Transportation Impact Study

2438 Gottingen Street

October 4, 2018

Submitted by:
Ekistics Plan + Design

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EKISTICS PLANNING & DESIGN

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APPENDICIES

1. INTRODUCTION

This Transportation Impact Study follows HRM's Guidelines for the Preparation of Transportation Impact Studies (8th Edition) and general transportation engineering principles recommended for such studies. It is intended to address the transportation impacts that can be reasonably expected on the roadway and active transportation networks resulting from the:

- Addition of a multistory residential development as described below.

Transportation Impact Studies are prepared to ensure developments are consistent with the objectives and policies of the Municipal Planning Strategies / Municipal Development Plans and the Regional Plan

Proposed Development	2438 Gottingen Street, Halifax, Nova Scotia
Owner / Developer	Joseph Arab
Location	Between Gottingen Street and Creighton Street, and Between Charles Drive and Buddy Day Street.
Building	137 Residential Units in New Building 13 Units in Victoria Hall (existing)
Parking	Vehicles = 76 Indoor, Bicycle = 76 Class A, 15 Class B

2. EXISTING CONDITIONS

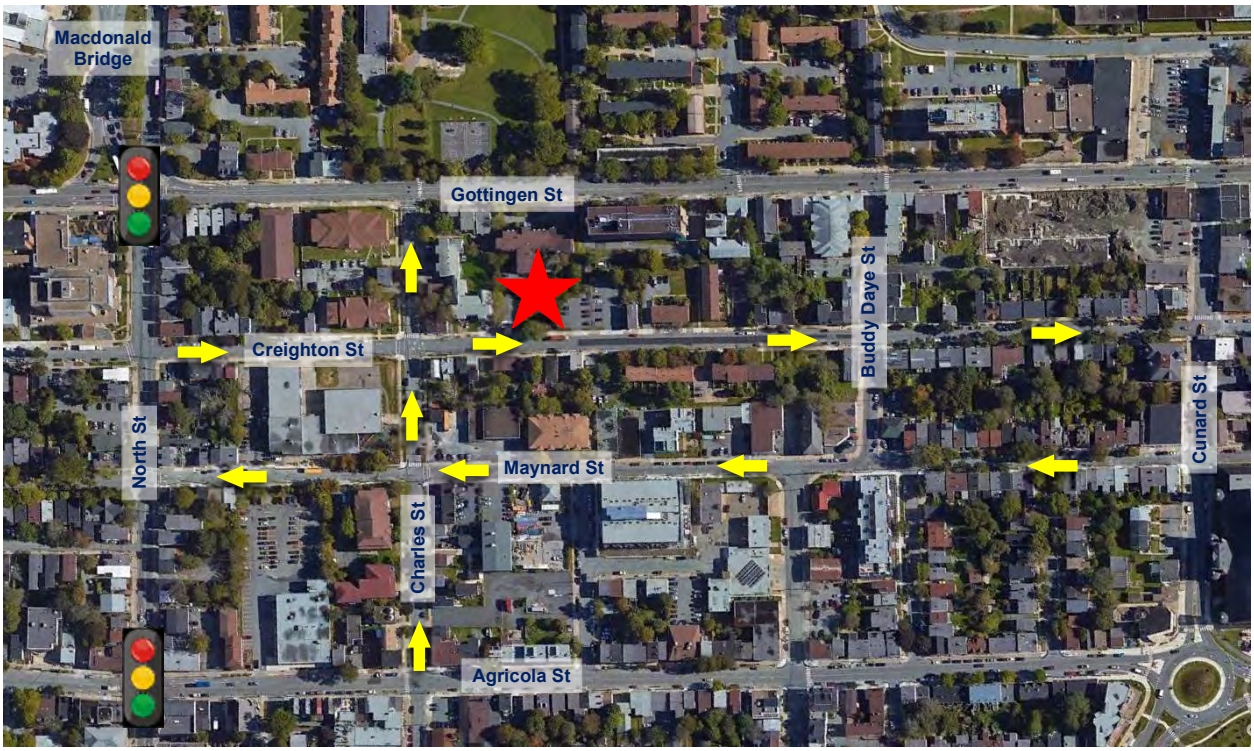
2.1 Study Area

The proposed development is located about 250 meters southeast of North Street (considered east for this study) in the block between Gottingen and Creighton Street, and between Charles Street and Buddy Daye Street. The development is in the middle of a larger residential area within a grid-based road network and only about 400 meters from the Halifax end of the Macdonald Bridge.

This area is heavily influenced by commuter traffic in the AM and PM peak hours which includes high volumes of traffic on Gottingen Street, and the frequent use of Creighton Avenue as a short cut route to bypass the queues that often occur when coming off the Macdonald Bridge and turning left onto Gottingen Street.

Creighton Street is a one-way street in the eastbound direction toward downtown and forms a one-way couplet with Maynard Street immediately to the south. Charles Street is a one-way street in the northbound direction towards Gottingen Street.

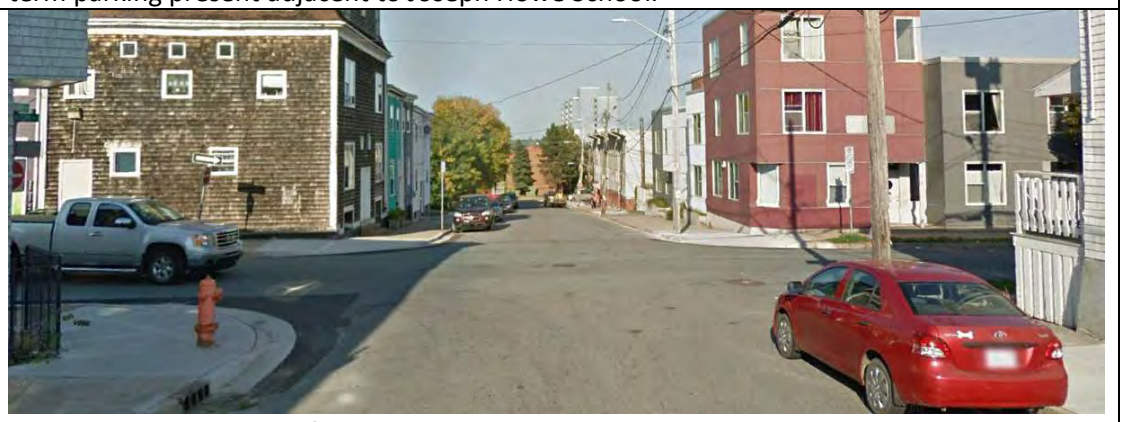
Figure 2-1: Study Area



2.2 Impacted Roadways

The following sections provide a brief summary of each of the key roadways in the study area.

Gottingen Street	 Gottingen Street near the development is an urban three-lane roadway with one inbound lane and two outbound lanes complete with sidewalks on both sides of the road. There are regular midblock cross walks along the roadway and traffic is highly commuter oriented during the peak hours. As one of the primary corridors to downtown Halifax, the roadway also remains busy throughout the day with vehicular and pedestrian traffic. Roadside uses are a mix of low and medium rise residential units with some commercial / retail uses in some areas. Areas further east towards downtown become increasingly commercial.

Creighton Street	 Creighton Street is a local residential one-way street with sidewalks, numerous driveways and parking permitted on both sides of the street in many areas. Adjacent residential development includes predominantly low-rise multi-unit single family residences as well as some mid-rise buildings and institutional land uses including the Joseph Howe Elementary School at the intersection of Creighton and Charles Street.
Charles Street	 Charles Street on the west side of the development is a local residential one-way street running from Robie Street to Gottingen Street (two-way south of Robie). It has sidewalks on both sides of the roadway and the adjacent land uses include low and medium rise residential units with some commercial and small industrial properties near the development. Parking is permitted on both sides of the road in most areas with some short-term parking present adjacent to Joseph Howe School.
Buddy Daye Drive	 Buddy Daye Street east of the development is a two-way residential street with sidewalks and parking permitted on one side of the street in most areas. It is only 2 blocks in length between Maynard and Gottingen Street and the roadside includes low rise multi-unit residential buildings and auto some repair / autobody properties.

2.3 Active Transportation (AT)

The areas surrounding the development and the Halifax Peninsula in general are known for high levels of active transportation (AT) activity. In the area of the development, both local and commuter based AT traffic is expected including commuter traffic that users the Macdonald Bridge to cross the harbour. The development is well connected to surrounding areas through sidewalks and on-road facilities. All roadways in the area typically have sidewalks along both sides of the road and all major intersections provide pedestrian crossings across the intersection.

2.4 Vehicle Traffic

Recent and historical traffic counts were provided from HRM for all intersections and some road sections in the study area which were also supplemented by site observations during typical weekday peak traffic. The background counts reviewed in this study are provided in Appendix B of this report and the figures in Section 4 of this report show the network model incorporating the count volumes at key impacted intersections.

2.5 Transit

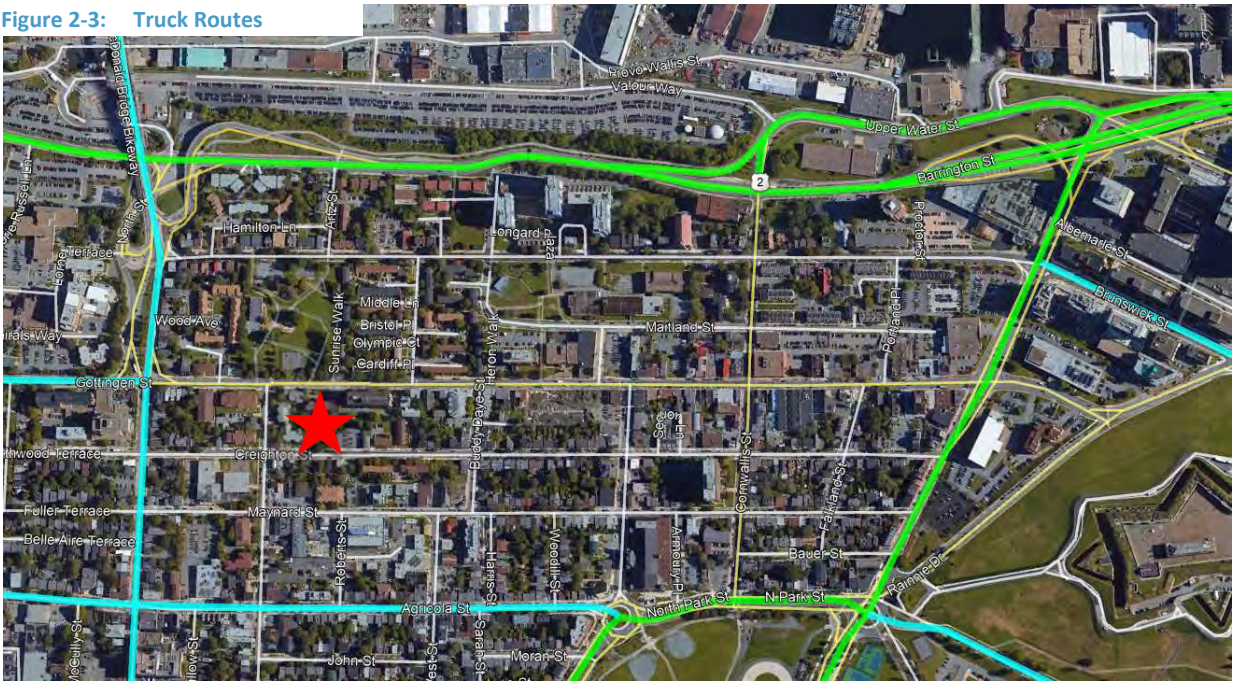
The development is the heart of one of Halifax's busiest transit areas which includes many routes on Gottingen and Barrington Street as well as North and Cornwallis Street. It is in close proximity to two major terminals with Scotia Square just over a kilometer to the east and the Bridge Terminal in Dartmouth about 2 kilometers to the north over the Macdonald Bridge.

Figure 2-2: Transit Routes

2.6 Truck Routes

Halifax's By-Law T-400 "Respecting the Establishment of Truck Routes for Certain Trucking Motor Vehicles within the HRM" Barrington Street, Cogswell Street and North Park Street as "Full Time" truck routes. In addition, North Street, a portion of Gottingen Street west of North Street and Agricola Street are defined as daylight routes between the hours of 7 am and 9 pm. The red star identifies the location of the development near the middle of these routes which should allow for adequate access to the new development, though it is expected that delivery requirements will be minimal to this site.

Figure 2-3: Truck Routes



3. FUTURE CONDITIONS

3.1 Context

3.1.1 Analysis Time Horizon

Based on recommended HRM guidelines, the base year for this study has been established as 2018. Given the relatively low volumes predicted from the development and the high level of traffic dispersion that is expected, future traffic scenarios are not considered relevant to the results of this study.

3.1.2 Analysis Period

This area of Halifax is highly commuter oriented therefore, the weekday AM and PM peak hours are considered to be the critical periods for the analysis.

3.2 The Development

Future traffic related to the development is impacted only by the addition of the proposed development. It is possible that there may be minor modifications to existing buildings, but this is not expected to have any impact on transportation operations or safety performance. Construction of the new building will result in the removal of some existing parking, though it is assumed that this parking will relocate to the underground parkade in the future therefore no impact to traffic volumes was accounted for.

The new 16-story residential building includes 137 units and about 76 underground parking spaces with access to the underground parkade located off Creighton Street as shown in the figure below. This will be a right-in, right-out driveway due to Creighton Street being one-way in the eastbound direction.

Figure 3-1: Building Rendering from Creighton

3.3 Trip Generation

New traffic generated by the development was based on the Institute of Transportation Engineers (ITE) Trip Generation Guide and was limited to residential trips as no commercial or retail uses are proposed for the development. The existing Victoria Hall building will see a reduction of approximately 5 units, though for the purposes of this report it was assumed that trip from this portion of the development would remain the same as today. A more detailed summary of the trip generation rates and background calculations are provided in Appendix C of this report.

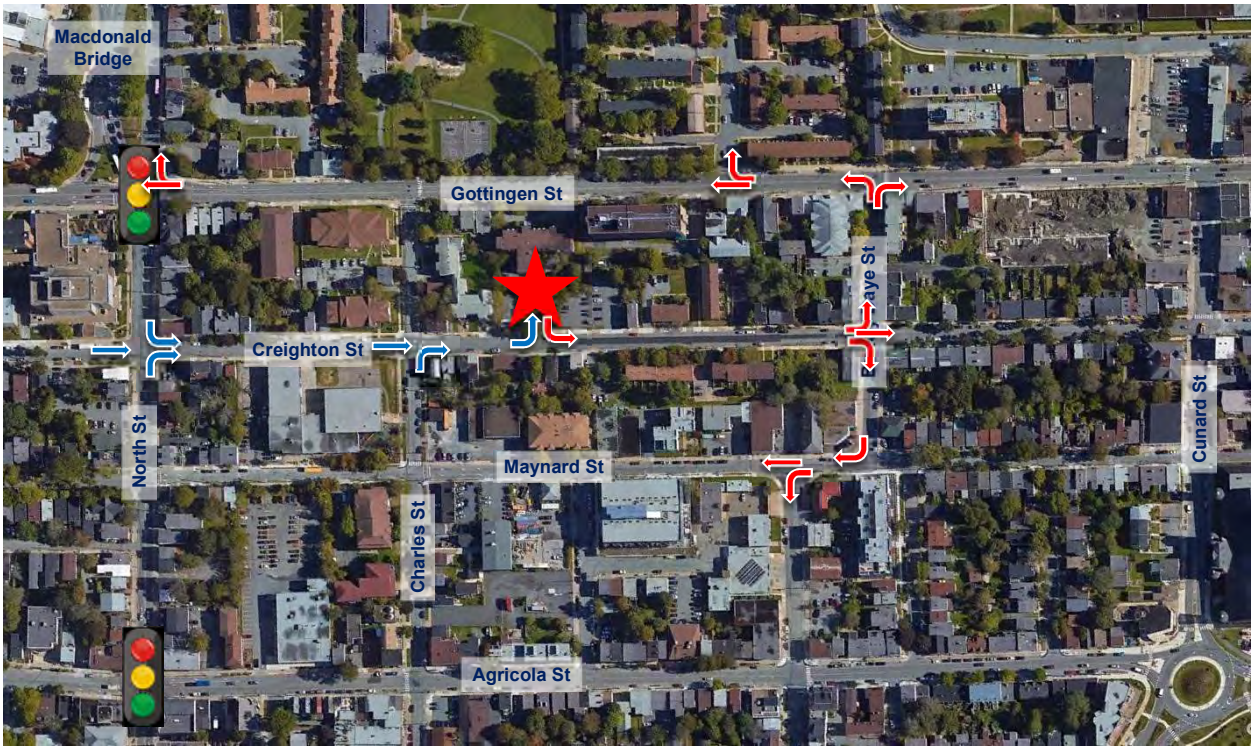
Table 3-1: Trip Generation Table

		ITE Land Use Type	AM Peak			PM Peak		
			Enter	Exit	Total	Enter	Exit	Total
Apartments	137 Units	ITE 222	11	31	42	34	22	56
Sub-Total			**11**	**31**	**42**	**34**	**22**	**56**

3.4 Trip Distribution and Assignment

All traffic entering the site will do so as an eastbound left turn from Creighton Street and all exiting traffic will make a southbound left turn onto Creighton Street. Upstream and downstream of these movements, there are numerous route options that drivers can select depending on their origins and destinations as shown in the figure below. Note that only the movements immediately upstream and downstream are indicated and beyond these intersections are a wide variety of other options.

Figure 3-2: Traffic Distribution



4. ANALYSIS

4.1 Transportation Modelling

A microscopic traffic model was prepared using the Synchro/SimTraffic platform for the AM and PM peak hours of analysis for an isolated area surrounding the development. Limited formal analysis was carried out for this project as intersections surrounding the development operate at a high level of service presently, and with the development added to the road network. The following two figures show the turning movement volumes (grey boxes with black numbers) and overall intersection capacity utilization (ICU) percentages (blue boxes with black numbers) surrounding the development. The figures are for the AM and PM peak hours and for the purposes of this analysis, all volumes were increased by 20% from the counted volumes to account for any variations in traffic.

Figure 4-1: AM Peak Hour – Development Driveway, Creighton and Gottingen Street

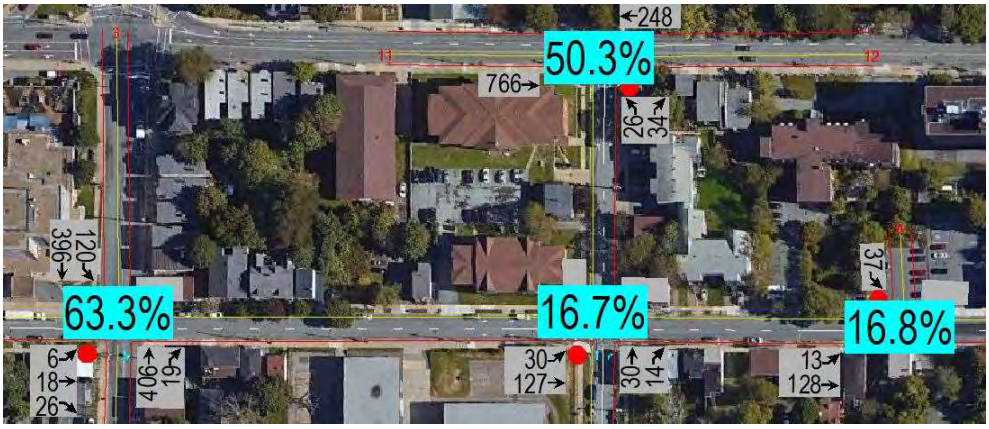


Figure 4-2: PM Peak Hour – Development Driveway, Creighton and Gottingen Street

The figures suggest that there is significant excess capacity at all intersections along Creighton Drive and that drivers to and from the development are expected to experience very little delay or queuing. Beyond these intersections, traffic is dispersed significantly in different directions and therefore has essential no impact on existing traffic operations or safety performance.

5. CONCLUSIONS

This report analyzed the impacts of the addition of a new multi-story residential development proposed for 2438 Gottingen Street. The primary vehicle driveway to the underground parkade is located off Creighton Street which is a low volume, one-way residential street towards downtown Halifax. All movements to the development will be right-in and right-out due to Creighton being a one-way street, therefore the entrance and exit driveway can be accommodated with single lanes.

There are a wide variety of route options to get to and from the site resulting in significant traffic dispersion throughout the road network. Combined with the relatively low volumes destined to and from the development, there is very minimal impact anywhere throughout the adjacent road network. While the area can be busy during peak hour traffic, and Creighton can frequently be used as an alternate route to downtown, there is significant available excess capacity to accommodate the proposed development without any infrastructure upgrade requirements.

Both transit and active transportation modal shares are expected to be high in this area and it is likely that residents of this development will take advantage of these travel modes to some degree. In general, the development is highly compatible with surrounding land uses and is a desirable infilling location to help support regional planning initiatives.

We trust that this report satisfies the Halifax requirements for the preparation of Transportation Impact Studies for such a development. Should there be any questions or comments regarding the content of the study, please do not hesitate to contact the undersigned.

Sincerely,

[redacted]

Roger N. Boychuk, P.Eng.
Senior Transportation Eningeer

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Oct.4,
` 2018

[redacted]

EKISTICS PLANNING & DESIGN

APPENDIX A

Site Statistics

2018.09.20
2438 Gottingen St Project Summary

New Building

Building Floor Level	GFA	Units	Parking Stalls	Bicycle Parking (Class A)	Bicycle Parking (Class B)
Parking -02			40		
Parking -01			36		
Main Level	11,340	6		62	15
Level 02	11,390	11			
Level 03	11,390	11			
Level 04	8,190	10			
Level 05	8,515	9			
Level 06	8,515	9			
Level 07	8,515	9			
Level 08	8,515	9			
Level 09	8,515	9			
Level 10	8,515	9			
Level 11	8,515	9			
Level 12	8,515	9			
Level 13	8,515	9			
Level 14	8,515	9			
Level 15	7,625	4			
Level 16	7,750	5			
Totals	142835	137	76	76	15

Level	Bachelor	1 Bed	2 Bed	Total Units
Main Level	0	4	2	6
Level 02	0	7	4	11
Level 03	0	7	4	11
Level 04	2	5	3	10
Level 05	1	4	4	9
Level 06	1	4	4	9
Level 07	1	4	4	9
Level 08	1	4	4	9
Level 09	1	4	4	9
Level 10	1	4	4	9
Level 11	1	4	4	9
Level 12	1	4	4	9
Level 13	1	4	4	9
Level 14	1	4	4	9
Level 15	0	0	4	4
Level 16	0	0	5	5
Total Units	12	63	62	137

Unit %	Bachelor	1 Bed	2 Bed	Total Units
	8.76	45.99	45.26	100

Victoria Hall Building Floor Level

	GFA	Units	Parking Stalls
Main Level	6110	4	
Level 02	6110	4	
Level 03	6,110	5	
Totals	18330	13	

Total Units	150

Development Lot Area	
PID	00148791
Total Lot Area	36,100
Total Development GFA excluding Parkin	161165
Floor Area Ratio	4.46

APPENDIX B

Traffic Counts

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION & PUBLIC WORKS
TRAFFIC & RIGHT OF WAY

CODE NO. 16-TM-349

MANUAL TRAFFIC COUNTS

INTERSECTION: CHARLES STREET AT GOTTINGEN STREET

WEATHER: CLEAR
RECORDER: AD

DAY	DATE	MONTH	YEAR
TUES	9	AUG	2016

STREET:					CHARLES STREET			GOTTINGEN STREET			GOTTINGEN STREET			
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
07:00:00 AM	07:15:00 AM	0	0	0	5	0	11	0	134	0	0	27	0	177
07:15:00 AM	07:30:00 AM	0	0	0	6	0	8	0	152	0	0	48	0	214
07:30:00 AM	07:45:00 AM	0	0	0	9	0	18	0	174	0	0	59	0	260
07:45:00 AM	08:00:00 AM	0	0	0	3	0	10	0	146	0	0	44	0	203
TOTAL		0	0	0	23	0	47	0	606	0	0	178	0	854
PEAK			0			70			606			178		
15 MIN PEAK			0			108			696			236		
PEAK HOUR FACTOR			0			0.65			0.87			0.75		
TWO WAY TOTALS			0			70			807			831		FACTOR
														1.03
														880

DAY	DATE	MONTH	YEAR
TUES	9	AUG	2016

TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
08:00:00 AM	08:15:00 AM	0	0	0	5	0	12	0	187	0	0	49	0	253
08:15:00 AM	08:30:00 AM	0	0	0	5	0	7	0	166	0	0	51	0	229
08:30:00 AM	08:45:00 AM	0	0	0	3	0	6	0	161	0	0	55	0	225
08:45:00 AM	09:00:00 AM	0	0	0	9	0	3	0	124	0	0	52	0	188
TOTAL		0	0	0	22	0	28	0	638	0	0	207	0	895
PEAK			0			50			638			207		
15 MIN PEAK			0			68			748			220		
PEAK HOUR FACTOR			0			0.74			0.85			0.94		
TWO WAY TOTALS			0			50			867			873		FACTOR
														1.03
														922

VEHICULAR GRAPHIC SUMMARY SHEET

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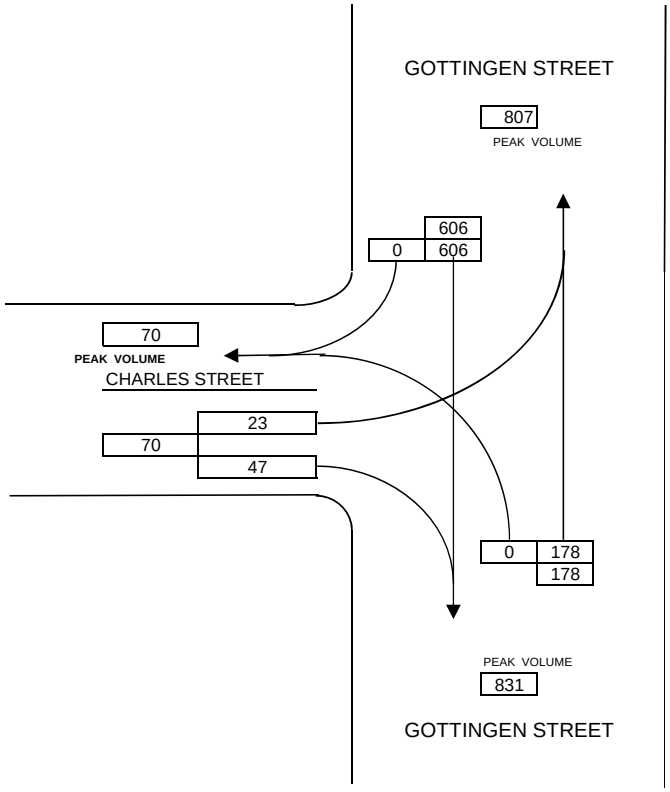

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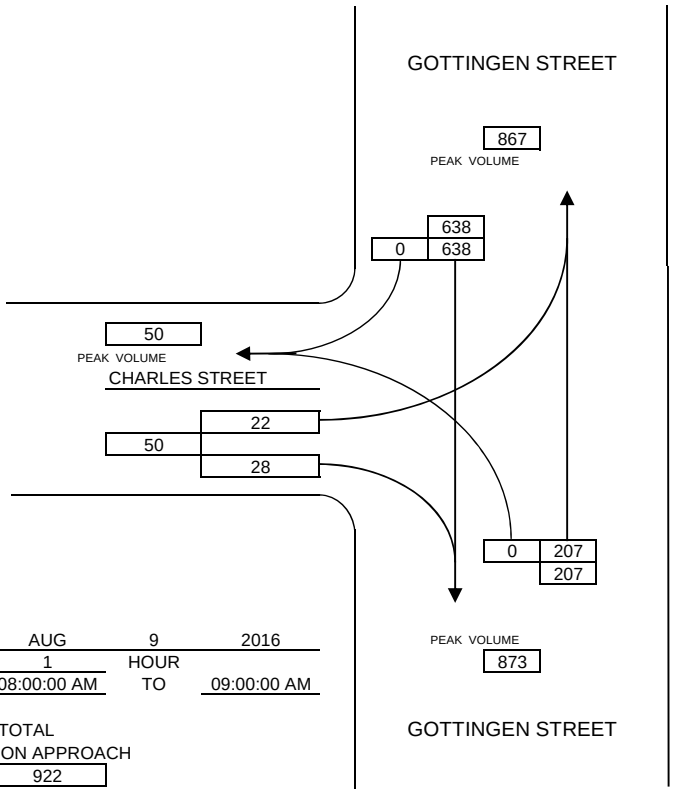

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VOLUME 922

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION & PUBLIC WORKS
TRAFFIC & RIGHT OF WAY

CODE NO. 16-TM-349

MANUAL TRAFFIC COUNTS

INTERSECTION: CHARLES STREET AT GOTTINGEN STREET

WEATHER: CLEAR
RECORDER: AD

DAY	DATE	MONTH	YEAR
TUES	9	AUG	2016

STREET:					CHARLES STREET			GOTTINGEN STREET			GOTTINGEN STREET			
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
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PEAK			0			84			342			675		
15 MIN PEAK			0			104			368			728		
PEAK HOUR FACTOR			0			0.81			0.93			0.93		
TWO WAY TOTALS			0			84			1063			1055		FACTOR
														1.03
														1134

DAY	DATE	MONTH	YEAR
TUES	9	AUG	2016

TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
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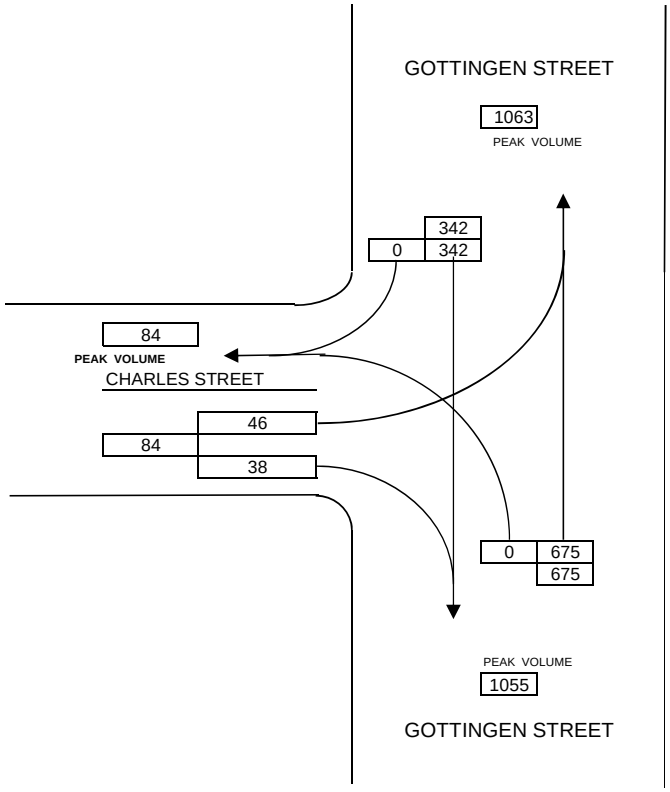
05:15:00 PM	05:30:00 PM	0	0	0	13	0	16	0	113	0	0	145	0	287
05:30:00 PM	05:45:00 PM	0	0	0	4	0	9	0	81	0	0	87	0	181
05:45:00 PM	06:00:00 PM	0	0	0	4	0	5	0	97	0	0	70	0	176
TOTAL		0	0	0	28	0	37	0	383	0	0	430	0	878
PEAK			0			65			383			430		
15 MIN PEAK			0			116			452			580		
PEAK HOUR FACTOR			0			0.56			0.85			0.74		
TWO WAY TOTALS			0			65			841			850		FACTOR
														1.03
														904

VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION : CHARLES STREET AT GOTTINGEN STREET



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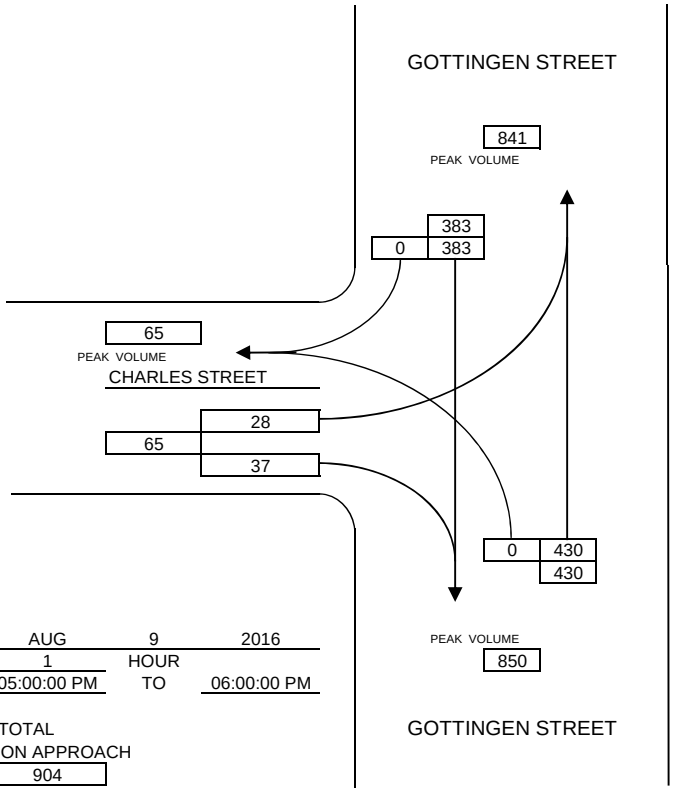

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INTERSECTION APPROACH
VOLUME 904

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION & PUBLIC WORKS
TRAFFIC & RIGHT OF WAY

CODE NO. 16-TM-351

MANUAL TRAFFIC COUNTS

INTERSECTION: BUDDY DAYE STREET AT GOTTINGEN STREET

WEATHER: CLEAR
RECORDER: AD

DAY	DATE	MONTH	YEAR
THURS	11	AUG	2016

STREET:					BUDDY DAYE STREET			GOTTINGEN STREET			GOTTINGEN STREET			
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07:30:00 AM	07:45:00 AM	0	0	0	0	0	1	0	151	4	2	40	0	198
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TOTAL		0	0	0	3	0	7	0	564	9	9	159	0	751
PEAK			0			10			573			168		
15 MIN PEAK			0			24			652			196		
PEAK HOUR FACTOR			0			0.42			0.88			0.86		
TWO WAY TOTALS			0			28			735			739		FACTOR
														1.02
														766

DAY	DATE	MONTH	YEAR
THURS	11	AUG	2016

TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
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08:30:00 AM	08:45:00 AM	0	0	0	2	0	4	0	179	4	2	45	0	236
08:45:00 AM	09:00:00 AM	0	0	0	4	0	5	0	146	3	5	48	0	211
TOTAL		0	0	0	10	0	14	0	650	21	10	187	0	892
PEAK			0			24			671			197		
15 MIN PEAK			0			36			732			212		
PEAK HOUR FACTOR			0			0.67			0.92			0.93		
TWO WAY TOTALS			0			55			868			861		FACTOR
														1.02
														910

VEHICULAR GRAPHIC SUMMARY SHEET

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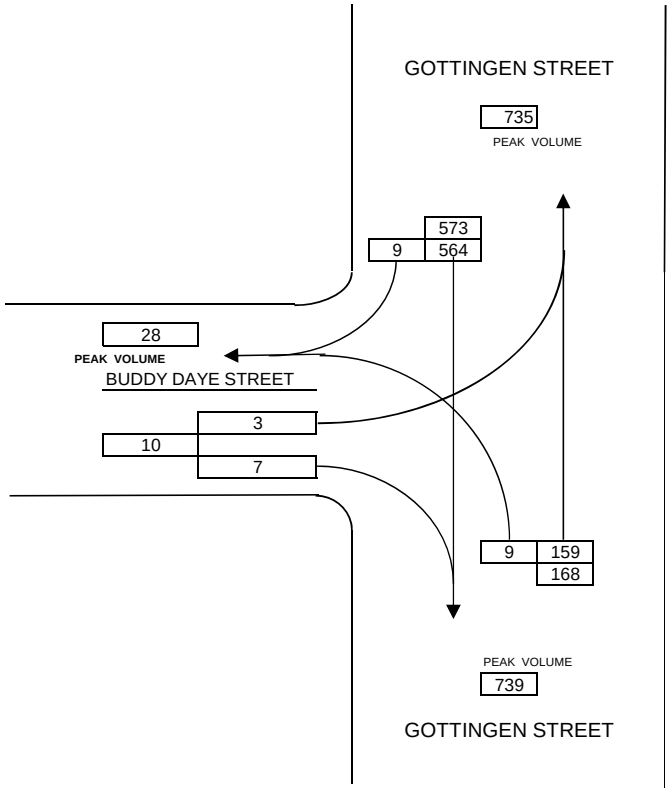

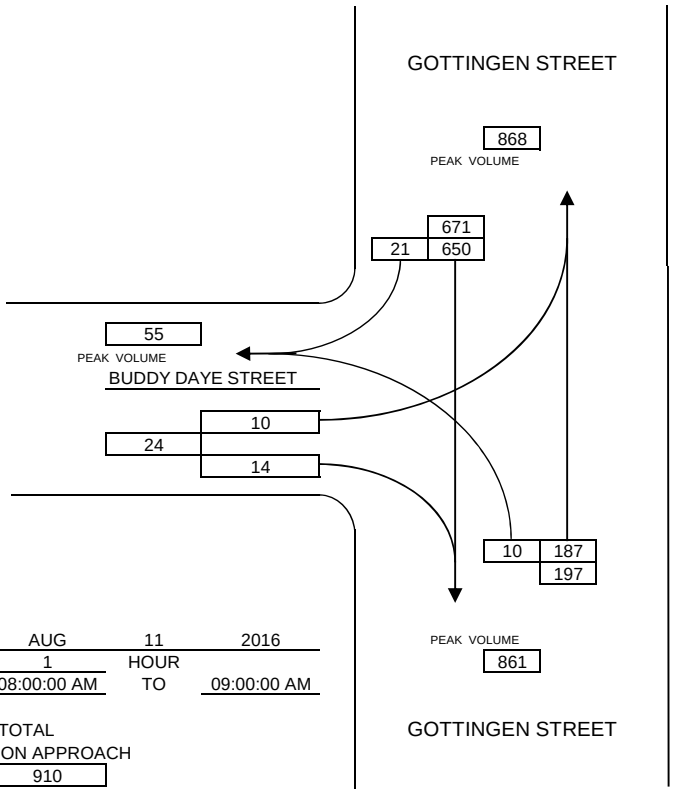

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VOLUME 910

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION & PUBLIC WORKS
TRAFFIC & RIGHT OF WAY

CODE NO. 16-TM-351

MANUAL TRAFFIC COUNTS

INTERSECTION: BUDDY DAYE STREET AT GOTTINGEN STREET

WEATHER: PARTLY CLOUDY
RECORDER: AD

DAY	DATE	MONTH	YEAR
THURS	11	AUG	2016

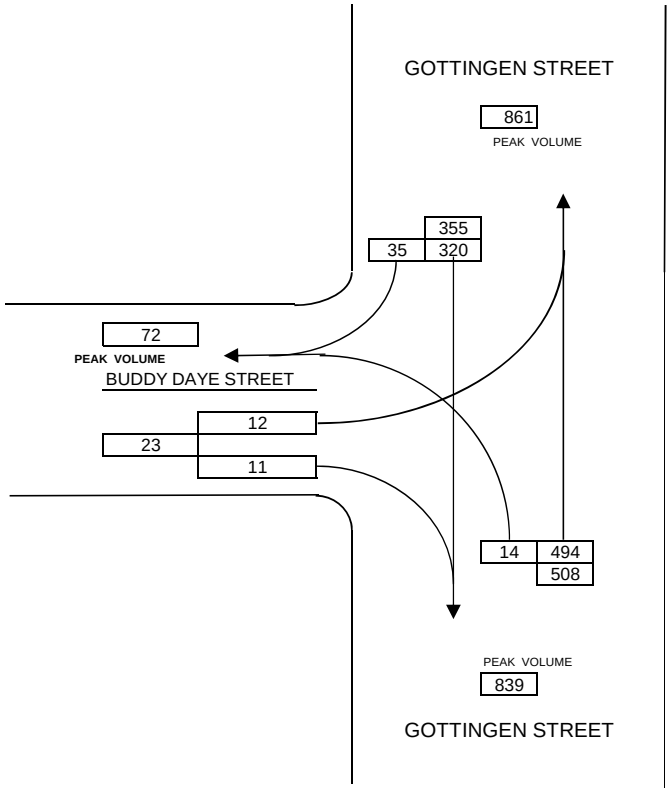
STREET:					BUDDY DAYE STREET			GOTTINGEN STREET			GOTTINGEN STREET			
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
04:00:00 PM	04:15:00 PM	0	0	0	2	0	3	0	66	10	4	115	0	200
04:15:00 PM	04:30:00 PM	0	0	0	5	0	5	0	92	8	2	131	0	243
04:30:00 PM	04:45:00 PM	0	0	0	1	0	2	0	90	7	4	138	0	242
04:45:00 PM	05:00:00 PM	0	0	0	4	0	1	0	72	10	4	110	0	201
TOTAL		0	0	0	12	0	11	0	320	35	14	494	0	886
PEAK			0			23			355			508		
15 MIN PEAK			0			40			400			568		
PEAK HOUR FACTOR			0			0.58			0.89			0.89		
TWO WAY TOTALS			0			72			861			839		FACTOR
														1.02
														904

DAY	DATE	MONTH	YEAR
THURS	11	AUG	2016

TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
05:00:00 PM	05:15:00 PM	0	0	0	4	0	1	0	75	6	5	127	0	218
05:15:00 PM	05:30:00 PM	0	0	0	1	0	3	0	70	13	4	71	0	162
05:30:00 PM	05:45:00 PM	0	0	0	4	0	4	0	78	7	2	79	0	174
05:45:00 PM	06:00:00 PM	0	0	0	1	0	4	0	72	9	6	71	0	163
TOTAL		0	0	0	10	0	12	0	295	35	17	348	0	717
PEAK			0			22			330			365		
15 MIN PEAK			0			32			340			528		
PEAK HOUR FACTOR			0			0.69			0.97			0.69		
TWO WAY TOTALS			0			74			688			672		FACTOR
														1.02
														731

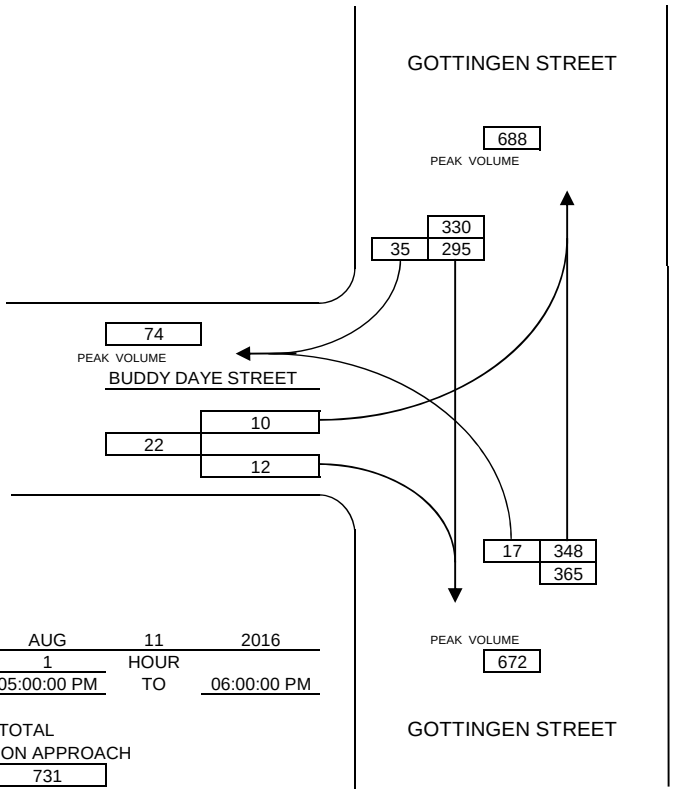
VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION : BUDDY DAYE STREET AT GOTTINGEN STREET



DATE: AUG 11 2016
TIME: 1 HOUR
FROM: 04:00:00 PM TO 05:00:00 PM

FACTORED TOTAL
INTERSECTION APPROACH
VOLUME 904



DATE: AUG 11 2016
TIME: 1 HOUR
FROM: 05:00:00 PM TO 06:00:00 PM

FACTORED TOTAL
INTERSECTION APPROACH
VOLUME 731

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION & PUBLIC WORKS
TRAFFIC MANAGEMENT

CODE NO. 18RQ236

MANUAL TRAFFIC COUNTS

INTERSECTION: CREIGHTON STREET AT NORTH STREET & NORTHWOOD TERRACE

WEATHER: SUNNY
RECORDER: LIAM BRADLEY

DAY	DATE	MONTH	YEAR
TUES.	31	JULY	2018

STREET:		NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
07:02:00 AM	07:17:00 AM	26	56	0	0	71	5	3	2	2	0	0	0	165
07:17:00 AM	07:32:00 AM	26	64	0	0	95	7	0	3	4	0	0	0	199
07:32:00 AM	07:47:00 AM	39	78	0	0	76	5	0	2	4	0	0	0	204
07:47:00 AM	08:02:00 AM	32	93	0	0	85	4	2	2	8	0	0	0	226
TOTAL		123	291	0	0	327	21	5	9	18	0	0	0	794
PEAK			414			348			32			0		
4(15 MIN PEAK)			500			408			48			0		
PEAK HOUR FACTOR			0.83			0.85			0.67			0		AAWT
TWO WAY TOTALS			746			657			32			153		FACTOR
														1.03
														818

DAY	DATE	MONTH	YEAR
TUES.	31	JULY	2018

TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
08:02:00 AM	08:17:00 AM	26	77	0	0	82	1	3	1	2	0	0	0	192
08:17:00 AM	08:32:00 AM	25	73	0	0	94	3	2	2	7	0	0	0	206
08:32:00 AM	08:47:00 AM	27	98	0	0	77	2	0	5	7	0	0	0	216
08:47:00 AM	09:02:00 AM	15	82	0	0	85	9	0	6	6	0	0	0	203
TOTAL		93	330	0	0	338	15	5	14	22	0	0	0	817
PEAK			423			353			41			0		
4(15 MIN PEAK)			500			388			48			0		
PEAK HOUR FACTOR			0.85			0.91			0.85			0		AAWT
TWO WAY TOTALS			766			705			41			122		FACTOR
														1.03
														842

Intersection Peak Hour

		NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:45 - 8:45	Car	110	332	3	1	328	11	6	9	24	0	0	0	824
	Truck	0	9	0	0	9	0	1	1	0	0	0	0	20
	Bicycle	0	2	0	1	17	0	0	10	0	0	1	0	31
	Vehicle Total	110	343	3	2	354	11	7	20	24	0	1	0	875
	Approach Factor		0.9			0.9			0.91			0.25		FACTOR
														1
														875

Peak Hour Pedestrians

		NE			NW			SW			SE			Total
		Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
7:45 - 8:45	Pedestrians	5	10	15	24	3	27	1	14	15	11	7	18	75

Car traffic

Interval starts	NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:02	26	55	0	0	69	5	3	2	2	0	0	0	163
7:15	26	60	0	0	93	6	0	3	4	0	0	0	193
7:30	39	75	0	0	72	4	0	2	4	0	0	0	196
7:45	32	91	0	0	82	4	2	2	8	0	0	0	222
8:00	26	74	0	0	82	2	2	1	2	0	0	0	190
8:15	25	70	0	0	88	3	2	2	7	0	0	0	197
8:30	27	97	0	0	76	2	0	4	7	0	0	0	215
8:45	15	80	0	0	82	8	0	6	6	0	0	0	197
TOTAL	216	602	0	0	644	34	9	22	40	0	0	0	1573

Truck traffic

Interval starts	NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:02	0	1	0	0	2	0	0	0	0	0	0	0	3
7:15	0	4	0	0	2	1	0	0	0	0	0	0	7
7:30	0	3	0	0	4	1	0	0	0	0	0	0	8
7:45	0	2	0	0	3	0	0	0	0	0	0	0	5
8:00	0	3	0	0	2	0	1	0	0	0	0	0	6
8:15	0	3	0	0	2	0	0	0	0	0	0	0	5
8:30	0	1	0	0	2	0	0	1	0	0	0	0	4
8:45	0	2	0	0	1	0	0	0	0	0	0	0	3
TOTAL	0	19	0	0	18	2	1	1	0	0	0	0	41

Bicycle traffic

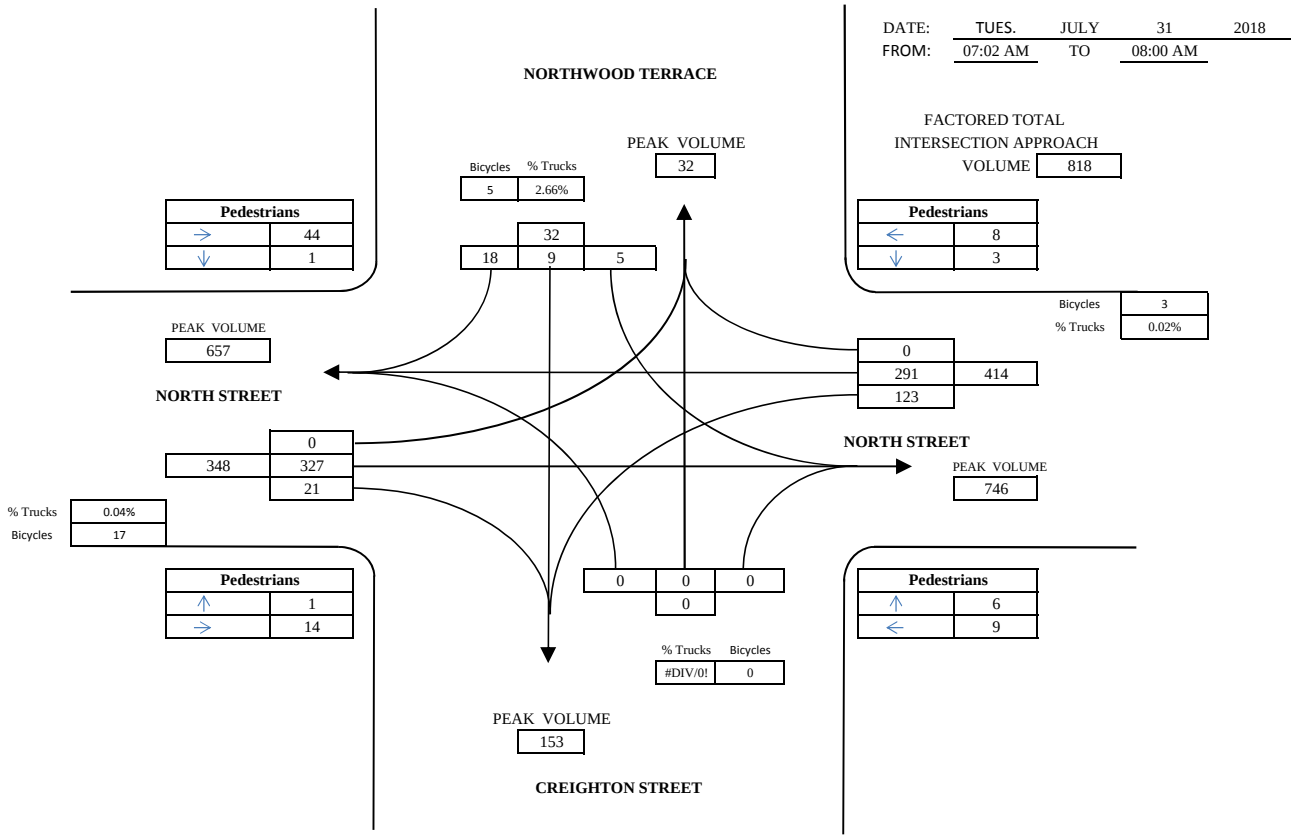
Interval starts	NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:02	0	1	0	0	5	1	0	0	1	0	0	0	8
7:15	0	1	0	0	4	0	0	0	0	0	0	0	5
7:30	0	1	0	0	6	0	1	3	0	0	0	0	11
7:45	0	0	0	0	1	0	0	0	0	0	0	0	1
8:00	0	1	0	0	3	0	0	6	0	0	0	0	10
8:15	0	0	0	0	8	0	0	2	0	0	0	0	12
8:30	0	1	0	0	5	0	0	2	0	0	0	0	8
8:45	0	1	0	0	3	1	1	2	1	0	0	0	10
TOTAL	0	6	0	0	35	2	2	15	2	0	0	0	65

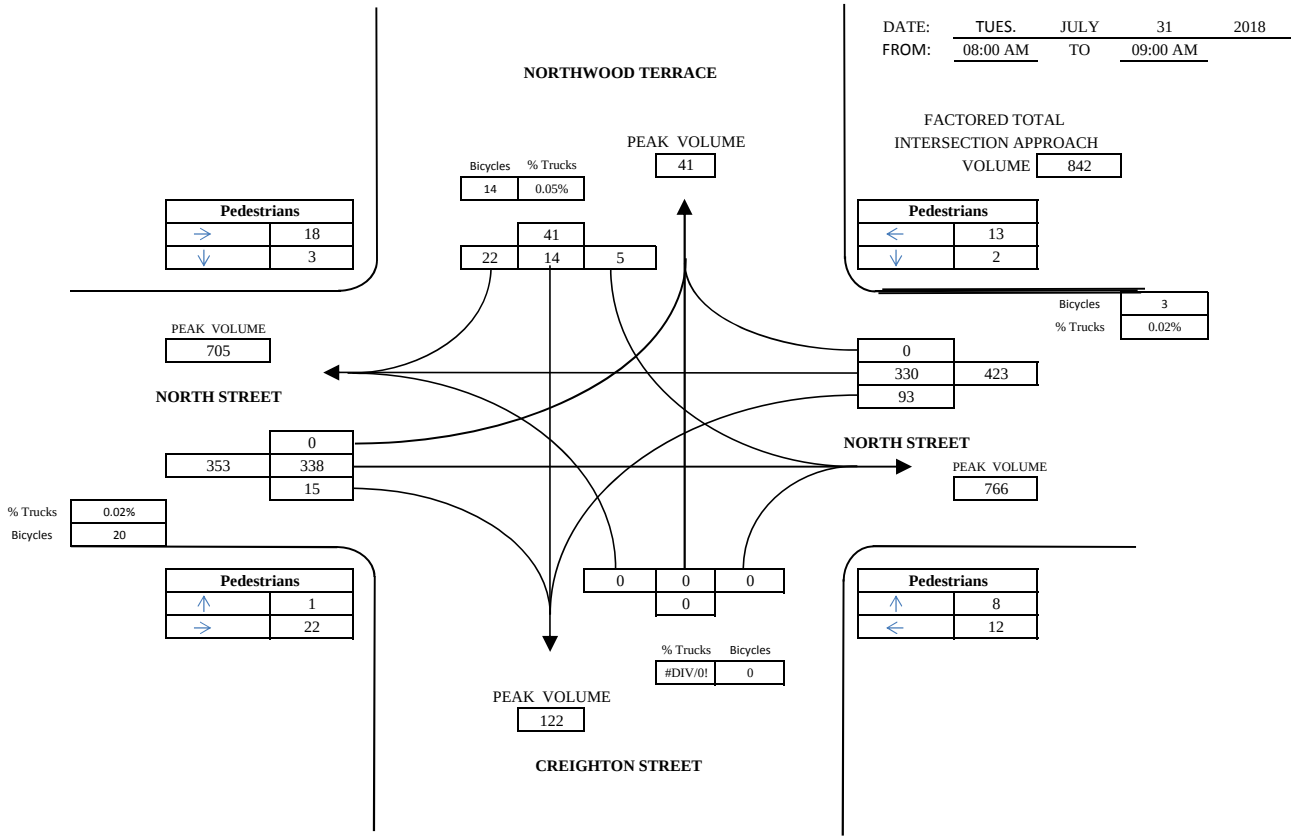
Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
7:02	0	2	2	15	0	15	1	4	5	3	1	4	26
7:15	0	0	0	15	0	15	0	3	3	3	3	6	24
7:30	0	4	4	5	1	6	0	4	4	1	1	2	16
7:45	3	2	5	9	0	9	0	3	3	2	1	3	20
8:00	0	2	2	6	0	6	0	1	1	1	2	3	12
8:15	0	0	0	7	1	8	0	5	5	2	4	6	19
8:30	2	6	8	2	2	4	1	5	6	6	0	6	24
8:45	0	5	5	3	0	3	0	11	11	3	2	5	24
TOTAL	5	21	26	62	4	66	2	36	38	21	14	35	165

VEHICULAR GRAPHIC SUMMARY SHEET

CREIGHTON STREET AT NORTH STREET & NORTHWOOD TERRACE





HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION & PUBLIC WORKS
TRAFFIC MANAGEMENT

CODE NO. 18RQ236

MANUAL TRAFFIC COUNTS

INTERSECTION: CREIGHTON STREET AT NORTH STREET & NORTHWOOD TERRACE

WEATHER: SUNNY
RECORDER: LIAM BRADLEY

DAY	DATE	MONTH	YEAR
TUES.	31	JULY	2018

STREET:		NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
04:00:00 PM	04:15:00 PM	3	91	0	0	155	1	9	4	13	0	0	0	276
04:15:00 PM	04:30:00 PM	15	104	0	0	162	8	0	2	6	0	0	0	297
04:30:00 PM	04:45:00 PM	17	98	0	0	136	1	1	5	6	0	0	0	264
04:45:00 PM	05:00:00 PM	10	103	0	0	167	7	2	2	6	0	0	0	297
TOTAL		45	396	0	0	620	17	12	13	31	0	0	0	1134
PEAK			441			637			56			0		
4(15 MIN PEAK)			476			696			104			0		
PEAK HOUR FACTOR			0.93			0.92			0.54			0		AAWT
TWO WAY TOTALS			1073			1064			56			75		FACTOR
														1.03
														1168

DAY	DATE	MONTH	YEAR
TUES.	31	JULY	2018

TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
05:00:00 PM	05:15:00 PM	7	109	0	0	122	7	2	0	1	0	0	0	248
05:15:00 PM	05:30:00 PM	11	108	0	0	113	6	3	2	5	0	0	0	248
05:30:00 PM	05:45:00 PM	9	79	0	0	104	4	0	2	3	0	0	0	201
05:45:00 PM	06:00:00 PM	4	96	0	0	97	4	1	0	2	0	0	0	204
TOTAL		31	392	0	0	436	21	6	4	11	0	0	0	901
PEAK			423			457			21			0		
4(15 MIN PEAK)			476			516			40			0		
PEAK HOUR FACTOR			0.89			0.89			0.53			0		AAWT
TWO WAY TOTALS			865			860			21			56		FACTOR
														1.03
														928

Intersection Peak Hour

		NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00-17:00	Car	45	384	1	1	611	16	12	12	31	0	0	0	1113
	Truck	0	11	0	0	8	1	0	1	0	0	0	0	21
	Bicycle	0	11	0	0	11	0	1	4	1	0	0	1	29
	Vehicle Total	45	406	1	1	630	17	13	17	32	0	0	1	1163
	Approach Factor		0.94			0.91			0.57			0.25		FACTOR
														1
														1163

Peak Hour Pedestrians

		NE			NW			SW			SE			Total
16:00-17:00		Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
	Pedestrians	7	37	44	7	2	9	3	47	50	17	5	22	125

Car traffic

Interval starts	NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	3	88	0	0	152	1	9	4	13	0	0	0	270
16:15	15	102	0	0	160	7	0	2	6	0	0	0	292
16:30	17	95	0	0	135	1	1	4	6	0	0	0	259
16:45	10	100	0	0	165	7	2	2	6	0	0	0	292
17:00	7	106	0	0	120	7	2	0	1	0	0	0	243
17:15	11	106	0	0	114	6	3	2	5	0	0	0	247
17:30	9	75	0	0	102	4	0	2	3	0	0	0	195
17:45	4	94	0	0	93	4	1	0	2	0	0	0	198
TOTAL	76	766	0	0	1041	37	18	16	42	0	0	0	1996

Truck traffic

Interval starts	NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	0	3	0	0	3	0	0	0	0	0	0	0	6
16:15	0	2	0	0	2	1	0	0	0	0	0	0	5
16:30	0	3	0	0	1	0	0	1	0	0	0	0	5
16:45	0	3	0	0	2	0	0	0	0	0	0	0	5
17:00	0	3	0	0	1	0	0	0	0	0	0	0	4
17:15	0	2	0	0	2	0	0	0	0	0	0	0	4
17:30	0	4	0	0	3	0	0	0	0	0	0	0	7
17:45	0	2	0	0	4	0	0	0	0	0	0	0	6
TOTAL	0	22	0	0	18	1	0	1	0	0	0	0	42

Bicycle traffic

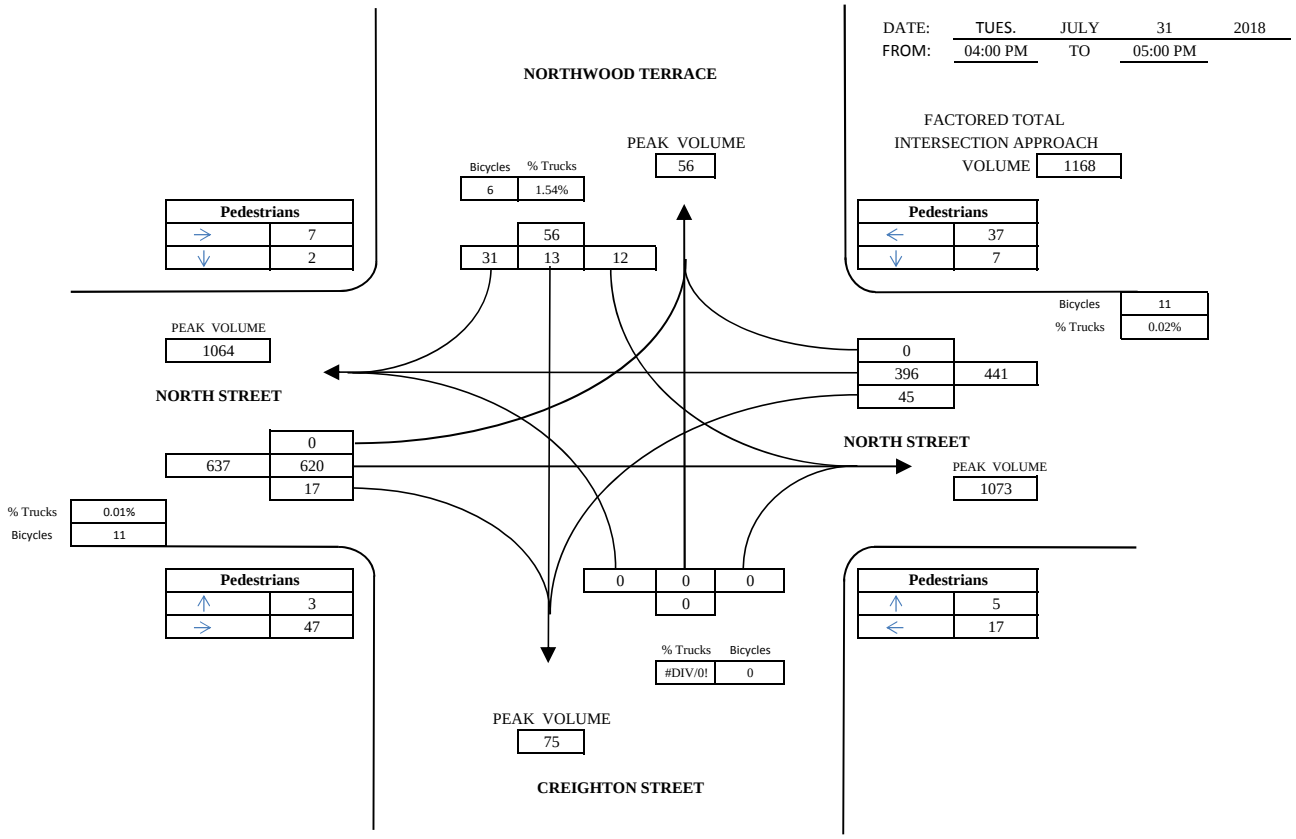
Interval starts	NORTH STREET			NORTH STREET			NORTHWOOD TERRACE			CREIGHTON STREET			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:00	0	3	0	0	1	0	0	1	0	0	0	0	5
16:15	0	1	0	0	3	0	0	0	0	0	0	0	4
16:30	0	4	0	0	3	0	1	1	1	0	0	0	11
16:45	0	3	0	0	4	0	0	2	0	0	0	0	9
17:00	0	2	0	0	2	0	0	0	0	0	0	0	4
17:15	0	3	0	0	0	0	0	0	0	0	0	0	3
17:30	0	5	0	0	2	0	0	1	0	0	0	0	8
17:45	0	1	0	0	4	0	0	2	0	0	0	0	7
TOTAL	0	22	0	0	19	0	1	7	1	0	0	0	51

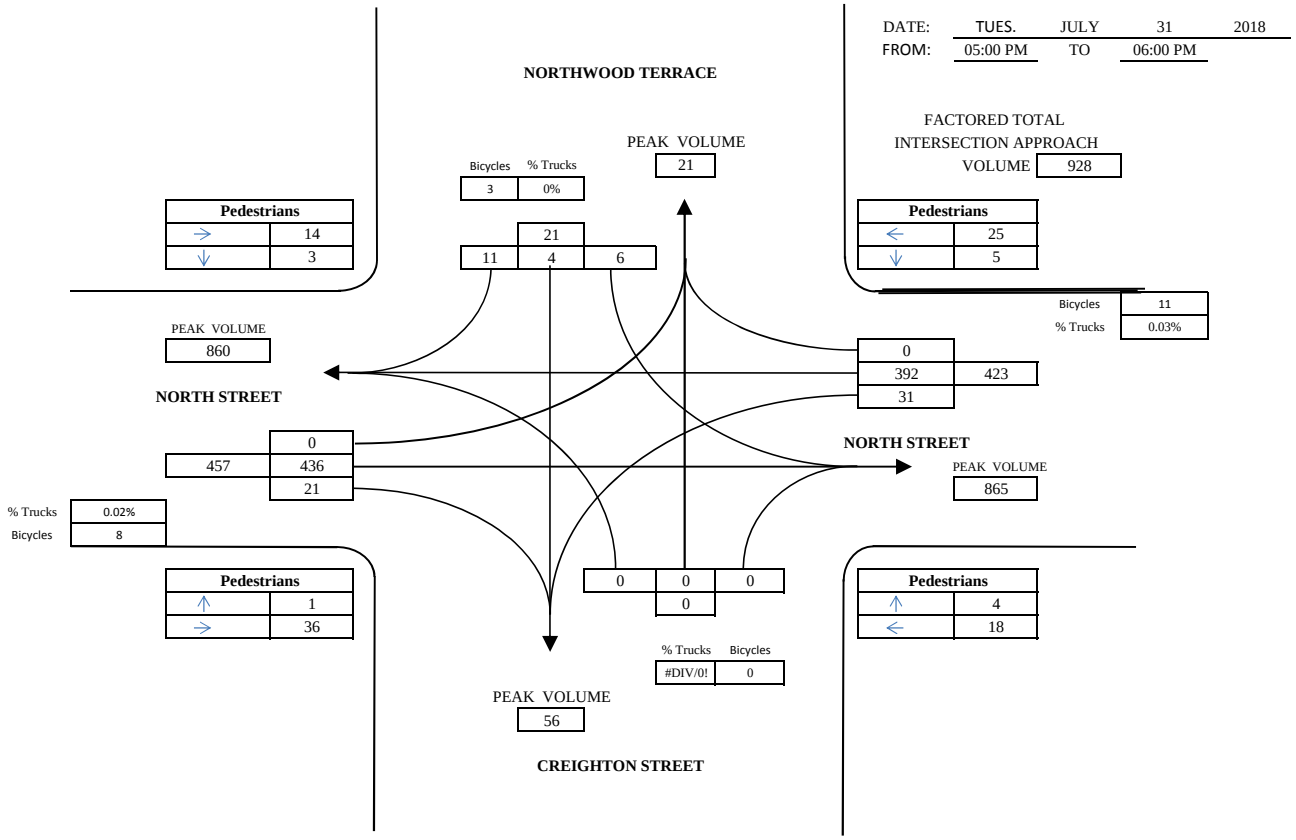
Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
16:00	2	10	12	2	2	4	1	11	12	7	0	7	35
16:15	1	12	13	1	0	1	0	11	11	1	2	3	28
16:30	2	7	9	1	0	1	1	17	18	3	3	6	34
16:45	2	8	10	3	0	3	1	8	9	6	0	6	28
17:00	1	4	5	3	1	4	0	18	18	1	1	2	29
17:15	1	5	6	1	1	2	1	6	7	7	0	7	22
17:30	0	8	8	4	1	5	0	10	10	8	2	10	33
17:45	3	8	11	6	0	6	0	2	2	2	1	3	22
TOTAL	12	62	74	21	5	26	4	83	87	35	9	44	231

VEHICULAR GRAPHIC SUMMARY SHEET

CREIGHTON STREET AT NORTH STREET & NORTHWOOD TERRACE





HOURLY TRAFFIC COUNTER SUMMARY

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION AND PUBLIC WORKS
TRAFFIC AND RIGHT OF WAY

Region: WESTERN
CODE No. 18-VOL-183
COUNTER No. Houston Radars 0007/908
File Name: R:\TPW\Engineering\Traff

DATE: 7/20/18
LOCATION: GOTTINGEN STREET
BETWEEN: CHARLES STREET AND UNIACKE STREET

AAWT: 13901

1-WAY		N-BOUND	X
2-WAY	X	E-BOUND	
		S-BOUND	X
		W-BOUND	

Axle Factor	1									
A.A.W.T. Factor	1.07	1.03	1	0.99	1		1	1		
Date	7/16/18	7/17/18	7/18/18	7/19/18	7/20/18		7/21/18	7/22/18		
Day	Monday	Tuesday	Wednesday	Thursday	Friday	**Subtotal**	Saturday	Sunday	**Subtotal**	**Total**
hour ending										
100	0	0	105	112	122	339	0	0	0	339
200	0	0	44	64	81	189	0	0	0	189
300	0	0	26	40	45	111	0	0	0	111
400	0	0	29	31	27	87	0	0	0	87
500	0	0	36	40	51	127	0	0	0	127
600	0	0	169	142	115	426	0	0	0	426
700	0	0	549	565	572	1686	0	0	0	1686
800	0	0	943	937	853	2733	0	0	0	2733
900	0	0	1013	997	350	2360	0	0	0	2360
1000	0	0	784	920	0	1704	0	0	0	1704
1100	0	0	810	768	0	1578	0	0	0	1578
1200	0	0	758	854	0	1612	0	0	0	1612
1300	0	0	789	924	0	1713	0	0	0	1713
1400	0	0	868	870	0	1738	0	0	0	1738
1500	0	0	885	917	0	1802	0	0	0	1802
1600	0	772	1021	1075	0	2868	0	0	0	2868
1700	0	1364	1374	1094	0	3832	0	0	0	3832
1800	0	999	927	1005	0	2931	0	0	0	2931
1900	0	751	796	809	0	2356	0	0	0	2356
2000	0	673	590	689	0	1952	0	0	0	1952
2100	0	473	420	521	0	1414	0	0	0	1414
2200	0	305	361	398	0	1064	0	0	0	1064
2300	0	259	262	282	0	803	0	0	0	803
2400	0	139	137	195	0	471	0	0	0	471
24 Hour TOTAL	0	5735	13696	14249	2216	35896	0	0	0	35896
24 Hour Factored TOTAL	0	5907	13696	14107	2216	35926	0	0	0	35926
Peak Hours (Factored)										
AM	0	0	1013	987	853	2853	0	0	4693	8399
Noon	0	0	885	915	0	1800	0	0	2715	4514
PM	0	1405	1374	1083	0	3862	0	0	4945	8807

HOURLY TRAFFIC COUNTER SUMMARY

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION AND PUBLIC WORKS
TRAFFIC AND RIGHT OF WAY

DISTRICT WESTERN
CODE No. 18-VOL-183
COUNTER No. HOUSTON RADAR 0007
File Name: R:\TPW\Engineering\Traffi

DATE: 20-Jul-18
LOCATION: GOTTINGEN STREET
BETWEEN: CHARLES STREET AND UNIACKE STREET

AAWT: 6311

1-WAY	X	N-BOUND	X
2-WAY		E-BOUND	
		S-BOUND	
		W-BOUND	

Axle Factor	1									
A.A.W.T. Factor	1.07	1.03	1.00	0.99	1.00		1.00	1.00		
Date	7/16/18	7/17/18	7/18/18	7/19/18	7/20/18		7/21/18	7/22/18		
Day	Monday	Tuesday	Wednesday	Thursday	Friday	**Subtotal**	Saturday	Sunday	**Subtotal**	**Total**
hour ending										
100	0	0	69	66	72	207	0	0	0	207
200	0	0	22	38	37	97	0	0	0	97
300	0	0	10	22	22	54	0	0	0	54
400	0	0	14	13	14	41	0	0	0	41
500	0	0	19	19	25	63	0	0	0	63
600	0	0	57	51	37	145	0	0	0	145
700	0	0	131	129	130	390	0	0	0	390
800	0	0	280	270	250	800	0	0	0	800
900	0	0	321	277	84	682	0	0	0	682
1000	0	0	292	334	0	626	0	0	0	626
1100	0	0	329	314	0	643	0	0	0	643
1200	0	0	362	357	0	719	0	0	0	719
1300	0	0	335	419	0	754	0	0	0	754
1400	0	0	386	381	0	767	0	0	0	767
1500	0	0	429	424	0	853	0	0	0	853
1600	0	422	586	619	0	1627	0	0	0	1627
1700	0	910	897	645	0	2452	0	0	0	2452
1800	0	538	492	514	0	1544	0	0	0	1544
1900	0	347	386	366	0	1099	0	0	0	1099
2000	0	312	286	331	0	929	0	0	0	929
2100	0	251	217	294	0	762	0	0	0	762
2200	0	196	188	209	0	593	0	0	0	593
2300	0	143	141	153	0	437	0	0	0	437
2400	0	86	73	118	0	277	0	0	0	277
24 Hour TOTAL	0	3205	6322	6363	671	16561	0	0	0	16561
24 Hour Factored TOTAL	0	3301	6322	6299	671	16594	0	0	0	16594
Peak Hours (Factored)										
AM	0	0	321	331	250	902	0	0	1482	2634
Noon	0	0	429	420	0	849	0	0	1269	2117
PM	0	937	897	639	0	2473	0	0	3111	5584

HOURLY TRAFFIC COUNTER SUMMARY

HALIFAX REGIONAL MUNICIPALITY
TRANSPORTATION AND PUBLIC WORKS
TRAFFIC AND RIGHT OF WAY

DISTRICT WESTERN
CODE No. 18-VOL-183
COUNTER No. HOUSTON RADAR 9089
File Name: R:\TPW\Engineering\Traffi

DATE (dd/mm/yy): 20-Jul-18
LOCATION: GOTTINGEN STREET
BETWEEN: CHARLES STREET AND UNIACKE STREET

AAWT: 7591

1-WAY	X	N-BOUND	
2-WAY		E-BOUND	
		S-BOUND	X
		W-BOUND	

Axle Factor	1									
A.A.W.T. Factor	1.07	1.03	1.00	0.99	1.00		1.00	1.00		
Date	7/16/18	7/17/18	7/18/18	7/19/18	7/20/18		7/21/18	7/22/18		
Day	Monday	Tuesday	Wednesday	Thursday	Friday	**Subtotal**	Saturday	Sunday	**Subtotal**	**Total**
hour ending										
100	0	0	36	46	50	132	0	0	0	132
200	0	0	22	26	44	92	0	0	0	92
300	0	0	16	18	23	57	0	0	0	57
400	0	0	15	18	13	46	0	0	0	46
500	0	0	17	21	26	64	0	0	0	64
600	0	0	112	91	78	281	0	0	0	281
700	0	0	418	436	442	1296	0	0	0	1296
800	0	0	663	667	603	1933	0	0	0	1933
900	0	0	692	720	266	1678	0	0	0	1678
1000	0	0	492	586	0	1078	0	0	0	1078
1100	0	0	481	454	0	935	0	0	0	935
1200	0	0	396	497	0	893	0	0	0	893
1300	0	0	454	505	0	959	0	0	0	959
1400	0	0	482	489	0	971	0	0	0	971
1500	0	0	456	493	0	949	0	0	0	949
1600	0	350	435	456	0	1241	0	0	0	1241
1700	0	454	477	449	0	1380	0	0	0	1380
1800	0	461	435	491	0	1387	0	0	0	1387
1900	0	404	410	443	0	1257	0	0	0	1257
2000	0	361	304	358	0	1023	0	0	0	1023
2100	0	222	203	227	0	652	0	0	0	652
2200	0	109	173	189	0	471	0	0	0	471
2300	0	116	121	129	0	366	0	0	0	366
2400	0	53	64	77	0	194	0	0	0	194
24 Hour TOTAL	0	2530	7374	7886	1545	19335	0	0	0	19335
24 Hour Factored TOTAL	0	2606	7374	7807	1545	19332	0	0	0	19332
Peak Hours (Factored)										
AM	0	0	692	713	603	2008	0	0	3324	5934
Noon	0	0	482	500	0	982	0	0	1482	2464
PM	0	475	477	486	0	1438	0	0	1924	3362

APPENDIX C

Trip Generation

Trip Generation Summary

Alternative: Alternative 1

Phase:

Project: 2438 Gottingen Street

Open Date: 9/27/2018

Analysis Date: 9/28/2018

ITE	Land Use	Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic				Weekday				Saturday			
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
222	Apartments		11	31	42		34	22	56		362	361	723		337	337	674
	137 Dwelling Units																
Unadjusted Volume			11	31	42		34	22	56		362	361	723		337	337	674
Internal Capture Trips			0	0	0		0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			11	31	42		34	22	56		362	361	723		337	337	674

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday Internal Capture = 0 Percent

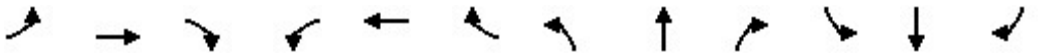
Total Saturday Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

APPENDIX D

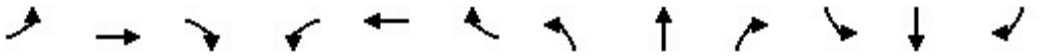
Synchro Output



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	15	22	0	0	0	0	338	16	100	330	0
Future Volume (Veh/h)	5	15	22	0	0	0	0	338	16	100	330	0
Sign Control		Stop			Stop			Free			Free	
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	20	29	0	0	0	0	441	21	130	430	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	1142	1152	430	1180	1142	452	430			462		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1142	1152	430	1180	1142	452	430			462		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	89	95	100	100	100	100			88		
cM capacity (veh/h)	162	174	625	132	177	608	1129			1099		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	7	49	462	560
Volume Left	7	0	0	130
Volume Right	0	29	21	0
cSH	162	304	1700	1099
Volume to Capacity	0.04	0.16	0.27	0.12
Queue Length 95th (m)	1.0	4.3	0.0	3.0
Control Delay (s)	28.3	19.1	0.0	3.1
Lane LOS	D	C		A
Approach Delay (s)	20.3		0.0	3.1
Approach LOS	C			

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	63.3%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	106	0	0	0	0	0	25	12	0	0	0
Future Volume (Veh/h)	25	106	0	0	0	0	0	25	12	0	0	0
Sign Control		Stop			Stop			Free			Free	
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)	33	138	0	0	0	0	0	33	16	0	0	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	33	49	0	102	33	33	0			49		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	33	49	0	102	33	33	0			49		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	84	100	100	100	100	100			100		
cM capacity (veh/h)	974	843	1085	768	860	1041	1623			1558		

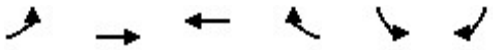
Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	33	138	33	16
Volume Left	33	0	0	0
Volume Right	0	0	0	16
cSH	974	843	1700	1700
Volume to Capacity	0.03	0.16	0.02	0.01
Queue Length 95th (m)	0.8	4.4	0.0	0.0
Control Delay (s)	8.8	10.1	0.0	0.0
Lane LOS	A	B		
Approach Delay (s)	9.9		0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	16.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	638	0	0	207	22	28
Future Volume (Veh/h)	638	0	0	207	22	28
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)	832	0	0	270	29	37
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			832		967	832
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			832		967	832
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		88	88
cM capacity (veh/h)			796		252	312

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	832	135	135	29	37
Volume Left	0	0	0	29	0
Volume Right	0	0	0	0	37
cSH	1700	1700	1700	252	312
Volume to Capacity	0.49	0.08	0.08	0.12	0.12
Queue Length 95th (m)	0.0	0.0	0.0	2.9	3.0
Control Delay (s)	0.0	0.0	0.0	21.1	18.1
Lane LOS				C	C
Approach Delay (s)	0.0	0.0		19.4	
Approach LOS				C	

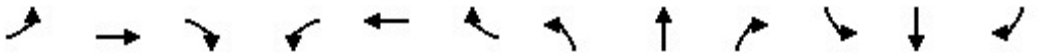
Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	107	0	0	31	0
Future Volume (Veh/h)	11	107	0	0	31	0
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)	14	140	0	0	40	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	0				168	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				168	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	100
cM capacity (veh/h)	1623				815	1085

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	14	140	40
Volume Left	14	0	40
Volume Right	0	0	0
cSH	1623	1700	815
Volume to Capacity	0.01	0.08	0.05
Queue Length 95th (m)	0.2	0.0	1.2
Control Delay (s)	7.2	0.0	9.6
Lane LOS	A		A
Approach Delay (s)	0.7		9.6
Approach LOS			A

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization		16.8%	ICU Level of Service
Analysis Period (min)		15	

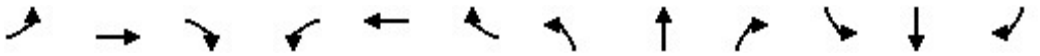


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	15	31	0	0	0	0	620	30	59	396	0
Future Volume (Veh/h)	12	15	31	0	0	0	0	620	30	59	396	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	20	40	0	0	0	0	809	39	77	517	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	1500	1519	517	1550	1500	828	517			848		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1500	1519	517	1550	1500	828	517			848		
tC, single (s)	*6.0	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	81	93	100	100	100	100			90		
cM capacity (veh/h)	148	107	558	68	110	371	1049			790		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	16	60	848	594
Volume Left	16	0	0	77
Volume Right	0	40	39	0
cSH	148	232	1700	790
Volume to Capacity	0.11	0.26	0.50	0.10
Queue Length 95th (m)	2.7	7.6	0.0	2.5
Control Delay (s)	32.2	25.8	0.0	2.5
Lane LOS	D	D		A
Approach Delay (s)	27.1		0.0	2.5
Approach LOS	D			

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	83.6%	ICU Level of Service	E	
Analysis Period (min)	15			

* User Entered Value



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	64	0	0	0	0	0	44	15	0	0	0
Future Volume (Veh/h)	40	64	0	0	0	0	0	44	15	0	0	0
Sign Control		Stop			Stop			Free			Free	
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)	52	83	0	0	0	0	0	57	20	0	0	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	57	77	0	98	57	57	0			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57	77	0	98	57	57	0			77		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	90	100	100	100	100	100			100		
cM capacity (veh/h)	940	813	1085	814	834	1009	1623			1522		

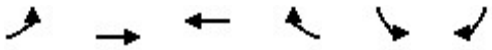
Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	52	83	57	20
Volume Left	52	0	0	0
Volume Right	0	0	0	20
cSH	940	813	1700	1700
Volume to Capacity	0.06	0.10	0.03	0.01
Queue Length 95th (m)	1.3	2.6	0.0	0.0
Control Delay (s)	9.1	9.9	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	9.6		0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	14.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	342	0	0	675	46	38
Future Volume (Veh/h)	342	0	0	675	46	38
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)	446	0	0	880	60	50
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			446		886	446
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			446		886	446
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		79	91
cM capacity (veh/h)			1111		284	560

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	446	440	440	60	50
Volume Left	0	0	0	60	0
Volume Right	0	0	0	0	50
cSH	1700	1700	1700	284	560
Volume to Capacity	0.26	0.26	0.26	0.21	0.09
Queue Length 95th (m)	0.0	0.0	0.0	5.9	2.2
Control Delay (s)	0.0	0.0	0.0	21.0	12.1
Lane LOS				C	B
Approach Delay (s)	0.0	0.0		17.0	
Approach LOS				C	

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	45	0	0	22	0
Future Volume (Veh/h)	34	45	0	0	22	0
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)	44	59	0	0	29	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	0				147	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				147	0
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				96	100
cM capacity (veh/h)	1623				822	1085

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	44	59	29
Volume Left	44	0	29
Volume Right	0	0	0
cSH	1623	1700	822
Volume to Capacity	0.03	0.03	0.04
Queue Length 95th (m)	0.6	0.0	0.8
Control Delay (s)	7.3	0.0	9.5
Lane LOS	A		A
Approach Delay (s)	3.1		9.5
Approach LOS			A

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

EKISTICS PLANNING & DESIGN