.8	17.9		62.7	63.7	30.8
LOS	E	D	A	F	E		F	B		E	E	C

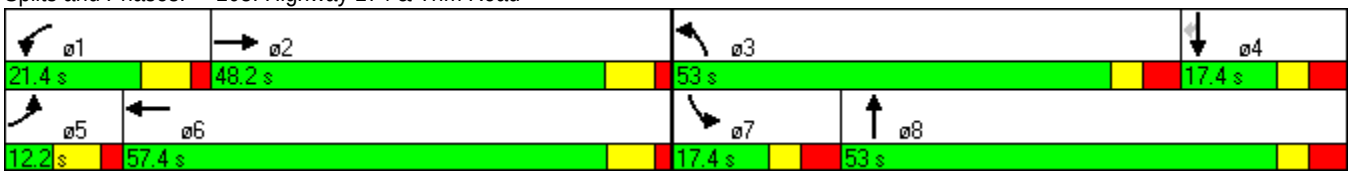
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		31.1			73.0			93.3			56.8	
Approach LOS		C			E			F			E	
Queue Length 50th (m)	5.3	76.7	0.0	31.0	~218.5		~209.8	15.1		3.6	6.1	0.0
Queue Length 95th (m)	13.7	91.1	0.0	#58.5	#245.3		#235.6	37.5		10.4	15.0	5.4
Internal Link Dist (m)		333.9			511.4			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	65	1542	1473	185	1889		1675	651		130	137	126
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.32	0.60	0.27	0.66	1.05		1.12	0.29		0.12	0.18	0.08

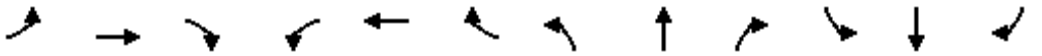
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 128.2			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 70.2		Intersection LOS: E	
Intersection Capacity Utilization 100.5%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road



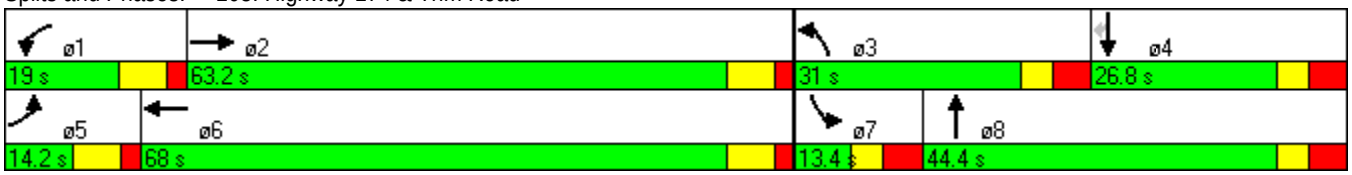


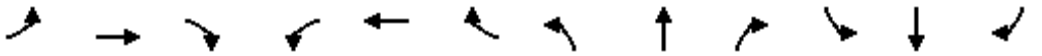
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	2101	1452	203	959	35	847	69	261	46	53	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.995			0.881				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3277	0	3195	2901	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	3293	1473	1647	3277	0	3195	2901	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			468		3			131				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1545.3			450.9			319.3	
Travel Time (s)		25.8			111.3			32.5			23.0	
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
Adj. Flow (vph)	23	2284	1578	221	1042	38	921	75	284	50	58	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	2284	1578	221	1080	0	921	359	0	50	58	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		17.4	43.4		12.4	17.4	17.4
Total Split (s)	14.2	63.2	0.0	19.0	68.0	0.0	31.0	44.4	0.0	13.4	26.8	26.8
Total Split (%)	10.1%	45.1%	0.0%	13.6%	48.6%	0.0%	22.1%	31.7%	0.0%	9.6%	19.1%	19.1%
Maximum Green (s)	7.0	56.2		11.8	61.0		23.6	37.0		6.0	19.4	19.4
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			11.0				
Flash Dont Walk (s)		18.0			18.0			25.0				
Pedestrian Calls (#/hr)		0			0			0				
Act Effct Green (s)	6.5	56.2	131.6	11.8	66.7		23.6	31.3		6.0	11.0	11.0
Actuated g/C Ratio	0.05	0.43	1.00	0.09	0.51		0.18	0.24		0.05	0.08	0.08
v/c Ratio	0.28	1.62	1.07	1.49	0.65		1.61	0.46		0.67	0.40	0.02
Control Delay	69.4	312.5	50.0	295.0	27.4		316.4	29.5		99.9	65.7	37.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	69.4	312.5	50.0	295.0	27.4		316.4	29.5		99.9	65.7	37.5
LOS	E	F	D	F	C		F	C		F	E	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		204.4			72.9			235.9			80.7	
Approach LOS		F			E			F			F	
Queue Length 50th (m)	5.3	~408.4	~51.7	~72.2	104.6		~160.5	24.9		11.9	13.4	0.0
Queue Length 95th (m)	14.2	#461.8	#127.1	#121.9	134.1		#203.9	38.9		#31.5	26.4	2.5
Internal Link Dist (m)		333.9			1521.3			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	87	1407	1473	148	1663		573	927		75	255	219
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.26	1.62	1.07	1.49	0.65		1.61	0.39		0.67	0.23	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 131.6			
Natural Cycle: 115			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.62			
Intersection Signal Delay: 182.5		Intersection LOS: F	
Intersection Capacity Utilization 131.2%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 103: Highway 174 & Trim Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	2101	1452	203	959	35	847	69	261	46	53	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	155.0		90.0	115.0		0.0	175.0		0.0	100.0		50.0
Storage Lanes	1		1	1		0	2		0	1		1
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.94	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.881				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	4732	1473	1647	4708	0	4644	1527	0	1647	1733	1473
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1647	4732	1473	1647	4708	0	4644	1527	0	1647	1733	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			672		6			122				2
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			542.2			450.9			319.3	
Travel Time (s)		25.8			39.0			32.5			23.0	
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
Adj. Flow (vph)	23	2284	1578	221	1042	38	921	75	284	50	58	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	2284	1578	221	1080	0	921	359	0	50	58	2
Turn Type	Prot		Free	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free									4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.2	32.1		12.2	32.1		12.4	17.4		12.4	17.4	17.4
Total Split (s)	13.6	67.6	0.0	24.0	78.0	0.0	31.0	35.6	0.0	12.8	17.4	17.4
Total Split (%)	9.7%	48.3%	0.0%	17.1%	55.7%	0.0%	22.1%	25.4%	0.0%	9.1%	12.4%	12.4%
Maximum Green (s)	6.4	60.6		16.8	71.0		23.6	28.2		5.4	10.0	10.0
Yellow Time (s)	5.1	5.1		5.1	5.1		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	2.1	1.9		2.1	1.9		4.1	4.1		4.1	4.1	4.1
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)	7.2	7.0	4.0	7.2	7.0	4.0	7.4	7.4	4.0	7.4	7.4	7.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Min		None	Min		None	None		None	None	None
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		18.0			18.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	6.2	60.8	136.5	16.8	76.9		23.7	27.3		5.4	10.0	10.0
Actuated g/C Ratio	0.05	0.45	1.00	0.12	0.56		0.17	0.20		0.04	0.07	0.07
v/c Ratio	0.31	1.08	1.07	1.08	0.41		1.14	0.89		0.76	0.46	0.02
Control Delay	75.7	83.5	50.0	142.8	19.0		128.9	60.0		122.6	74.4	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.7	83.5	50.0	142.8	19.0		128.9	60.0		122.6	74.4	42.0
LOS	E	F	D	F	B		F	E		F	E	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		69.8			40.0			109.6			95.7	
Approach LOS		E			D			F			F	
Queue Length 50th (m)	5.8	~244.1	~55.6	~64.7	62.5		~99.3	61.9		12.9	14.5	0.0
Queue Length 95th (m)	14.6	#269.5	#129.6	#112.3	73.3		#124.8	#112.8		#35.1	28.3	2.7
Internal Link Dist (m)		333.9			518.2			426.9			295.3	
Turn Bay Length (m)	155.0		90.0	115.0			175.0			100.0		50.0
Base Capacity (vph)	77	2106	1473	204	2654		805	413		66	127	110
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.30	1.08	1.07	1.08	0.41		1.14	0.87		0.76	0.46	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 136.5			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 72.1		Intersection LOS: E	
Intersection Capacity Utilization 104.2%		ICU Level of Service G	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 103: Highway 174 & Trim Road

INPUT REPORT

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2031 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	122.0	5.00	92.0	1.20	100.00	2.00
North	1871.0	5.00	92.0	1.20	100.00	2.00
East	23.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	10.0	5.00	92.0	1.20	100.00	2.00
West	2.0	5.00	92.0	1.20	100.00	2.00
North	2.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	82.0	5.00	92.0	1.20	100.00	2.00
South	355.0	5.00	92.0	1.20	100.00	2.00
West	73.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	23.0	5.00	92.0	1.20	100.00	2.00
East	3.0	5.00	92.0	1.20	100.00	2.00
South	37.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

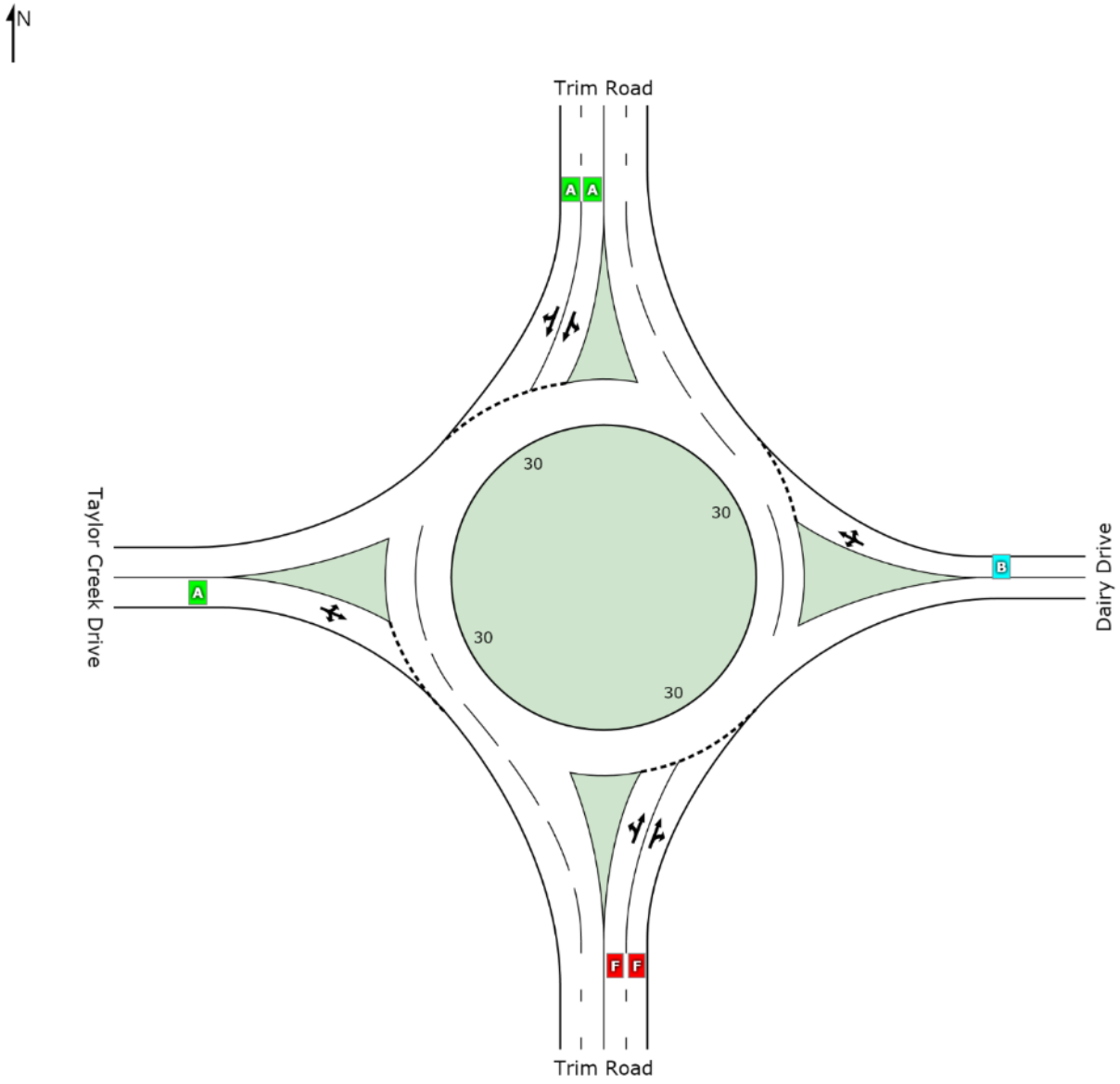
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK + Site - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	F	B	A	A	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK + Site - AM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	133	5.0	1.220	126.6	LOS F	98.5	780.4	1.00	2.08	9.6
8	T	2034	5.0	1.220	126.6	LOS F	98.5	780.4	1.00	2.08	10.3
18	R	25	5.0	1.220	126.6	LOS F	98.5	780.4	1.00	2.08	8.9
Approach		2191	5.0	1.220	126.6	LOS F	98.5	780.4	1.00	2.08	10.2
East: Dairy Drive											
1	L	11	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.94	35.1
6	T	2	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.80	35.3
16	R	2	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.85	36.8
Approach		15	5.0	0.053	13.5	LOS B	0.1	1.0	0.74	0.90	35.4
North: Trim Road											
7	L	89	5.0	0.310	7.4	LOS A	1.2	9.8	0.30	0.83	39.6
4	T	386	5.0	0.310	7.4	LOS A	1.2	9.8	0.30	0.51	46.3
14	R	79	5.0	0.310	7.4	LOS A	1.2	9.8	0.30	0.59	43.5
Approach		554	5.0	0.310	7.4	LOS A	1.2	9.8	0.30	0.57	44.7
West: Taylor Creek Drive											
5	L	25	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.84	39.4
2	T	3	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.47	41.4
12	R	40	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.61	42.3
Approach		68	5.0	0.092	5.8	LOS A	0.2	1.8	0.37	0.69	41.1
All Vehicles		2829	5.0	1.220	99.7	LOS F	98.5	780.4	0.85	1.74	12.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK + Site - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout 2031 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Dairy Drive	Two-way	1	1	–	0.0
North	Trim Road	Two-way	2	2	5.00	0.0
West	Taylor Creek Drive	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Dairy Drive	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Taylor Creek Drive	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Dairy Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	Taylor Creek Drive					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
East	Dairy Drive				
App. Lane 1		3.50	500.0	1.00	–
Exit Lane 1		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	375.0	1.00	–
App. Lane 2		3.50	325.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
West	Taylor Creek Drive				
App. Lane 1		5.00	500.0	1.00	–
Exit Lane 1		5.40	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Dairy Drive		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	Taylor Creek Drive		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Dairy Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Taylor Creek Drive	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Dairy Drive	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	Taylor Creek Drive	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	48.0	5.00	92.0	1.20	100.00	2.00
North	1114.0	5.00	92.0	1.20	100.00	2.00
East	19.0	5.00	92.0	1.20	100.00	2.00
From: East	Dairy Drive					
South	104.0	5.00	92.0	1.20	100.00	2.00
West	11.0	5.00	92.0	1.20	100.00	2.00
North	15.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	22.0	5.00	92.0	1.20	100.00	2.00
South	1640.0	5.00	92.0	1.20	100.00	2.00
West	45.0	5.00	92.0	1.20	100.00	2.00
From: West	Taylor Creek Drive					
North	47.0	5.00	92.0	1.20	100.00	2.00
East	3.0	5.00	92.0	1.20	100.00	2.00
South	107.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	50.0	300.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	50.0	300.0	–	–	–	–
From: East	Dairy Drive						
South	50.0	70.0	500.0	–	–	–	–
West	50.0	50.0	500.0	–	–	–	–
North	50.0	70.0	500.0	–	–	–	–
From: North	Trim Road						
East	70.0	50.0	375.0	–	–	–	–
South	70.0	70.0	375.0	–	–	–	–
West	70.0	50.0	375.0	–	–	–	–

From: West	Taylor Creek Drive						
North	50.0	70.0	500.0	–	–	–	–
East	50.0	50.0	500.0	–	–	–	–
South	50.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Dairy Drive								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Taylor Creek Drive								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Dairy Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Taylor Creek Drive			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Dairy Drive									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Taylor Creek Drive									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

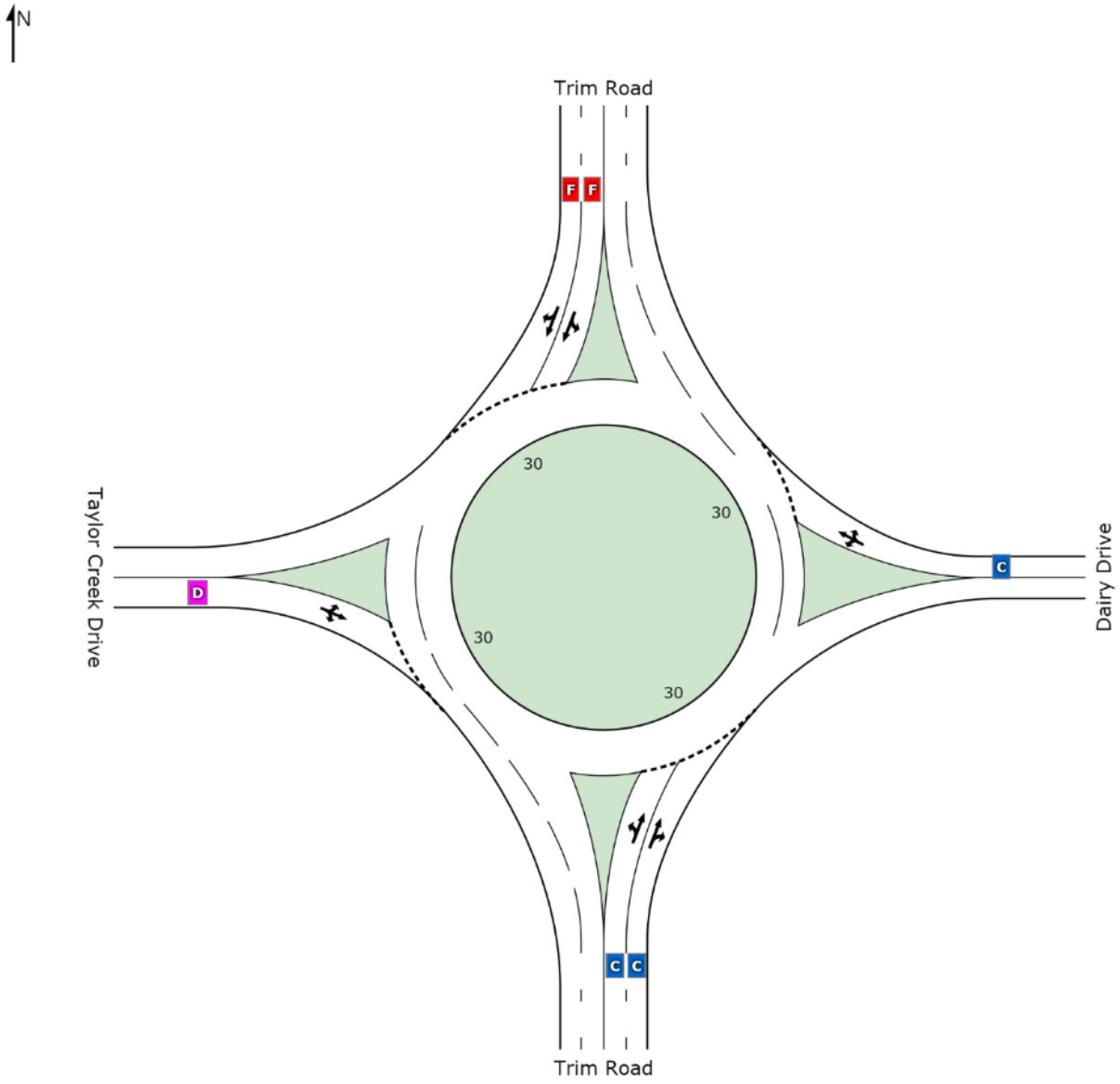
Demand & Sensitivity	
Analysis Method:	None

Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	C	C	F	D	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

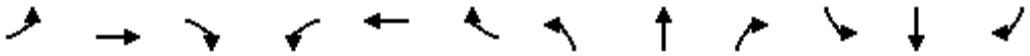
Site: Trim-Dairy-Taylor Creek Roundabout - 2031 BK + Site - PM

Trim Road/ Dairy Drive/ Taylor Creek Drive Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	52	5.0	0.686	15.2	LOS C	4.8	37.8	0.41	0.83	31.2
8	T	1211	5.0	0.686	15.2	LOS C	4.8	37.8	0.41	0.51	36.1
18	R	21	5.0	0.686	15.2	LOS C	4.8	37.8	0.41	0.59	33.0
Approach		1284	5.0	0.686	15.2	LOS C	4.8	37.8	0.41	0.53	35.9
East: Dairy Drive											
1	L	113	5.0	0.345	15.1	LOS C	1.0	7.7	0.71	0.96	34.3
6	T	12	5.0	0.345	15.1	LOS C	1.0	7.7	0.71	0.81	34.4
16	R	16	5.0	0.345	15.1	LOS C	1.0	7.7	0.71	0.86	35.9
Approach		141	5.0	0.345	15.1	LOS C	1.0	7.7	0.71	0.94	34.5
North: Trim Road											
7	L	24	5.0	1.096	81.5	LOS F	53.3	421.9	1.00	1.75	15.3
4	T	1783	5.0	1.096	81.5	LOS F	53.3	421.9	1.00	1.75	16.4
14	R	49	5.0	1.096	81.5	LOS F	53.3	421.9	1.00	1.75	14.7
Approach		1855	5.0	1.096	81.5	LOS F	53.3	421.9	1.00	1.75	16.3
West: Taylor Creek Drive											
5	L	51	5.0	0.579	30.6	LOS D	1.8	14.6	0.86	1.08	28.4
2	T	3	5.0	0.579	30.6	LOS D	1.8	14.6	0.86	0.99	27.4
12	R	116	5.0	0.579	30.6	LOS D	1.8	14.6	0.86	1.03	29.0
Approach		171	5.0	0.579	30.6	LOS D	1.8	14.6	0.86	1.04	28.8
All Vehicles		3451	5.0	1.096	51.6	LOS F	53.3	421.9	0.76	1.22	21.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

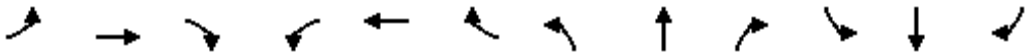


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	3	37	10	2	2	122	1871	23	82	355	73
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	60.0		0.0	60.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.921			0.982			0.998			0.975	
Flt Protected		0.982			0.965		0.950			0.950		
Satd. Flow (prot)	0	1568	0	0	1643	0	1647	3287	0	1647	3211	0
Flt Permitted		0.873			0.834		0.466			0.071		
Satd. Flow (perm)	0	1394	0	0	1420	0	808	3287	0	123	3211	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			2			3			50	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		358.0			304.7			163.9			450.9	
Travel Time (s)		25.8			21.9			11.8			32.5	
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)	25	3	40	11	2	2	133	2034	25	89	386	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	68	0	0	15	0	133	2059	0	89	465	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		11.0	24.0		11.0	24.0	
Total Split (s)	16.0	16.0	0.0	16.0	16.0	0.0	12.0	63.0	0.0	11.0	62.0	0.0
Total Split (%)	17.8%	17.8%	0.0%	17.8%	17.8%	0.0%	13.3%	70.0%	0.0%	12.2%	68.9%	0.0%
Maximum Green (s)	10.0	10.0		10.0	10.0		6.0	57.0		5.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)		10.1			10.1		63.5	60.5		60.3	55.2	
Actuated g/C Ratio		0.12			0.12		0.74	0.71		0.70	0.64	
v/c Ratio		0.34			0.09		0.20	0.89		0.50	0.22	
Control Delay		24.4			34.2		3.8	20.8		20.4	6.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		24.4			34.2		3.8	20.8		20.4	6.5	
LOS		C			C		A	C		C	A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		24.4			34.2			19.8			8.8	
Approach LOS		C			C			B			A	
Queue Length 50th (m)		4.1			1.9		4.5	152.1		2.9	13.6	
Queue Length 95th (m)		15.4			7.2		8.3	#218.4		13.8	19.8	
Internal Link Dist (m)		334.0			280.7			139.9			426.9	
Turn Bay Length (m)							60.0			60.0		
Base Capacity (vph)		200			170		660	2324		177	2146	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.34			0.09		0.20	0.89		0.50	0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 85.6			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 17.8		Intersection LOS: B	
Intersection Capacity Utilization 83.5%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 105: Taylor Creek Road & Trim Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	3	107	104	11	15	48	1114	19	22	1640	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	60.0		0.0	60.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.908			0.985			0.997			0.996	
Flt Protected		0.985			0.961		0.950			0.950		
Satd. Flow (prot)	0	1550	0	0	1641	0	1647	3283	0	1647	3280	0
Flt Permitted		0.878			0.588		0.074			0.176		
Satd. Flow (perm)	0	1382	0	0	1004	0	128	3283	0	305	3280	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		102			6			3			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		358.0			304.7			184.9			450.9	
Travel Time (s)		25.8			21.9			13.3			32.5	
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)	51	3	116	113	12	16	52	1211	21	24	1783	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	170	0	0	141	0	52	1232	0	24	1832	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		11.0	24.0		11.0	24.0	
Total Split (s)	20.0	20.0	0.0	20.0	20.0	0.0	11.0	59.0	0.0	11.0	59.0	0.0
Total Split (%)	22.2%	22.2%	0.0%	22.2%	22.2%	0.0%	12.2%	65.6%	0.0%	12.2%	65.6%	0.0%
Maximum Green (s)	14.0	14.0		14.0	14.0		5.0	53.0		5.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)								7.0			7.0	
Flash Dont Walk (s)								11.0			11.0	
Pedestrian Calls (#/hr)								0			0	
Act Effct Green (s)		13.7			13.7		56.2	54.3		55.1	52.3	
Actuated g/C Ratio		0.16			0.16		0.67	0.64		0.65	0.62	
v/c Ratio		0.55			0.84		0.30	0.58		0.09	0.90	
Control Delay		22.7			74.5		8.9	10.7		4.7	22.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		22.7			74.5		8.9	10.7		4.7	22.7	
LOS		C			E		A	B		A	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		22.7			74.5			10.6			22.5	
Approach LOS		C			E			B			C	
Queue Length 50th (m)		9.7			21.3		2.1	40.3		1.0	131.1	
Queue Length 95th (m)		27.9			#52.7		4.8	81.0		2.8	#190.8	
Internal Link Dist (m)		334.0			280.7			160.9			426.9	
Turn Bay Length (m)							60.0			60.0		
Base Capacity (vph)		317			173		176	2165		280	2084	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.54			0.82		0.30	0.57		0.09	0.88	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84.2			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 20.2		Intersection LOS: C	
Intersection Capacity Utilization 73.7%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 105: Taylor Creek Road & Trim Road

INPUT REPORT

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2031 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	3	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Continuous	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
East	Old Montreal Road				
App. Lane 1		3.75	130.0	1.00	–
App. Lane 2		3.50	130.0	1.00	–
App. Lane 3		3.50	85.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
Exit Lane 3		3.50	300.0	-1.00	–
West	St. Joseph Boulevard				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
App. Lane 3		3.50	100.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Old Montreal Road		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	St. Joseph Boulevard		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	166.0	5.00	92.0	1.20	100.00	2.00
North	1303.0	5.00	92.0	1.20	100.00	2.00
East	55.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	149.0	5.00	92.0	1.20	100.00	2.00
West	453.0	5.00	92.0	1.20	100.00	2.00
North	687.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	138.0	5.00	92.0	1.20	100.00	2.00
South	243.0	5.00	92.0	1.20	100.00	2.00
West	22.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	26.0	5.00	92.0	1.20	100.00	2.00
East	85.0	5.00	92.0	1.20	100.00	2.00
South	41.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Cont.*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

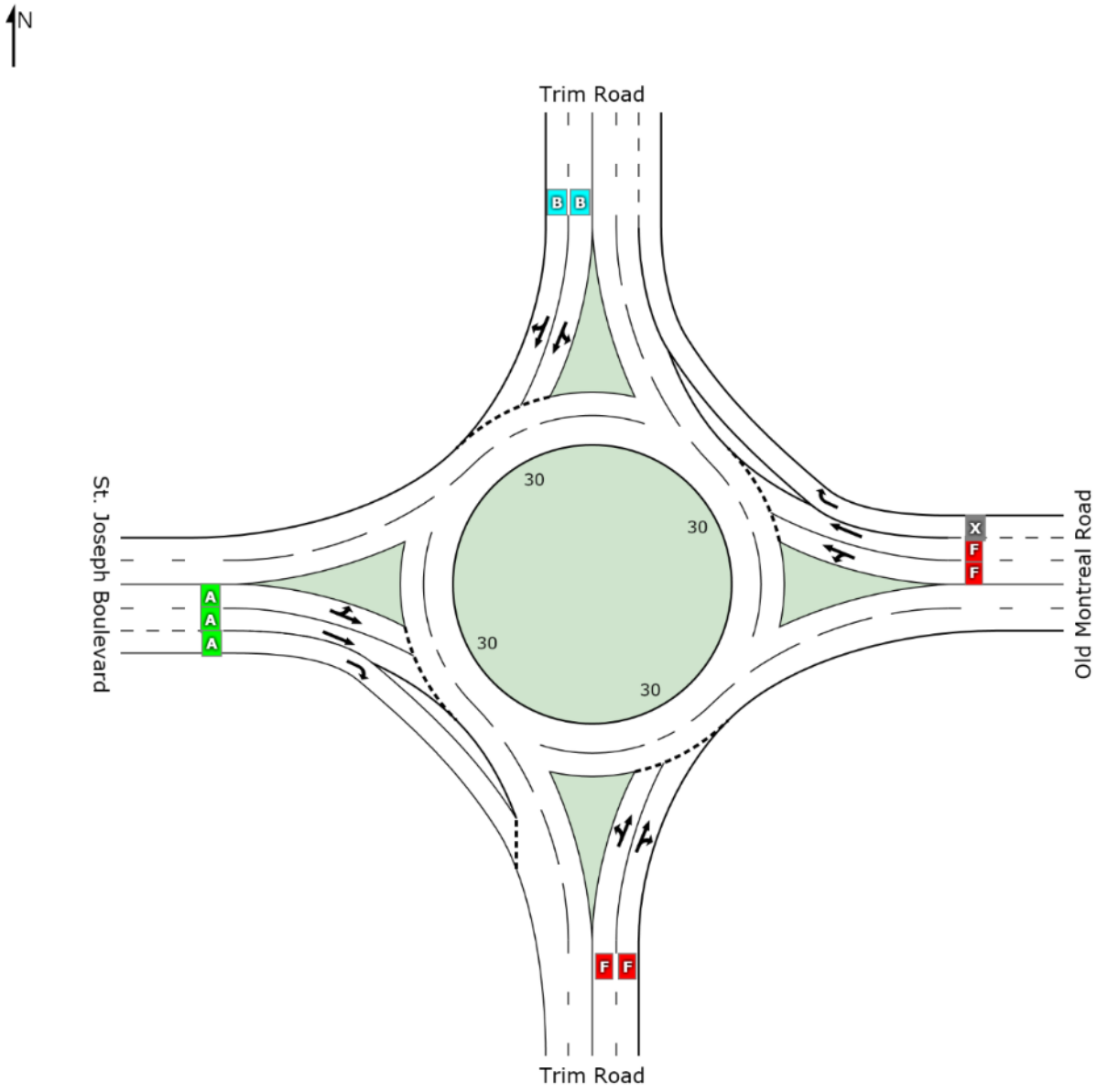
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK +Site - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	F	E	B	A	E

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal
Roundabout - 2031 BK +Site - AM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	180	5.0	0.993	51.8	LOS F	20.2	160.3	1.00	1.36	24.4
8	T	1416	5.0	0.993	51.6	LOS F	20.2	160.3	0.99	1.34	19.9
18	R	60	5.0	0.993	51.4	LOS F	19.6	155.2	0.98	1.33	18.6
Approach		1657	5.0	0.993	51.6	LOS F	20.2	160.3	0.99	1.35	20.4
East: Old Montreal Road											
1	L	162	5.0	1.046	103.5	LOS F	11.8	93.3	1.00	1.87	8.7
6	T	492	5.0	1.046	100.6	LOS F	12.2	96.8	1.00	1.89	7.3
16	R	747	5.0	0.507	0.1	X	X	X	X	0.45	44.1
Approach		1401	5.0	1.046	47.4	LOS E	12.2	96.8	0.47	1.12	13.2
North: Trim Road											
7	L	150	5.0	0.378	12.1	LOS B	1.2	9.7	0.58	0.94	34.0
4	T	264	5.0	0.378	11.7	LOS B	1.2	9.7	0.56	0.79	39.0
14	R	24	5.0	0.378	11.6	LOS B	1.2	9.3	0.56	0.84	37.3
Approach		438	5.0	0.378	11.9	LOS B	1.2	9.7	0.57	0.84	37.0
West: St. Joseph Boulevard											
5	L	28	5.0	0.089	6.4	LOS A	0.2	1.8	0.42	0.89	42.7
2	T	92	5.0	0.089	6.2	LOS A	0.2	1.8	0.41	0.61	46.4
12	R	45	5.0	0.059	5.3	LOS A	0.1	1.1	0.34	0.61	47.4
Approach		165	5.0	0.089	6.0	LOS A	0.2	1.8	0.39	0.66	45.9
All Vehicles		3661	5.0	1.046	43.2	LOS E	20.2	160.3	0.71	1.17	19.8

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK +Site - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout 2031 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Trim Road	Two-way	2	2	5.00	0.0
East	Old Montreal Road	Two-way	3	2	–	0.0
North	Trim Road	Two-way	2	3	5.00	0.0
West	St. Joseph Boulevard	Two-way	3	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	10.00	2	30.0	30.0	1.2000	None
North	Trim Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	St. Joseph Boulevard	30.00	10.00	2	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Continuous	R	1800	–	–	0.0
North	Trim Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
West	St. Joseph Boulevard					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	T	1800	–	–	0.0
App. Lane 3	Slip (Giveway/Yield)	R	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number		Lane Width m	Lane Length m	Grade %	SL Type
South	Trim Road				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
East	Old Montreal Road				
App. Lane 1		3.75	130.0	1.00	–
App. Lane 2		3.50	130.0	1.00	–
App. Lane 3		3.50	85.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–
North	Trim Road				
App. Lane 1		3.75	300.0	1.00	–
App. Lane 2		3.50	300.0	1.00	–
Exit Lane 1		3.75	300.0	-1.00	–
Exit Lane 2		3.50	300.0	-1.00	–
Exit Lane 3		3.50	300.0	-1.00	–
West	St. Joseph Boulevard				
App. Lane 1		3.75	500.0	1.00	–
App. Lane 2		3.50	500.0	1.00	–
App. Lane 3		3.50	100.0	1.00	–
Exit Lane 1		3.75	500.0	-1.00	–
Exit Lane 2		3.50	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach		Movement Banned	Turn Desig.
From: South	Trim Road		
South		Yes	–
West		No	L
North		No	T
East		No	R
From: East	Old Montreal Road		
East		Yes	–
South		No	L
West		No	T
North		No	R
From: North	Trim Road		
North		Yes	–
East		No	L
South		No	T
West		No	R
From: West	St. Joseph Boulevard		
West		Yes	–
North		No	L
East		No	T
South		No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Trim Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	St. Joseph Boulevard	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Trim Road	4.00	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Trim Road	4.00	20.0	–	No
West	St. Joseph Boulevard	4.00	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Trim Road					
West	123.0	5.00	92.0	1.20	100.00	2.00
North	763.0	5.00	92.0	1.20	100.00	2.00
East	149.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	147.0	5.00	92.0	1.20	100.00	2.00
West	215.0	5.00	92.0	1.20	100.00	2.00
North	347.0	5.00	92.0	1.20	100.00	2.00
From: North	Trim Road					
East	518.0	5.00	92.0	1.20	100.00	2.00
South	1247.0	5.00	92.0	1.20	100.00	2.00
West	85.0	5.00	92.0	1.20	100.00	2.00
From: West	St. Joseph Boulevard					
North	71.0	5.00	92.0	1.20	100.00	2.00
East	314.0	5.00	92.0	1.20	100.00	2.00
South	250.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Trim Road						
West	70.0	60.0	500.0	–	–	–	–
North	70.0	70.0	300.0	–	–	–	–
East	70.0	60.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	60.0	70.0	130.0	–	–	–	–
West	60.0	60.0	130.0	–	–	–	–
North	60.0	70.0	130.0	–	–	–	–
From: North	Trim Road						
East	70.0	60.0	300.0	–	–	–	–
South	70.0	70.0	300.0	–	–	–	–
West	70.0	60.0	300.0	–	–	–	–

From: West	St. Joseph Boulevard						
North	60.0	70.0	500.0	–	–	–	–
East	60.0	60.0	500.0	–	–	–	–
South	60.0	70.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Trim Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Cont.*	–
North	Trim Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	St. Joseph Boulevard								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Slip*	*Giveway*

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
North	Trim Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	St. Joseph Boulevard			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Trim Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Trim Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	St. Joseph Boulevard									
4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

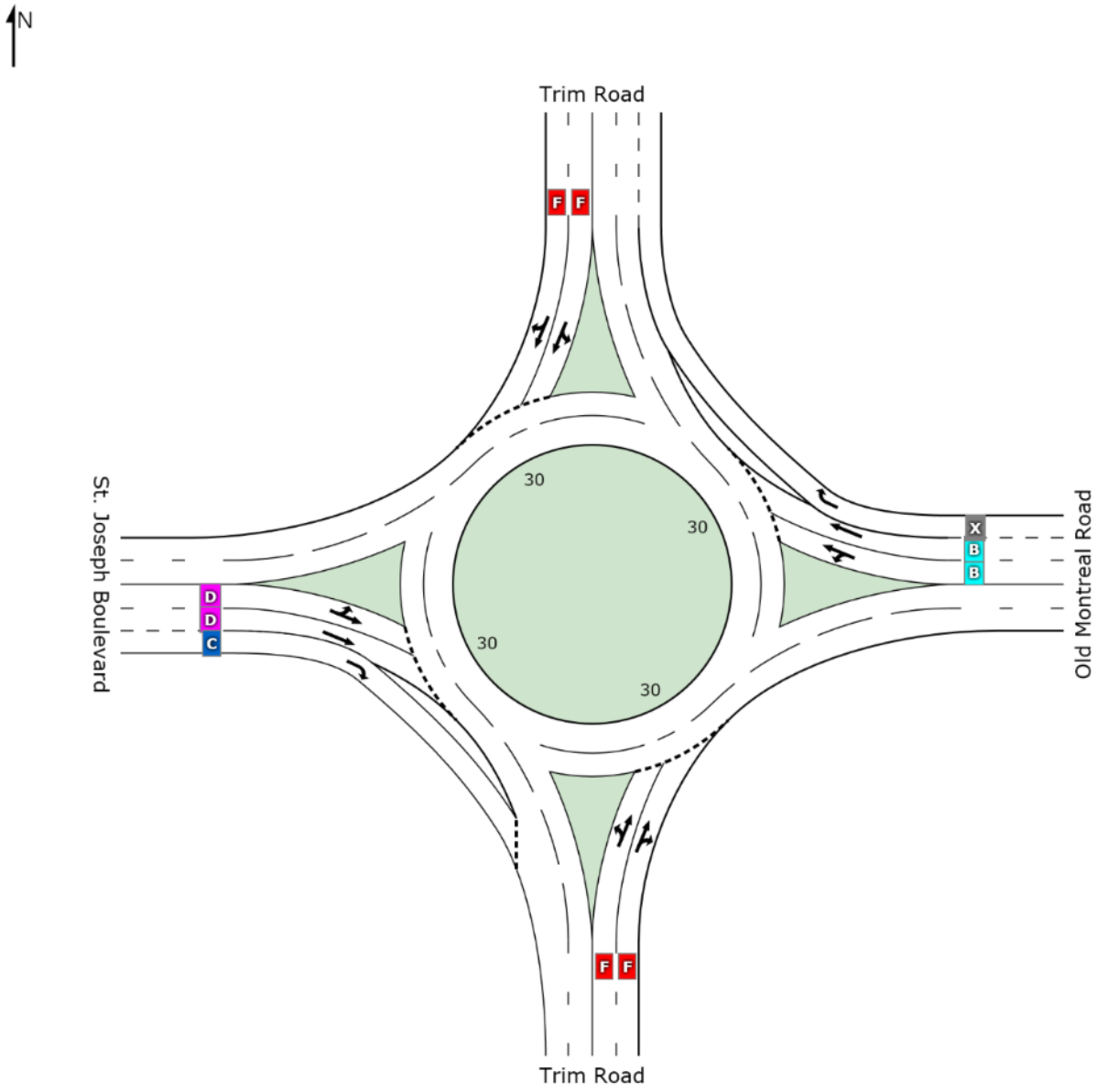
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: Trim-st_joseph-old_montreal Roundabout - 2031 BK +Site - PM

Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	F	A	F	D	F

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Trim-st_joseph-old_montreal
Roundabout - 2031 BK +Site - PM

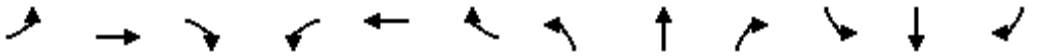
Trim Road/ St. Joseph Boulevard/ Old Montreal Road Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Trim Road											
3	L	134	5.0	0.974	58.7	LOS F	11.9	94.2	0.92	1.52	22.7
8	T	829	5.0	0.974	58.0	LOS F	11.9	94.2	0.92	1.47	18.4
18	R	162	5.0	0.974	57.3	LOS F	11.7	92.8	0.91	1.47	17.3
Approach		1125	5.0	0.974	58.0	LOS F	11.9	94.2	0.92	1.47	18.8
East: Old Montreal Road											
1	L	160	5.0	0.403	14.6	LOS B	1.3	10.3	0.67	0.96	25.9
6	T	234	5.0	0.403	14.1	LOS B	1.3	10.3	0.65	0.83	26.3
16	R	377	5.0	0.256	0.0	X	X	X	X	0.45	44.2
Approach		771	5.0	0.403	7.3	LOS A	1.3	10.3	0.34	0.67	32.1
North: Trim Road											
7	L	563	5.0	1.440	223.9	LOS F	106.6	844.2	1.00	4.64	6.4
4	T	1355	5.0	1.440	223.6	LOS F	109.1	863.8	1.00	4.71	6.4
14	R	92	5.0	1.440	223.4	LOS F	109.1	863.8	1.00	4.74	5.8
Approach		2011	5.0	1.440	223.7	LOS F	109.1	863.8	1.00	4.69	6.3
West: St. Joseph Boulevard											
5	L	77	5.0	0.630	30.7	LOS D	2.3	18.0	0.85	1.09	30.3
2	T	341	5.0	0.630	30.7	LOS D	2.3	18.0	0.85	1.02	30.6
12	R	272	5.0	0.567	19.7	LOS C	2.1	16.4	0.73	0.94	36.6
Approach		690	5.0	0.630	26.4	LOS D	2.3	18.0	0.80	1.00	32.7
All Vehicles		4597	5.0	1.440	117.2	LOS F	109.1	863.8	0.84	2.68	10.9

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.



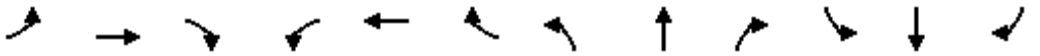
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	85	41	149	453	687	166	1303	55	138	243	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		60.0	60.0		100.0	60.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95
Frt			0.850			0.850		0.994			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3293	1473	1647	3274	0	3195	3254	0
Flt Permitted	0.389			0.500			0.950			0.950		
Satd. Flow (perm)	674	3293	1473	867	3293	1473	1647	3274	0	3195	3254	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			45			399		5			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1025.1			309.0			185.2	
Travel Time (s)		25.8			73.8			22.2			13.3	
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)	28	92	45	162	492	747	180	1416	60	150	264	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	92	45	162	492	747	180	1476	0	150	288	0
Turn Type	pm+pt		Perm	pm+pt		Free	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free						
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	28.0	28.0	11.0	28.0		11.0	24.0		11.0	24.0	
Total Split (s)	11.0	28.0	28.0	13.0	30.0	0.0	28.0	65.0	0.0	14.0	51.0	0.0
Total Split (%)	9.2%	23.3%	23.3%	10.8%	25.0%	0.0%	23.3%	54.2%	0.0%	11.7%	42.5%	0.0%
Maximum Green (s)	5.0	22.0	22.0	7.0	24.0		22.0	59.0		8.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		15.0	15.0		15.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	19.2	16.7	16.7	25.6	21.7	109.3	17.0	55.1		8.0	46.2	
Actuated g/C Ratio	0.18	0.15	0.15	0.23	0.20	1.00	0.16	0.50		0.07	0.42	
v/c Ratio	0.17	0.18	0.17	0.61	0.75	0.51	0.70	0.89		0.64	0.21	
Control Delay	33.6	42.3	13.5	46.0	50.5	1.3	60.7	33.7		65.2	22.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.6	42.3	13.5	46.0	50.5	1.3	60.7	33.7		65.2	22.0	
LOS	C	D	B	D	D	A	E	C		E	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		33.0			23.7			36.6			36.8	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	4.4	8.8	0.0	27.6	53.3	0.0	37.6	150.2		16.7	20.3	
Queue Length 95th (m)	10.9	15.8	9.3	45.1	70.7	0.0	58.1	#197.8		#29.6	31.1	
Internal Link Dist (m)		333.9			1001.1			285.0			161.2	
Turn Bay Length (m)	60.0		60.0	60.0		100.0	60.0			100.0		
Base Capacity (vph)	164	675	338	267	737	1473	338	1803		238	1408	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.17	0.14	0.13	0.61	0.67	0.51	0.53	0.82		0.63	0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 109.3			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 31.5		Intersection LOS: C	
Intersection Capacity Utilization 81.4%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 107: St. Joseph Blvd & Trim Road

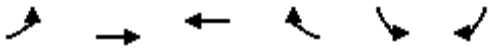


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	314	250	147	215	347	123	763	149	518	1247	85
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		60.0	60.0		100.0	60.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95
Frt			0.850			0.850		0.975			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3293	1473	1647	3293	1473	1647	3211	0	3195	3260	0
Flt Permitted	0.606			0.389			0.950			0.950		
Satd. Flow (perm)	1050	3293	1473	674	3293	1473	1647	3211	0	3195	3260	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			212			377		21			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		357.9			1025.1			309.0			164.2	
Travel Time (s)		25.8			73.8			22.2			11.8	
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)	77	341	272	160	234	377	134	829	162	563	1355	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	341	272	160	234	377	134	991	0	563	1447	0
Turn Type	pm+pt		Perm	pm+pt		Free	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free						
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	28.0	28.0	11.0	28.0		11.0	24.0		11.0	24.0	
Total Split (s)	12.0	28.0	28.0	12.0	28.0	0.0	17.0	49.0	0.0	31.0	63.0	0.0
Total Split (%)	10.0%	23.3%	23.3%	10.0%	23.3%	0.0%	14.2%	40.8%	0.0%	25.8%	52.5%	0.0%
Maximum Green (s)	6.0	22.0	22.0	6.0	22.0		11.0	43.0		25.0	57.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		15.0	15.0		15.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	23.7	17.7	17.7	25.1	20.5	113.7	11.1	42.6		23.3	54.8	
Actuated g/C Ratio	0.21	0.16	0.16	0.22	0.18	1.00	0.10	0.37		0.20	0.48	
v/c Ratio	0.31	0.66	0.67	0.80	0.39	0.26	0.84	0.82		0.86	0.92	
Control Delay	37.1	52.2	20.2	67.0	44.9	0.4	90.7	38.6		58.4	38.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	37.1	52.2	20.2	67.0	44.9	0.4	90.7	38.6		58.4	38.2	
LOS	D	D	C	E	D	A	F	D		E	D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		37.9			27.7			44.8			43.8	
Approach LOS		D			C			D			D	
Queue Length 50th (m)	12.6	35.8	11.2	27.6	23.6	0.0	28.1	96.2		58.2	140.7	
Queue Length 95th (m)	23.8	49.8	36.9	#55.7	35.1	0.0	#62.5	127.3		#85.2	#198.0	
Internal Link Dist (m)		333.9			1001.1			285.0			140.2	
Turn Bay Length (m)	60.0		60.0	60.0		100.0	60.0			100.0		
Base Capacity (vph)	251	641	457	200	654	1473	160	1244		706	1647	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.31	0.53	0.60	0.80	0.36	0.26	0.84	0.80		0.80	0.88	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 113.7			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 40.5		Intersection LOS: D	
Intersection Capacity Utilization 84.2%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 107: St. Joseph Blvd & Trim Road

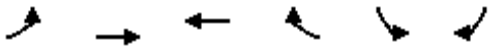


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	39	237	1158	4	6	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	258	1259	4	7	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1263				1603	1261
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1263				1603	1261
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	92				97	58
cM capacity (veh/h)	540				216	337

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	300	1263	149
Volume Left	42	0	7
Volume Right	0	4	142
cSH	540	1700	329
Volume to Capacity	0.08	0.74	0.45
Queue Length 95th (m)	1.8	0.0	15.8
Control Delay (s)	2.7	0.0	24.7
Lane LOS	A		C
Approach Delay (s)	2.7	0.0	24.7
Approach LOS			C

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

* User Entered Value

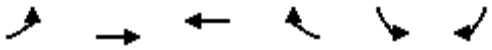


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	39	237	1158	4	6	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	258	1259	4	7	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1263				1474	632
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1263				1474	632
tC, single (s)	4.2				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	92				97	78
cM capacity (veh/h)	530				247	642

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	128	172	839	424	149
Volume Left	42	0	0	0	7
Volume Right	0	0	0	4	142
cSH	530	1700	1700	1700	600
Volume to Capacity	0.08	0.10	0.49	0.25	0.25
Queue Length 95th (m)	1.8	0.0	0.0	0.0	6.8
Control Delay (s)	4.8	0.0	0.0	0.0	13.0
Lane LOS	A				B
Approach Delay (s)	2.0		0.0		13.0
Approach LOS					B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

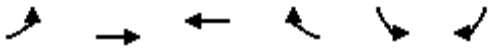


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	122	860	640	20	19	68
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	133	935	696	22	21	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	717				1907	707
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	717				1907	707
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	85				86	88
cM capacity (veh/h)	870				144	595

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1067	717	95
Volume Left	133	0	21
Volume Right	0	22	74
cSH	870	1700	353
Volume to Capacity	0.15	0.42	0.27
Queue Length 95th (m)	3.8	0.0	7.4
Control Delay (s)	4.2	0.0	18.9
Lane LOS	A		C
Approach Delay (s)	4.2	0.0	18.9
Approach LOS			C

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		

* User Entered Value

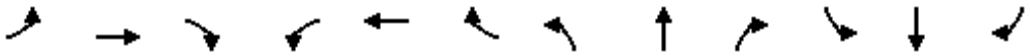


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	122	860	640	20	19	68
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	133	935	696	22	21	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	717				1439	359
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	717				1439	359
tC, single (s)	4.2				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				*3.0	*3.0
p0 queue free %	85				91	91
cM capacity (veh/h)	860				236	844

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	444	623	464	254	95
Volume Left	133	0	0	0	21
Volume Right	0	0	0	22	74
cSH	860	1700	1700	1700	540
Volume to Capacity	0.15	0.37	0.27	0.15	0.18
Queue Length 95th (m)	3.8	0.0	0.0	0.0	4.4
Control Delay (s)	4.3	0.0	0.0	0.0	13.1
Lane LOS	A				B
Approach Delay (s)	1.8		0.0		13.1
Approach LOS					B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

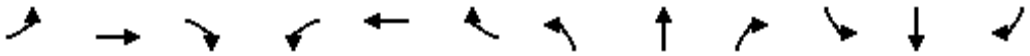


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	57	102	83	32	711	37	307	211	0	21	74	146
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	111	90	35	773	40	334	229	0	23	80	159
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	813			201			1341	1162	156	1257	1188	793
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	813			201			1341	1162	156	1257	1188	793
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	92			97			0	32	100	84	75	71
cM capacity (veh/h)	801			1353			164	335	1030	141	327	545

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	263	848	563	262
Volume Left	62	35	334	23
Volume Right	90	40	0	159
cSH	801	1353	208	375
Volume to Capacity	0.08	0.03	2.71	0.70
Queue Length 95th (m)	1.8	0.6	341.4	35.8
Control Delay (s)	3.0	0.7	819.9	34.1
Lane LOS	A	A	F	D
Approach Delay (s)	3.0	0.7	819.9	34.1
Approach LOS			F	D

Intersection Summary			
Average Delay	243.8		
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		

* User Entered Value

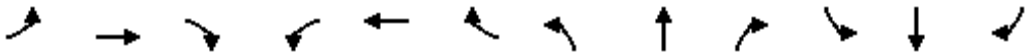


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	102	83	32	711	37	307	211	0	21	74	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		30.0	60.0		0.0	60.0		0.0	60.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
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			0.850		0.993						0.900	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	1733	1473	1647	1721	0	1647	1733	0	1647	1560	0
Flt Permitted	0.130			0.685			0.338			0.616		
Satd. Flow (perm)	225	1733	1473	1187	1721	0	586	1733	0	1068	1560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			90		4						99	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		404.9			612.0			258.8			237.0	
Travel Time (s)		29.2			44.1			18.6			17.1	
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
Adj. Flow (vph)	62	111	90	35	773	40	334	229	0	23	80	159
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	111	90	35	813	0	334	229	0	23	239	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		2			6		3	8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0		8.0	24.0		24.0	24.0	
Total Split (s)	52.0	52.0	52.0	52.0	52.0	0.0	14.0	38.0	0.0	24.0	24.0	0.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	57.8%	0.0%	15.6%	42.2%	0.0%	26.7%	26.7%	0.0%
Maximum Green (s)	46.0	46.0	46.0	46.0	46.0		11.0	32.0		18.0	18.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		0.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0			11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0			0		0	0	
Act Effct Green (s)	41.8	41.8	41.8	41.8	41.8		30.7	27.7		13.5	13.5	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51		0.38	0.34		0.17	0.17	
v/c Ratio	0.54	0.13	0.11	0.06	0.92		0.92	0.39		0.13	0.70	
Control Delay	35.5	11.2	3.1	10.9	36.3		54.9	23.8		32.0	31.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.5	11.2	3.1	10.9	36.3		54.9	23.8		32.0	31.1	
LOS	D	B	A	B	D		D	C		C	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		14.1			35.3			42.2			31.2	
Approach LOS		B			D			D			C	
Queue Length 50th (m)	5.5	7.7	0.0	2.3	99.4		39.9	26.7		3.0	19.9	
Queue Length 95th (m)	#24.3	16.6	6.3	6.9	#187.4		#88.1	43.9		9.0	42.0	
Internal Link Dist (m)		380.9			588.0			234.8			213.0	
Turn Bay Length (m)	60.0		30.0	60.0			60.0			60.0		
Base Capacity (vph)	128	989	879	678	984		365	688		239	425	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.11	0.10	0.05	0.83		0.92	0.33		0.10	0.56	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 81.6			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 33.9		Intersection LOS: C	
Intersection Capacity Utilization 94.9%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 111: Old Montreal Road & N/S Collector

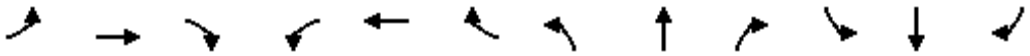


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	102	83	32	711	37	307	211	0	21	74	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		30.0	60.0		0.0	60.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.933			0.993						0.900	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3073	0	1647	3270	0	1647	1733	0	1647	1560	0
Flt Permitted	0.252			0.626			0.435			0.616		
Satd. Flow (perm)	437	3073	0	1085	3270	0	754	1733	0	1068	1560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90			8						99	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		404.9			612.0			258.8			237.0	
Travel Time (s)		29.2			44.1			18.6			17.1	
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
Adj. Flow (vph)	62	111	90	35	773	40	334	229	0	23	80	159
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	201	0	35	813	0	334	229	0	23	239	0
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		8.0	24.0		24.0	24.0	
Total Split (s)	52.0	52.0	0.0	52.0	52.0	0.0	14.0	38.0	0.0	24.0	24.0	0.0
Total Split (%)	57.8%	57.8%	0.0%	57.8%	57.8%	0.0%	15.6%	42.2%	0.0%	26.7%	26.7%	0.0%
Maximum Green (s)	46.0	46.0		46.0	46.0		11.0	32.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	3.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	22.5	22.5		22.5	22.5		29.8	26.7		12.4	12.4	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.48	0.43		0.20	0.20	
v/c Ratio	0.39	0.17		0.09	0.68		0.63	0.30		0.11	0.61	
Control Delay	22.7	7.8		13.4	19.3		18.8	14.1		23.5	21.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.7	7.8		13.4	19.3		18.8	14.1		23.5	21.4	
LOS	C	A		B	B		B	B		C	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		11.3			19.1			16.9			21.6	
Approach LOS		B			B			B			C	
Queue Length 50th (m)	4.4	3.6		2.2	33.9		20.5	14.4		1.9	12.6	
Queue Length 95th (m)	14.6	9.8		7.4	57.2		#51.1	34.5		7.6	35.5	
Internal Link Dist (m)		380.9			588.0			234.8			213.0	
Turn Bay Length (m)	60.0			60.0			60.0			60.0		
Base Capacity (vph)	334	2371		830	2502		528	922		319	536	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.08		0.04	0.32		0.63	0.25		0.07	0.45	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 61.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 17.7		Intersection LOS: B	
Intersection Capacity Utilization 80.2%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 111: Old Montreal Road & N/S Collector

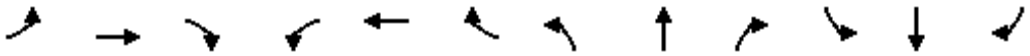


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	235	388	258	75	360	25	218	179	0	137	258	84
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	255	422	280	82	391	27	237	195	0	149	280	91
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	418			702			1872	1654	562	1738	1781	405
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	418			702			1872	1654	562	1738	1781	405
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	77			91			0	0	100	0	0	89
cM capacity (veh/h)	1125			881			0	156	689	0	136	806

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	958	500	432	521
Volume Left	255	82	237	149
Volume Right	280	27	0	91
cSH	1125	881	0	0
Volume to Capacity	0.23	0.09	Err	Err
Queue Length 95th (m)	6.1	2.1	Err	Err
Control Delay (s)	5.0	2.5	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	5.0	2.5	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization			129.4%	ICU Level of Service H
Analysis Period (min)			15	

* User Entered Value

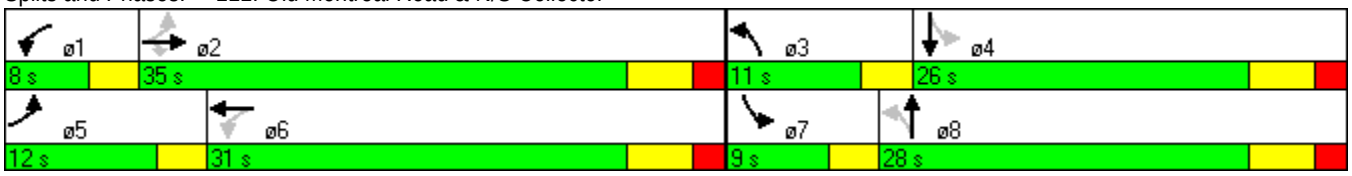


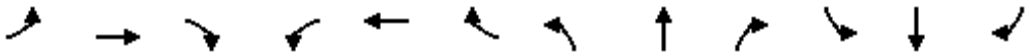
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	388	258	75	360	25	218	179	0	137	258	84
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		30.0	60.0		0.0	60.0		0.0	60.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
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			0.850		0.990						0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	1733	1473	1647	1716	0	1647	1733	0	1647	1669	0
Flt Permitted	0.248			0.431			0.253			0.635		
Satd. Flow (perm)	430	1733	1473	747	1716	0	439	1733	0	1101	1669	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			248		5						20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		404.9			612.0			258.8			237.0	
Travel Time (s)		29.2			44.1			18.6			17.1	
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
Adj. Flow (vph)	255	422	280	82	391	27	237	195	0	149	280	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	422	280	82	418	0	237	195	0	149	371	0
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6			8			4		
Detector Phase	5	2	2	1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	8.0	24.0	24.0	8.0	24.0		8.0	24.0		8.0	24.0	
Total Split (s)	12.0	35.0	35.0	8.0	31.0	0.0	11.0	28.0	0.0	9.0	26.0	0.0
Total Split (%)	15.0%	43.8%	43.8%	10.0%	38.8%	0.0%	13.8%	35.0%	0.0%	11.3%	32.5%	0.0%
Maximum Green (s)	9.0	29.0	29.0	5.0	25.0		8.0	22.0		6.0	20.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		0.0	2.0		0.0	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)	3.0	6.0	6.0	3.0	6.0	4.0	3.0	6.0	4.0	3.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min	Min	None	Min		None	None		None	None	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	36.9	27.7	27.7	29.9	21.8		31.8	20.7		27.8	18.7	
Actuated g/C Ratio	0.49	0.37	0.37	0.39	0.29		0.42	0.27		0.37	0.25	
v/c Ratio	0.72	0.67	0.40	0.23	0.84		0.76	0.41		0.33	0.87	
Control Delay	25.7	27.2	5.7	12.7	41.9		34.0	26.3		17.1	49.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.7	27.2	5.7	12.7	41.9		34.0	26.3		17.1	49.0	
LOS	C	C	A	B	D		C	C		B	D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		20.5			37.1			30.6			39.8	
Approach LOS		C			D			C			D	
Queue Length 50th (m)	20.0	48.9	2.9	5.7	52.0		21.3	22.1		12.6	46.8	
Queue Length 95th (m)	#39.9	77.2	16.9	12.0	#91.5		#42.2	38.8		23.6	#90.0	
Internal Link Dist (m)		380.9			588.0			234.8			213.0	
Turn Bay Length (m)	60.0		30.0	60.0			60.0			60.0		
Base Capacity (vph)	355	668	720	354	574		313	507		447	458	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.72	0.63	0.39	0.23	0.73		0.76	0.38		0.33	0.81	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 75.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 29.9		Intersection LOS: C	
Intersection Capacity Utilization 84.5%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 111: Old Montreal Road & N/S Collector



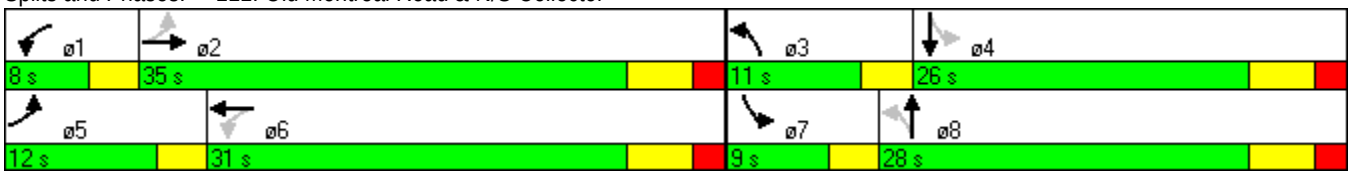


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	388	258	75	360	25	218	179	0	137	258	84
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		30.0	60.0		0.0	60.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	10.0		10.0	10.0		10.0	10.0		10.0	10.0		10.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.940			0.990						0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1647	3096	0	1647	3260	0	1647	1733	0	1647	1669	0
Flt Permitted	0.385			0.351			0.287			0.635		
Satd. Flow (perm)	667	3096	0	608	3260	0	497	1733	0	1101	1669	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		222			9						20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		404.9			612.0			258.8			237.0	
Travel Time (s)		29.2			44.1			18.6			17.1	
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
Adj. Flow (vph)	255	422	280	82	391	27	237	195	0	149	280	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	702	0	82	418	0	237	195	0	149	371	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	8.0	24.0		8.0	24.0		8.0	24.0		8.0	24.0	
Total Split (s)	12.0	35.0	0.0	8.0	31.0	0.0	11.0	28.0	0.0	9.0	26.0	0.0
Total Split (%)	15.0%	43.8%	0.0%	10.0%	38.8%	0.0%	13.8%	35.0%	0.0%	11.3%	32.5%	0.0%
Maximum Green (s)	9.0	29.0		5.0	25.0		8.0	22.0		6.0	20.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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)	3.0	6.0	4.0	3.0	6.0	4.0	3.0	6.0	4.0	3.0	6.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	30.3	21.1		23.2	15.1		31.6	22.3		27.3	18.2	
Actuated g/C Ratio	0.44	0.31		0.34	0.22		0.46	0.32		0.40	0.26	
v/c Ratio	0.60	0.64		0.29	0.58		0.65	0.35		0.31	0.81	
Control Delay	19.6	17.2		14.7	26.7		23.3	22.0		14.0	39.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.6	17.2		14.7	26.7		23.3	22.0		14.0	39.3	
LOS	B	B		B	C		C	C		B	D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		17.9			24.8			22.7			32.1	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	20.0	26.8		5.7	23.4		15.8	17.6		9.3	37.7	
Queue Length 95th (m)	33.9	41.9		12.1	34.8		#34.7	37.5		22.5	#86.2	
Internal Link Dist (m)		380.9			588.0			234.8			213.0	
Turn Bay Length (m)	60.0			60.0			60.0			60.0		
Base Capacity (vph)	424	1448		282	1204		364	575		486	505	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.60	0.48		0.29	0.35		0.65	0.34		0.31	0.73	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 68.7			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 111: Old Montreal Road & N/S Collector



INPUT REPORT

Old Montreal Road/ Collector Road Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Old Montreal Road/ Collector Road Roundabout 2031 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	1	1	–	0.0
East	Old Montreal Road	Two-way	1	1	–	0.0
North	Collector Road	Two-way	1	1	–	0.0
West	Old Montreal Road	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None
North	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
West	Old Montreal Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
North	**Collector Road**			
App. Lane 1	3.75	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
West	**Old Montreal Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Collector Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**Old Montreal Road**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.75	20.0	–	No
East	Old Montreal Road	3.75	20.0	–	No
North	Collector Road	3.75	20.0	–	No
West	Old Montreal Road	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	307.0	5.00	92.0	1.20	100.00	2.00
North	211.0	5.00	92.0	1.20	100.00	2.00
East	1.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	32.0	5.00	92.0	1.20	100.00	2.00
West	711.0	5.00	92.0	1.20	100.00	2.00
North	37.0	5.00	92.0	1.20	100.00	2.00
From: North	Collector Road					
East	21.0	5.00	92.0	1.20	100.00	2.00
South	74.0	5.00	92.0	1.20	100.00	2.00
West	146.0	5.00	92.0	1.20	100.00	2.00
From: West	Old Montreal Road					
North	57.0	5.00	92.0	1.20	100.00	2.00
East	102.0	5.00	92.0	1.20	100.00	2.00
South	83.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	50.0	300.0	–	–	–	–
North	50.0	50.0	300.0	–	–	–	–
East	50.0	50.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	80.0	50.0	130.0	–	–	–	–
West	80.0	50.0	130.0	–	–	–	–
North	80.0	80.0	400.0	–	–	–	–
From: North	Collector Road						
East	50.0	50.0	300.0	–	–	–	–
South	50.0	50.0	300.0	–	–	–	–
West	50.0	50.0	300.0	–	–	–	–

From: West	Old Montreal Road						
North	80.0	80.0	500.0	–	–	–	–
East	80.0	80.0	500.0	–	–	–	–
South	80.0	80.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Collector Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Old Montreal Road								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Collector Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Old Montreal Road									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

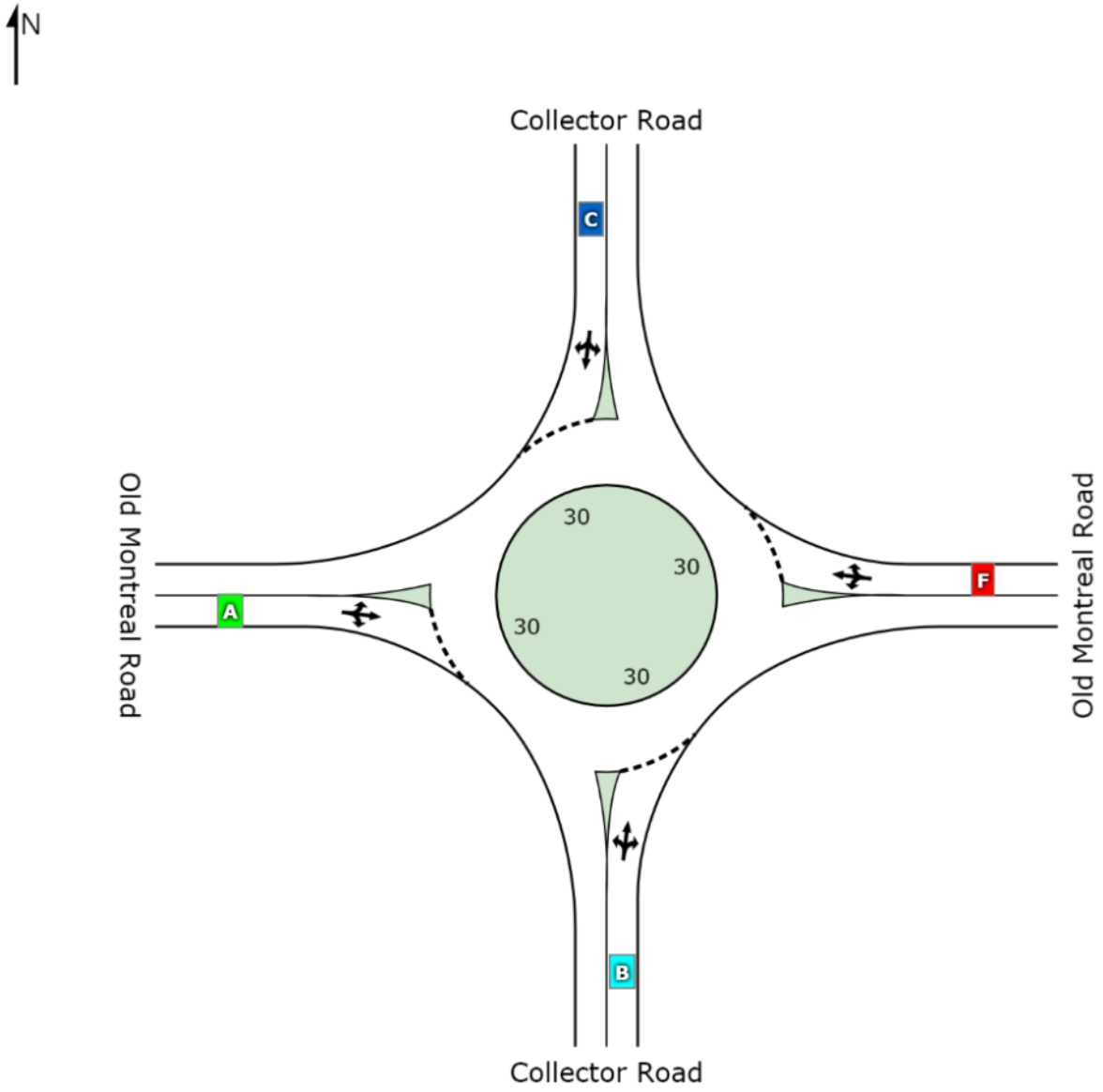
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: old_montreal-collector Roundabout - 2031 BK + Site - AM

Old Montreal Road/ Collector Road Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	B	F	C	A	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: old_montreal-collector Roundabout - 2031 BK + Site - AM

Old Montreal Road/ Collector Road Roundabout
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	334	5.0	0.648	14.7	LOS B	4.7	36.8	0.59	0.83	28.6
8	T	229	5.0	0.648	14.7	LOS B	4.7	36.8	0.59	0.59	30.2
18	R	1	5.0	0.648	14.7	LOS B	4.7	36.8	0.59	0.66	29.7
Approach		564	5.0	0.648	14.7	LOS B	4.7	36.8	0.59	0.73	29.2
East: Old Montreal Road											
1	L	35	5.0	1.530	267.4	LOS F	103.6	820.6	1.00	4.18	3.4
6	T	773	5.0	1.530	267.4	LOS F	103.6	820.6	1.00	4.18	3.0
16	R	40	5.0	1.530	267.4	LOS F	103.6	820.6	1.00	4.18	6.9
Approach		848	5.0	1.530	267.4	LOS F	103.6	820.6	1.00	4.18	3.2
North: Collector Road											
7	L	23	5.0	0.602	23.0	LOS C	2.9	23.0	0.77	1.11	25.0
4	T	80	5.0	0.602	23.0	LOS C	2.9	23.0	0.77	0.95	25.6
14	R	159	5.0	0.602	23.0	LOS C	2.9	23.0	0.77	0.99	25.4
Approach		262	5.0	0.602	23.0	LOS C	2.9	23.0	0.77	0.99	25.4
West: Old Montreal Road											
5	L	62	5.0	0.281	6.7	LOS A	1.2	9.2	0.30	0.82	48.1
2	T	111	5.0	0.281	6.7	LOS A	1.2	9.2	0.30	0.54	53.9
12	R	90	5.0	0.281	6.7	LOS A	1.2	9.2	0.30	0.62	52.8
Approach		263	5.0	0.281	6.7	LOS A	1.2	9.2	0.30	0.64	52.0
All Vehicles		1937	5.0	1.530	125.3	LOS F	103.6	820.6	0.76	2.26	8.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Old Montreal Road/ Collector Road Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Old Montreal Road/ Collector Road Roundabout 2031 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	1	1	–	0.0
East	Old Montreal Road	Two-way	1	1	–	0.0
North	Collector Road	Two-way	1	1	–	0.0
West	Old Montreal Road	Two-way	1	1	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None
North	Collector Road	30.00	5.00	1	30.0	30.0	1.2000	None
West	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
North	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
West	Old Montreal Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.75	130.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
North	**Collector Road**			
App. Lane 1	3.75	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
West	**Old Montreal Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Collector Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**Old Montreal Road**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.75	20.0	–	No
East	Old Montreal Road	3.75	20.0	–	No
North	Collector Road	3.75	20.0	–	No
West	Old Montreal Road	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	218.0	5.00	92.0	1.20	100.00	2.00
North	179.0	5.00	92.0	1.20	100.00	2.00
East	1.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	75.0	5.00	92.0	1.20	100.00	2.00
West	360.0	5.00	92.0	1.20	100.00	2.00
North	25.0	5.00	92.0	1.20	100.00	2.00
From: North	Collector Road					
East	137.0	5.00	92.0	1.20	100.00	2.00
South	258.0	5.00	92.0	1.20	100.00	2.00
West	84.0	5.00	92.0	1.20	100.00	2.00
From: West	Old Montreal Road					
North	235.0	5.00	92.0	1.20	100.00	2.00
East	388.0	5.00	92.0	1.20	100.00	2.00
South	258.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	50.0	300.0	–	–	–	–
North	50.0	50.0	300.0	–	–	–	–
East	50.0	50.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	80.0	50.0	130.0	–	–	–	–
West	80.0	50.0	130.0	–	–	–	–
North	80.0	80.0	400.0	–	–	–	–
From: North	Collector Road						
East	50.0	50.0	300.0	–	–	–	–
South	50.0	50.0	300.0	–	–	–	–
West	50.0	50.0	300.0	–	–	–	–

From: West	Old Montreal Road						
North	80.0	80.0	500.0	–	–	–	–
East	80.0	80.0	500.0	–	–	–	–
South	80.0	80.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Collector Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Old Montreal Road								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Collector Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Old Montreal Road									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

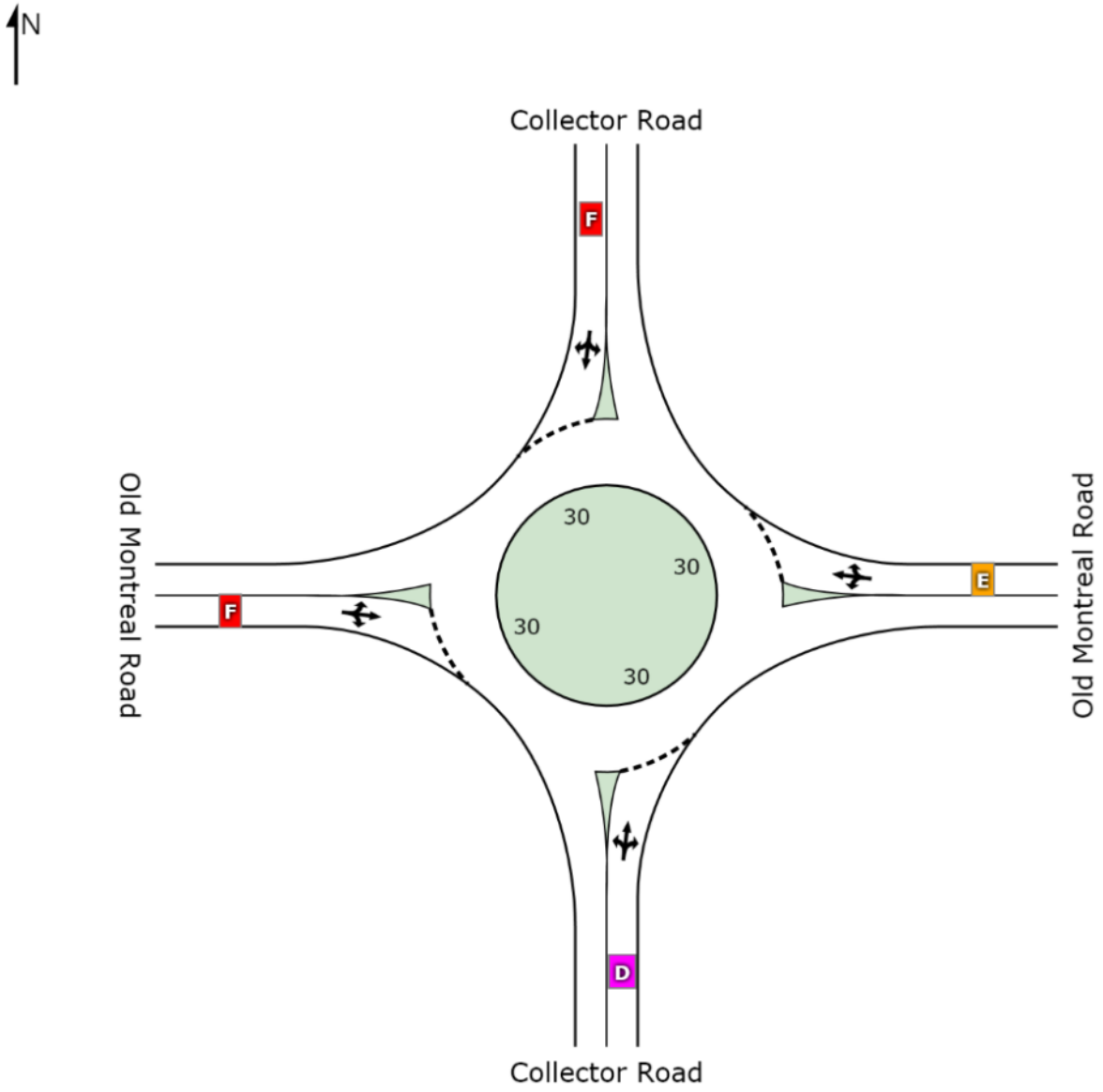
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: old_montreal-collector
Roundabout - 2031 BK + Site - PM

Old Montreal Road/ Collector Road Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	D	E	F	F	F

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: old_montreal-collector Roundabout - 2031 BK + Site - PM

Old Montreal Road/ Collector Road Roundabout
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	237	5.0	0.754	26.8	LOS D	5.4	42.9	0.82	1.16	23.4
8	T	195	5.0	0.754	26.8	LOS D	5.4	42.9	0.82	1.05	23.7
18	R	1	5.0	0.754	26.8	LOS D	5.4	42.9	0.82	1.08	23.5
Approach		433	5.0	0.754	26.8	LOS D	5.4	42.9	0.82	1.11	23.5
East: Old Montreal Road											
1	L	82	5.0	0.879	40.5	LOS E	8.9	70.4	0.91	1.26	15.1
6	T	391	5.0	0.879	40.5	LOS E	8.9	70.4	0.91	1.22	14.6
16	R	27	5.0	0.879	40.5	LOS E	8.9	70.4	0.91	1.23	27.8
Approach		500	5.0	0.879	40.5	LOS E	8.9	70.4	0.91	1.23	15.6
North: Collector Road											
7	L	149	5.0	1.027	75.8	LOS F	18.9	149.3	1.00	2.06	13.4
4	T	280	5.0	1.027	75.8	LOS F	18.9	149.3	1.00	2.06	12.8
14	R	91	5.0	1.027	75.8	LOS F	18.9	149.3	1.00	2.06	12.8
Approach		521	5.0	1.027	75.8	LOS F	18.9	149.3	1.00	2.06	13.0
West: Old Montreal Road											
5	L	255	5.0	1.515	258.0	LOS F	115.6	915.9	1.00	4.21	8.5
2	T	422	5.0	1.515	258.0	LOS F	115.6	915.9	1.00	4.21	8.3
12	R	280	5.0	1.515	258.0	LOS F	115.6	915.9	1.00	4.21	8.2
Approach		958	5.0	1.515	258.0	LOS F	115.6	915.9	1.00	4.21	8.3
All Vehicles		2411	5.0	1.515	132.0	LOS F	115.6	915.9	0.95	2.57	10.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

INPUT REPORT

Old Montreal Road/ Collector Road Roundabout (4-Lanes)
2031 Background plus Site Generated Traffic - AM Peak Hour

Intersection Parameters	
Title	Old Montreal Road/ Collector Road Roundabout (4-Lanes) 2031 Background plus Site Generated Traffic - AM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	1	1	–	0.0
East	Old Montreal Road	Two-way	2	2	–	0.0
North	Collector Road	Two-way	1	1	–	0.0
West	Old Montreal Road	Two-way	2	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None
North	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
North	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
West	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.50	130.0	1.00	–
App. Lane 2	3.75	130.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.75	500.0	-1.00	–
North	**Collector Road**			
App. Lane 1	3.75	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
West	**Old Montreal Road**			
App. Lane 1	3.50	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.75	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Collector Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**Old Montreal Road**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.50	20.0	–	No
East	Old Montreal Road	3.50	20.0	–	No
North	Collector Road	3.50	20.0	–	No
West	Old Montreal Road	3.50	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	307.0	5.00	92.0	1.20	100.00	2.00
North	211.0	5.00	92.0	1.20	100.00	2.00
East	1.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	32.0	5.00	92.0	1.20	100.00	2.00
West	711.0	5.00	92.0	1.20	100.00	2.00
North	37.0	5.00	92.0	1.20	100.00	2.00
From: North	Collector Road					
East	21.0	5.00	92.0	1.20	100.00	2.00
South	74.0	5.00	92.0	1.20	100.00	2.00
West	146.0	5.00	92.0	1.20	100.00	2.00
From: West	Old Montreal Road					
North	57.0	5.00	92.0	1.20	100.00	2.00
East	102.0	5.00	92.0	1.20	100.00	2.00
South	83.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	80.0	300.0	–	–	–	–
North	50.0	50.0	300.0	–	–	–	–
East	50.0	80.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	80.0	50.0	130.0	–	–	–	–
West	80.0	80.0	130.0	–	–	–	–
North	80.0	50.0	400.0	–	–	–	–
From: North	Collector Road						
East	50.0	80.0	300.0	–	–	–	–
South	50.0	50.0	300.0	–	–	–	–
West	50.0	80.0	300.0	–	–	–	–

From: West	Old Montreal Road						
North	80.0	50.0	500.0	–	–	–	–
East	80.0	80.0	500.0	–	–	–	–
South	80.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	0.850	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Collector Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Old Montreal Road								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Collector Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Old Montreal Road									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

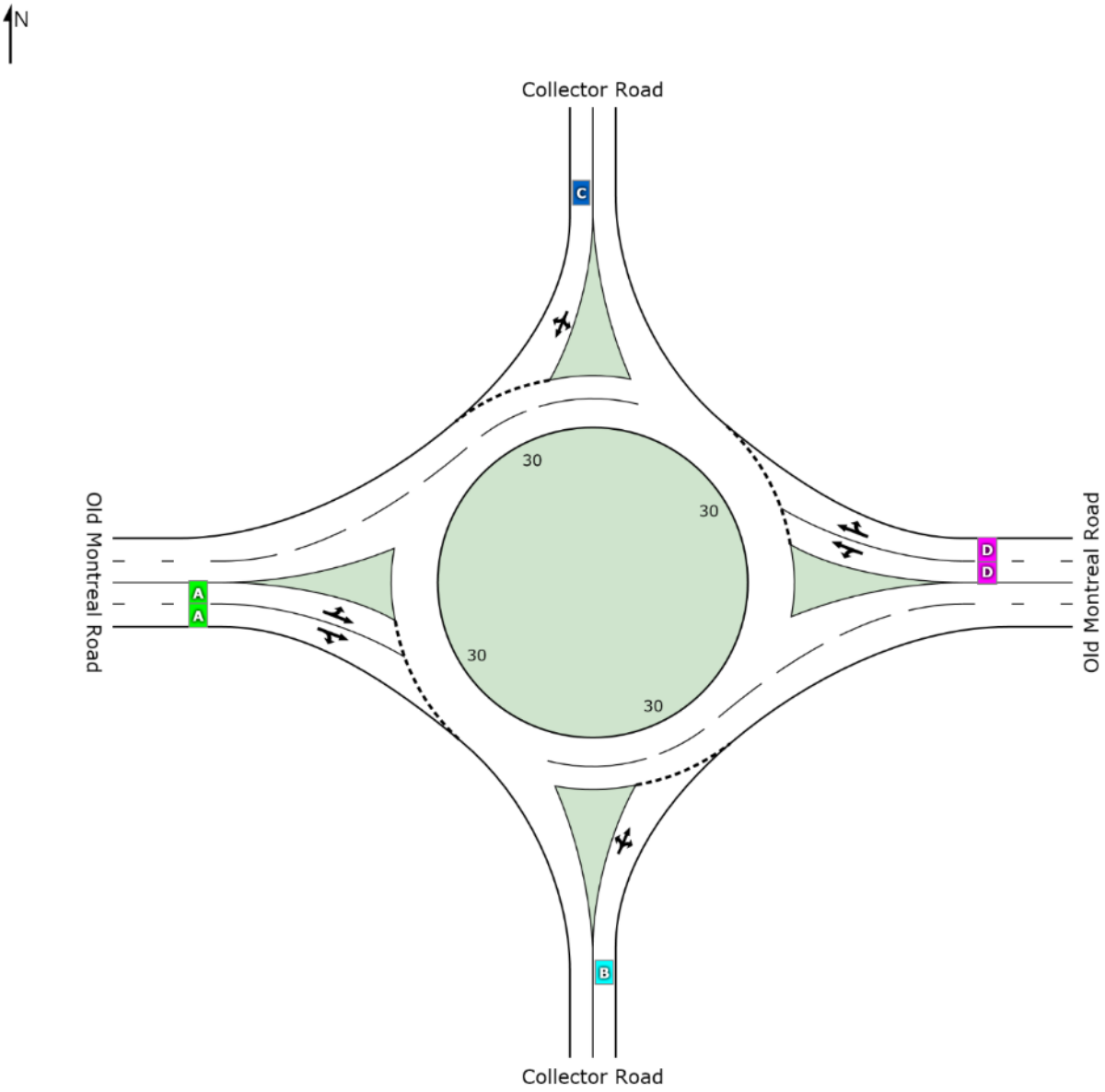
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: old_montreal-collector Roundabout - 2031 BK + Site - AM

Old Montreal Road/ Collector Road Roundabout (4-Lanes)
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	B	D	C	A	C

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: old_montreal-collector Roundabout - 2031 BK + Site - AM

Old Montreal Road/ Collector Road Roundabout (4-Lanes)
2031 Background plus Site Generated Traffic - AM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	334	5.0	0.610	12.8	LOS B	3.0	23.6	0.43	0.82	33.1
8	T	229	5.0	0.610	12.8	LOS B	3.0	23.6	0.43	0.48	31.6
18	R	1	5.0	0.610	12.8	LOS B	3.0	23.6	0.43	0.61	35.2
Approach		564	5.0	0.610	12.8	LOS B	3.0	23.6	0.43	0.68	32.6
East: Old Montreal Road											
1	L	35	5.0	0.777	29.8	LOS D	5.6	44.4	0.83	1.16	18.1
6	T	773	5.0	0.777	29.8	LOS D	5.6	44.4	0.83	1.08	23.2
16	R	40	5.0	0.777	29.8	LOS D	5.6	44.4	0.83	1.10	29.3
Approach		848	5.0	0.777	29.8	LOS D	5.6	44.4	0.83	1.08	23.3
North: Collector Road											
7	L	23	5.0	0.563	20.1	LOS C	2.0	16.1	0.74	1.06	29.7
4	T	80	5.0	0.563	20.1	LOS C	2.0	16.1	0.74	0.89	27.1
14	R	159	5.0	0.563	20.1	LOS C	2.0	16.1	0.74	0.95	30.9
Approach		262	5.0	0.563	20.1	LOS C	2.0	16.1	0.74	0.94	29.7
West: Old Montreal Road											
5	L	62	5.0	0.149	5.6	LOS A	0.5	4.0	0.28	0.80	47.2
2	T	111	5.0	0.149	5.6	LOS A	0.5	4.0	0.28	0.54	55.2
12	R	90	5.0	0.149	5.6	LOS A	0.5	4.0	0.28	0.61	52.2
Approach		263	5.0	0.149	5.6	LOS A	0.5	4.0	0.28	0.62	52.2
All Vehicles		1937	5.0	0.777	20.3	LOS C	5.6	44.4	0.62	0.88	30.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

INPUT REPORT

Old Montreal Road/ Collector Road Roundabout (4-Lanes)
2031 Background plus Site Generated Traffic - PM Peak Hour

Intersection Parameters	
Title	Old Montreal Road/ Collector Road Roundabout (4-Lanes) 2031 Background plus Site Generated Traffic - PM Peak Hour
Intersection ID	1
Unit Time (for volumes)	60 minutes
Peak Flow Period (for performance)	15 minutes

Geometry - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Median Width m	Extra Bunching %
South	Collector Road	Two-way	1	1	–	0.0
East	Old Montreal Road	Two-way	2	2	–	0.0
North	Collector Road	Two-way	1	1	–	0.0
West	Old Montreal Road	Two-way	2	2	–	0.0

Geometry - Roundabout Data

Location	Name	Island Diameter m	Circ. Width m	Circ. Lanes	Entry Radius m	Entry Angle degrees	Env. Factor	Entry/Circ. Flow Adjust.
South	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
East	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None
North	Collector Road	30.00	10.00	2	30.0	30.0	1.2000	None
West	Old Montreal Road	30.00	5.00	1	30.0	30.0	1.2000	None

Geometry - Approach Lane Data

Lane Number	Lane Type	Lane Discip.	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %
South	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
East	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0
North	Collector Road					
App. Lane 1	Normal	LTR	1800	–	–	0.0
West	Old Montreal Road					
App. Lane 1	Normal	LT	1800	–	–	0.0
App. Lane 2	Normal	TR	1800	–	–	0.0

Geometry - Approach & Exit Lane Data

Lane Number	Lane Width m	Lane Length m	Grade %	SL Type
South	**Collector Road**			
App. Lane 1	3.75	500.0	1.00	–
Exit Lane 1	3.75	500.0	-1.00	–
East	**Old Montreal Road**			
App. Lane 1	3.50	130.0	1.00	–
App. Lane 2	3.50	130.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.75	500.0	-1.00	–
North	**Collector Road**			
App. Lane 1	3.75	300.0	1.00	–
Exit Lane 1	3.75	300.0	-1.00	–
West	**Old Montreal Road**			
App. Lane 1	3.50	500.0	1.00	–
App. Lane 2	3.75	500.0	1.00	–
Exit Lane 1	3.50	500.0	-1.00	–
Exit Lane 2	3.75	500.0	-1.00	–

Lanes are numbered from left to right in the direction of travel.

Geometry - Movement Definitions

To Approach	Movement Banned	Turn Desig.
From: South	**Collector Road**	
South	Yes	–
West	No	L
North	No	T
East	No	R
From: East	**Old Montreal Road**	
East	Yes	–
South	No	L
West	No	T
North	No	R
From: North	**Collector Road**	
North	Yes	–
East	No	L
South	No	T
West	No	R
From: West	**Old Montreal Road**	
West	Yes	–
North	No	L
East	No	T
South	No	R

HCM 2010 Roundabout Model Calibration

Location	Name	HCM 2010 Single Lane		HCM 2010 Multi-Lane Dominant Lane		HCM 2010 Multi-Lane Subdominant Lane	
		Para. A	Para. B	Para. A	Para. B	Para. A	Para. B
South	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
East	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
North	Collector Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750
West	Old Montreal Road	1130.0	0.001000	1130.0	0.000700	1130.0	0.000750

Roundabout FHWA 2000 Model Data

Location	Name	Approach Half Width m	Flare Length (Effective) m	Cap. at Zero Circ. Flow veh/h	Grade-Separated
South	Collector Road	3.75	20.0	–	No
East	Old Montreal Road	3.75	20.0	–	No
North	Collector Road	3.75	20.0	–	No
West	Old Montreal Road	3.75	20.0	–	No

Volumes

To Approach	Total veh	HV %	Peak Flow Factor %	Vehicle Occupancy pers/veh	Flow Scale %	Growth Rate %/year
From: South	Collector Road					
West	218.0	5.00	92.0	1.20	100.00	2.00
North	179.0	5.00	92.0	1.20	100.00	2.00
East	1.0	5.00	92.0	1.20	100.00	2.00
From: East	Old Montreal Road					
South	75.0	5.00	92.0	1.20	100.00	2.00
West	360.0	5.00	92.0	1.20	100.00	2.00
North	25.0	5.00	92.0	1.20	100.00	2.00
From: North	Collector Road					
East	137.0	5.00	92.0	1.20	100.00	2.00
South	258.0	5.00	92.0	1.20	100.00	2.00
West	84.0	5.00	92.0	1.20	100.00	2.00
From: West	Old Montreal Road					
North	235.0	5.00	92.0	1.20	100.00	2.00
East	388.0	5.00	92.0	1.20	100.00	2.00
South	258.0	5.00	92.0	1.20	100.00	2.00

Path Data

To Approach	App. Cruise Speed km/h	Exit Cruise Speed km/h	App. Trav. Distance m	Negn Speed km/h	Negn Distance m	Downst. Distance m	Negn Radius m
From: South	Collector Road						
West	50.0	80.0	300.0	–	–	–	–
North	50.0	50.0	300.0	–	–	–	–
East	50.0	80.0	300.0	–	–	–	–
From: East	Old Montreal Road						
South	80.0	50.0	130.0	–	–	–	–
West	80.0	80.0	130.0	–	–	–	–
North	80.0	50.0	400.0	–	–	–	–
From: North	Collector Road						
East	50.0	80.0	300.0	–	–	–	–
South	50.0	50.0	300.0	–	–	–	–
West	50.0	80.0	300.0	–	–	–	–

From: West	Old Montreal Road						
North	80.0	50.0	500.0	–	–	–	–
East	80.0	80.0	500.0	–	–	–	–
South	80.0	50.0	500.0	–	–	–	–

Movement Data - General

Turn	Mov. ID	Queue Space LV m	Queue Space HV m	Vehicle Length LV m	Vehicle Length HV m	HVE	P.Deg. Satn	Movement Type	Movement Control
South	Collector Road								
L	3	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	8	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	18	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
East	Old Montreal Road								
L	1	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	6	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	16	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
North	Collector Road								
L	7	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	4	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	14	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
West	Old Montreal Road								
L	5	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
T	2	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–
R	12	7.60	14.00	5.10	11.00	2.00	–	*Normal*	–

Movement Type and Control parameters are set automaticly from Approach Control and Lane Type data in the Geometry dialog.

Gap Acceptance

Movement	Critical Gap sec	Follow-up Headway sec	Min. Departures veh/min	Exiting Flow Effect %
South	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
East	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
North	Collector Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0
West	Old Montreal Road			
L	–	–	2.50	0
T	–	–	2.50	0
R	–	–	2.50	0

Pedestrians

Mov. ID	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %/year	Crossing Distance m	App. Trav. Distance m	Downst. Distance m	Walking Speed m/sec	Queue Space m	P.Deg. Satn
South	Collector Road									
2P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
East	Old Montreal Road									
8P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
North	Collector Road									
6P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–
West	Old Montreal Road									

4P	50.0	92.0	100.00	2.00	–	10.0	10.0	1.30	1.00	–

Model Settings - Options	
General Options	
Level of Service Method	Delay & v/c (HCM 2010)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Gap Acceptance	
HV Method for Gap-Acceptance	Include HV Effect for all percentages
Gap-Acceptance Capacity	Traditional M1
HCM Delay Formula	Yes
Downstream Short Lane Model	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Roundabouts	
Roundabout Model Options	
Capacity Model	US HCM 2010
LOS Method	Same as Sign Control
US HCM 2010 Roundabout Model	
Include Origin-Destination Pattern Effects	No
Factor for Parameter A	1.000
Factor for Parameter B	1.000
Other Roundabout Models	
FHWA 2000	Yes
Use Urban Compact Roundabout	No
HCM 2000	No
NAASRA 1986	No

Model Settings - Cost Parameters	
Vehicle Operating Cost	
Cost Unit	$
Pump Price of Fuel	0.800 $/L
Fuel Resource Cost Factor	0.700
Ratio of Running Cost to Fuel Cost	3.00
Vehicle Mass	
Light Vehicle Mass	1400.0 kg
Heavy Vehicle Mass	11000.0 kg
Heavy Vehicle Maximum Power	130 kW
Time Cost	
Average Income	23.00 $/h
Time Value Factor	0.400

Demand & Sensitivity	
Analysis Method:	None

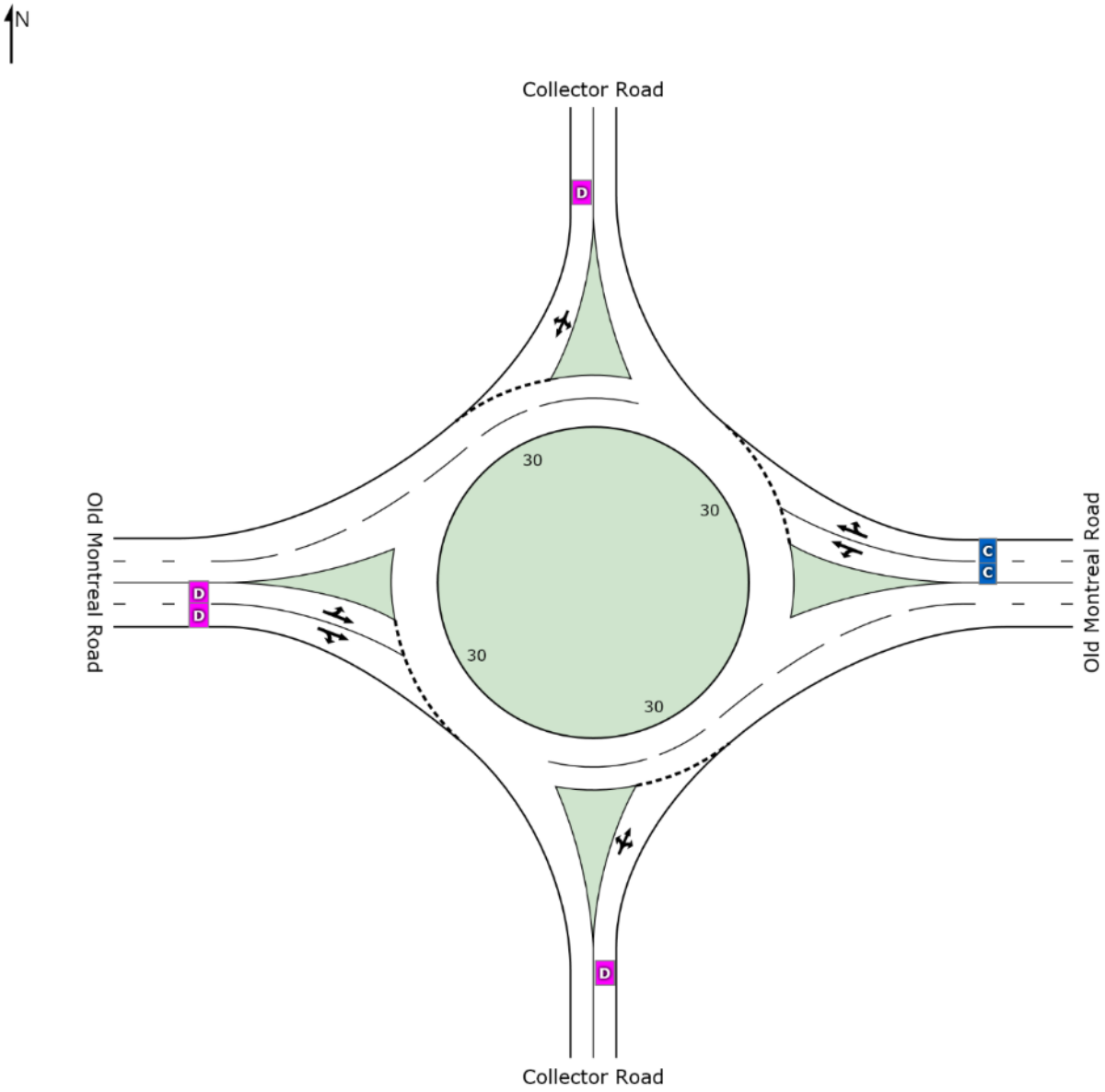
Site Properties	
Site (Intersection) Type	Roundabout

Model Name	US HCM (Metric)
Drive Rule	Right-hand side of the road
New Zealand Rule	No
HCM Version	Yes
Units	Metric

LEVEL OF SERVICE SUMMARY

Site: old_montreal-collector
Roundabout - 2031 BK + Site - PM

Old Montreal Road/ Collector Road Roundabout (4-Lanes)
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout



	South	East	North	West	Intersection
LOS	D	C	D	D	D

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: old_montreal-collector
Roundabout - 2031 BK + Site - PM

Old Montreal Road/ Collector Road Roundabout (4-Lanes)
2031 Background plus Site Generated Traffic - PM Peak Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Collector Road											
3	L	237	5.0	0.743	25.6	LOS D	3.8	30.4	0.74	1.10	27.1
8	T	195	5.0	0.743	25.6	LOS D	3.8	30.4	0.74	0.95	24.2
18	R	1	5.0	0.743	25.6	LOS D	3.8	30.4	0.74	1.01	27.9
Approach		433	5.0	0.743	25.6	LOS D	3.8	30.4	0.74	1.03	26.0
East: Old Montreal Road											
1	L	82	5.0	0.487	15.9	LOS C	2.1	17.0	0.69	1.03	23.9
6	T	391	5.0	0.487	15.9	LOS C	2.1	17.0	0.69	0.90	31.3
16	R	27	5.0	0.487	15.9	LOS C	2.1	17.0	0.69	0.94	38.3
Approach		500	5.0	0.487	15.9	LOS C	2.1	17.0	0.69	0.93	30.4
North: Collector Road											
7	L	149	5.0	0.821	30.5	LOS D	5.4	42.7	0.78	1.18	25.5
4	T	280	5.0	0.821	30.5	LOS D	5.4	42.7	0.78	1.03	22.4
14	R	91	5.0	0.821	30.5	LOS D	5.4	42.7	0.78	1.09	26.0
Approach		521	5.0	0.821	30.5	LOS D	5.4	42.7	0.78	1.08	24.0
West: Old Montreal Road											
5	L	255	5.0	0.786	28.1	LOS D	6.2	49.3	0.82	1.12	32.3
2	T	422	5.0	0.786	28.1	LOS D	6.2	49.3	0.82	1.06	36.4
12	R	280	5.0	0.786	28.1	LOS D	6.2	49.3	0.82	1.08	33.5
Approach		958	5.0	0.786	28.1	LOS D	6.2	49.3	0.82	1.08	34.5
All Vehicles		2411	5.0	0.821	25.6	LOS D	6.2	49.3	0.77	1.04	29.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	103	19	1	721	60	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	112	21	1	784	65	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			133		908	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			133		908	122
tC, single (s)			4.1		*5.0	*5.0
tC, 2 stage (s)						
tF (s)			2.2		*3.0	*3.0
p0 queue free %			100		87	100
cM capacity (veh/h)			1434		484	1065

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	133	785	70
Volume Left	0	1	65
Volume Right	21	0	4
cSH	1700	1434	501
Volume to Capacity	0.08	0.00	0.14
Queue Length 95th (m)	0.0	0.0	3.4
Control Delay (s)	0.0	0.0	13.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	13.3
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	103	19	1	721	60	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	112	21	1	784	65	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			133		516	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			133		516	66
tC, single (s)			4.2		*5.0	*5.0
tC, 2 stage (s)						
tF (s)			2.2		*3.0	*3.0
p0 queue free %			100		91	100
cM capacity (veh/h)			1428		720	1125

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	75	58	262	522	70
Volume Left	0	0	1	0	65
Volume Right	0	21	0	0	4
cSH	1700	1700	1428	1700	737
Volume to Capacity	0.04	0.03	0.00	0.31	0.09
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.2
Control Delay (s)	0.0	0.0	0.0	0.0	10.4
Lane LOS			A		B
Approach Delay (s)	0.0		0.0		10.4
Approach LOS					B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	465	62	4	424	38	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	505	67	4	461	41	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			573		1009	539
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			573		1009	539
tC, single (s)			4.1		*5.0	*5.0
tC, 2 stage (s)						
tF (s)			2.2		*3.0	*3.0
p0 queue free %			100		91	100
cM capacity (veh/h)			985		435	705

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	573	465	43
Volume Left	0	4	41
Volume Right	67	0	2
cSH	1700	985	444
Volume to Capacity	0.34	0.00	0.10
Queue Length 95th (m)	0.0	0.1	2.3
Control Delay (s)	0.0	0.1	14.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	14.0
Approach LOS			B

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		39.8%	ICU Level of Service A
Analysis Period (min)		15	

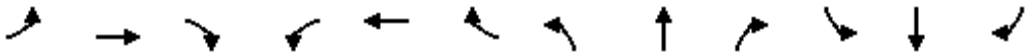
* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	465	62	4	424	38	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	505	67	4	461	41	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			573		778	286
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			573		778	286
tC, single (s)			4.2		*5.0	*5.0
tC, 2 stage (s)						
tF (s)			2.2		*3.0	*3.0
p0 queue free %			100		93	100
cM capacity (veh/h)			976		551	906

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	337	236	158	307	43
Volume Left	0	0	4	0	41
Volume Right	0	67	0	0	2
cSH	1700	1700	976	1700	562
Volume to Capacity	0.20	0.14	0.00	0.18	0.08
Queue Length 95th (m)	0.0	0.0	0.1	0.0	1.8
Control Delay (s)	0.0	0.0	0.3	0.0	11.9
Lane LOS			A		B
Approach Delay (s)	0.0		0.1		11.9
Approach LOS					B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	25.7%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

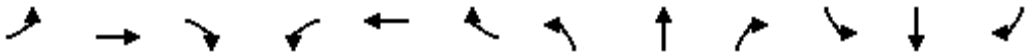


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	59	43	20	438	0	239	1	5	0	3	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	64	47	22	476	0	260	1	5	0	3	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	476			111			628	611	88	617	635	476
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	476			111			628	611	88	617	635	476
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	100			99			58	100	100	100	99	98
cM capacity (veh/h)	1071			1461			620	644	1102	639	629	750

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	113	498	266	18
Volume Left	2	22	260	0
Volume Right	47	0	5	15
cSH	1071	1461	626	726
Volume to Capacity	0.00	0.01	0.43	0.03
Queue Length 95th (m)	0.0	0.3	14.8	0.5
Control Delay (s)	0.2	0.5	14.9	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.5	14.9	10.1
Approach LOS			B	B

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

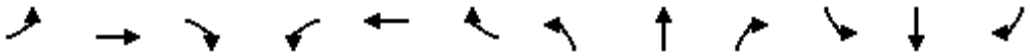


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	59	43	20	438	0	239	1	5	0	3	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	64	47	22	476	0	260	1	5	0	3	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	476			111			390	611	55	562	635	238
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	476			111			390	611	55	562	635	238
tC, single (s)	4.2			4.2			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	100			99			67	100	100	100	99	98
cM capacity (veh/h)	1061			1455			791	644	1137	676	629	951

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	34	79	260	238	266	18
Volume Left	2	0	22	0	260	0
Volume Right	0	47	0	0	5	15
cSH	1061	1700	1455	1700	795	872
Volume to Capacity	0.00	0.05	0.01	0.14	0.33	0.02
Queue Length 95th (m)	0.0	0.0	0.3	0.0	10.3	0.5
Control Delay (s)	0.5	0.0	0.7	0.0	11.8	9.2
Lane LOS	A		A		B	A
Approach Delay (s)	0.2		0.4		11.8	9.2
Approach LOS					B	A

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	44.4%	ICU Level of Service		A
Analysis Period (min)	15			

* User Entered Value

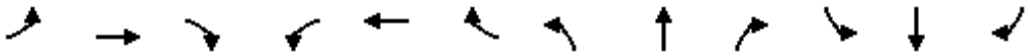


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	275	152	20	261	0	142	1	5	0	3	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	299	165	22	284	0	154	1	5	0	3	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	284			464			736	726	382	732	809	284
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284			464			736	726	382	732	809	284
tC, single (s)	4.1			4.1			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	99			98			72	100	99	100	99	99
cM capacity (veh/h)	1262			1082			557	568	825	563	522	909

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	473	305	161	12
Volume Left	9	22	154	0
Volume Right	165	0	5	9
cSH	1262	1082	564	756
Volume to Capacity	0.01	0.02	0.29	0.02
Queue Length 95th (m)	0.1	0.4	8.2	0.3
Control Delay (s)	0.2	0.8	13.9	9.8
Lane LOS	A	A	B	A
Approach Delay (s)	0.2	0.8	13.9	9.8
Approach LOS			B	A

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	49.4%	ICU Level of Service	A	
Analysis Period (min)	15			

* User Entered Value

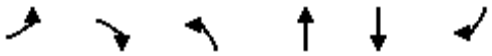


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	275	152	20	261	0	142	1	5	0	3	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	299	165	22	284	0	154	1	5	0	3	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	284			464			595	726	232	500	809	142
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284			464			595	726	232	500	809	142
tC, single (s)	4.2			4.2			*5.0	*5.0	*5.0	*5.0	*5.0	*5.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			*3.0	*3.0	*3.0	*3.0	*3.0	*3.0
p0 queue free %	99			98			76	100	99	100	99	99
cM capacity (veh/h)	1254			1073			644	568	956	712	522	1045

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	158	315	164	142	161	12
Volume Left	9	0	22	0	154	0
Volume Right	0	165	0	0	5	9
cSH	1254	1700	1073	1700	651	821
Volume to Capacity	0.01	0.19	0.02	0.08	0.25	0.01
Queue Length 95th (m)	0.1	0.0	0.4	0.0	6.8	0.3
Control Delay (s)	0.5	0.0	1.3	0.0	12.3	9.5
Lane LOS	A		A		B	A
Approach Delay (s)	0.2		0.7		12.3	9.5
Approach LOS					B	A

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

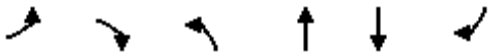
* User Entered Value



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	79	24	245	66	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	86	26	266	72	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	390	72	72			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	72	72			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	98			
cM capacity (veh/h)	597	982	1510			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	86	292	72
Volume Left	0	26	0
Volume Right	86	0	0
cSH	982	1510	1700
Volume to Capacity	0.09	0.02	0.04
Queue Length 95th (m)	2.0	0.4	0.0
Control Delay (s)	9.0	0.8	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.8	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	41	73	148	175	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	45	79	161	190	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	510	190	190			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	190	190			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	95	94			
cM capacity (veh/h)	488	844	1366			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	45	240	190
Volume Left	0	79	0
Volume Right	45	0	0
cSH	844	1366	1700
Volume to Capacity	0.05	0.06	0.11
Queue Length 95th (m)	1.2	1.3	0.0
Control Delay (s)	9.5	2.9	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	2.9	0.0
Approach LOS	A		

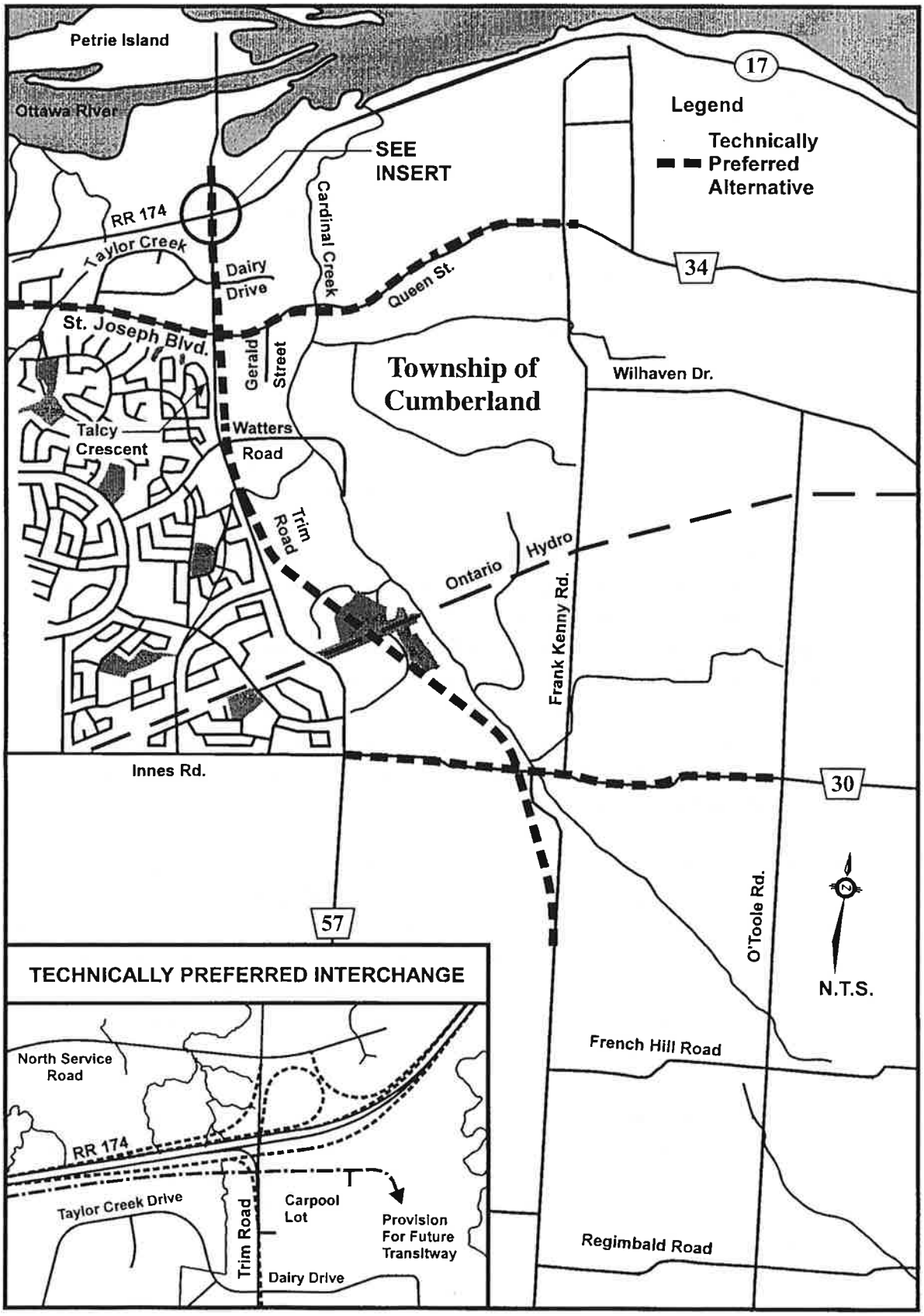
Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX G

OTTAWA ROAD 174/ TRIM ROAD INTERCHANGE SCHEMATIC

(Extract from Report to Transportation Committee, Trim Road Environmental Assessment, Final Recommendations, April 23, 1998, Regional Municipality of Ottawa-Carleton)

Figure 2
TECHNICALLY PREFERRED ALTERNATIVES



OP046A-7

APPENDIX H

TRAFFIC SIGNAL WARRANTS ANALYSES

IBI GROUP

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES*

Project: Cardinal Creek Village CTS **Date:** 2012-08-14

Project # 31539

Location Highway 174 (Roadway) at Collector Road (Intersecting Roadway)

Municipality City of Ottawa Projected Volume Future (2021) Background Plus Site Generated Traffic

Peak Hour AM Peak Hour

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT FOR 2 LANE HIGHWAYS				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL		ENTIRE %
						Number	%	
1. VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	720	1080	1245	173%	83%
	B. Vehicle volume along minor roads (Average Hour)	120	170	270	383	224	83%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	720	1080	1021	142%	142%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	75	113	224	298%	

Projected Traffic Volumes:

Approach Volume Input (vph)			
Artery V1	Artery V2	Minor V3	Minor V4
710	1332	448	0

Notes and Adjustment Factors:

		Adj. Factors
1. Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above.	No	1
2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.	Yes	
3. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h.	No	
4. The lowest sectional percentage governs the entire warrant.		
5. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only).	Yes	1.5
6. All flow values for Warrant 1 and Warrant 2 are to be increased by 20% for existing intersections and by 50% in the case of new intersections.	New	1.5
7. The crossing volumes are defined as:		
(a) Left-turns from both minor road approaches.	447 0	
(b) The heaviest through volume from the minor road.	0	
© 50% of the heavier left turn movement from major road when both of the following are met:	86	0
(i) the left-turn volume >120 vph	No	
(ii) the left-turn volume plus the opposing volume >720 vph	Yes	
(d) Pedestrians crossing the main road.	0	

CONCLUSION: The intersection meets the minimum warrants for traffic control signals.

* "Ontario Traffic Manual, Book 12, 2007", Ontario Ministry of Transportation.

IBI GROUP

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES*

Project: Cardinal Creek Village CTS **Date:** 2012-08-14

Project # 31539

Location Highway 174 (Roadway) at Collector Road (Intersecting Roadway)

Municipality City of Ottawa Projected Volume Future (2021) Background Plus Site Generated Traffic

Peak Hour PM Peak Hour

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT FOR 2 LANE HIGHWAYS				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL		ENTIRE %
						Number	%	
1. VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	720	1080	1657	230%	
	B. Vehicle volume along minor roads (Average Hour)	120	170	270	383	218	81%	81%
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	720	1080	1439	200%	
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	75	113	273	363%	200%

Projected Traffic Volumes:

Approach Volume Input (vph)			
Artery V1	Artery V2	Minor V3	Minor V4
2046	831	436	0

Notes and Adjustment Factors:

		Adj. Factors
1. Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above.	No	1
2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.	Yes	
3. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h.	No	
4. The lowest sectional percentage governs the entire warrant.		
5. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only).	Yes	1.5
6. All flow values for Warrant 1 and Warrant 2 are to be increased by 20% for existing intersections and by 50% in the case of new intersections.	New	1.5
7. The crossing volumes are defined as:		
(a) Left-turns from both minor road approaches.	431 0	
(b) The heaviest through volume from the minor road.	0	
© 50% of the heavier left turn movement from major road when both of the following are met:	228	114
(i) the left-turn volume >120 vph	Yes	
(ii) the left-turn volume plus the opposing volume >720 vph	Yes	
(d) Pedestrians crossing the main road.	0	

CONCLUSION: The intersection meets the minimum warrants for traffic control signals.

* "Ontario Traffic Manual, Book 12, 2007", Ontario Ministry of Transportation.

IBI GROUP

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES*

Project: Cardinal Creek Village CTS **Date:** 2012-08-14

Project # 31539

Location Old Montreal Road (Roadway) at Collector Road (Intersecting Roadway)

Municipality City of Ottawa Projected Volume Future (2031) Background Plus Site Generated Traffic

Peak Hour AM Peak Hour

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT FOR 2 LANE HIGHWAYS				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL		ENTIRE %
						Number	%	
1. VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	720	1080	891	124%	124%
	B. Vehicle volume along minor roads (Average Hour)	120	170	180	255	380	211%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	720	1080	511	71%	71%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	75	113	270	359%	

Projected Traffic Volumes:

Approach Volume Input (vph)			
Artery V1	Artery V2	Minor V3	Minor V4
242	780	241	518

Notes and Adjustment Factors:

		Adj. Factors
1. Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above.	No	1
2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.	Yes	
3. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h.	No	
4. The lowest sectional percentage governs the entire warrant.		
5. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only).	No	1
6. All flow values for Warrant 1 and Warrant 2 are to be increased by 20% for existing intersections and by 50% in the case of new intersections.	New	1.5
7. The crossing volumes are defined as:		
(a) Left-turns from both minor road approaches.	21 307	
(b) The heaviest through volume from the minor road.	211	
© 50% of the heavier left turn movement from major road when both of the following are met:	57	0
(i) the left-turn volume >120 vph	No	
(ii) the left-turn volume plus the opposing volume >720 vph	Yes	
(d) Pedestrians crossing the main road.	0	

CONCLUSION: The intersection meets the minimum warrants for traffic control signals.

* "Ontario Traffic Manual, Book 12, 2007", Ontario Ministry of Transportation.

IBI GROUP

MINIMUM WARRANTS FOR INSTALLATION OF TRAFFIC SIGNALS USING PROJECTED VOLUMES*

Project: Cardinal Creek Village CTS **Date:** 2012-08-14

Project # 31539

Location Old Montreal Road (Roadway) at Collector Road (Intersecting Roadway)

Municipality City of Ottawa Projected Volume Future (2031) Background Plus Site Generated Traffic

Peak Hour PM Peak Hour

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT FOR 2 LANE HIGHWAYS				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL		ENTIRE %
						Number	%	
1. VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	720	1080	1109	154%	154%
	B. Vehicle volume along minor roads (Average Hour)	120	170	180	255	438	243%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	720	1080	671	93%	93%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	75	113	236	315%	

Projected Traffic Volumes:

Approach Volume Input (vph)			
Artery V1	Artery V2	Minor V3	Minor V4
881	460	479	397

Notes and Adjustment Factors:

		Adj. Factors
1. Vehicle volume warrants (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above.	No	1
2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000.	Yes	
3. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h.	No	
4. The lowest sectional percentage governs the entire warrant.		
5. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only).	No	1
6. All flow values for Warrant 1 and Warrant 2 are to be increased by 20% for existing intersections and by 50% in the case of new intersections.	New	1.5
7. The crossing volumes are defined as:		
(a) Left-turns from both minor road approaches.	137 218	
(b) The heaviest through volume from the minor road.	0	
© 50% of the heavier left turn movement from major road when both of the following are met:	235	117.5
(i) the left-turn volume >120 vph	Yes	
(ii) the left-turn volume plus the opposing volume >720 vph	Yes	
(d) Pedestrians crossing the main road.	0	

CONCLUSION: The intersection meets the minimum warrants for traffic control signals.

* "Ontario Traffic Manual, Book 12, 2007", Ontario Ministry of Transportation.