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# Transportation Impact Study

Wyse Road, Dartmouth

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a report by  
Fathom Studio

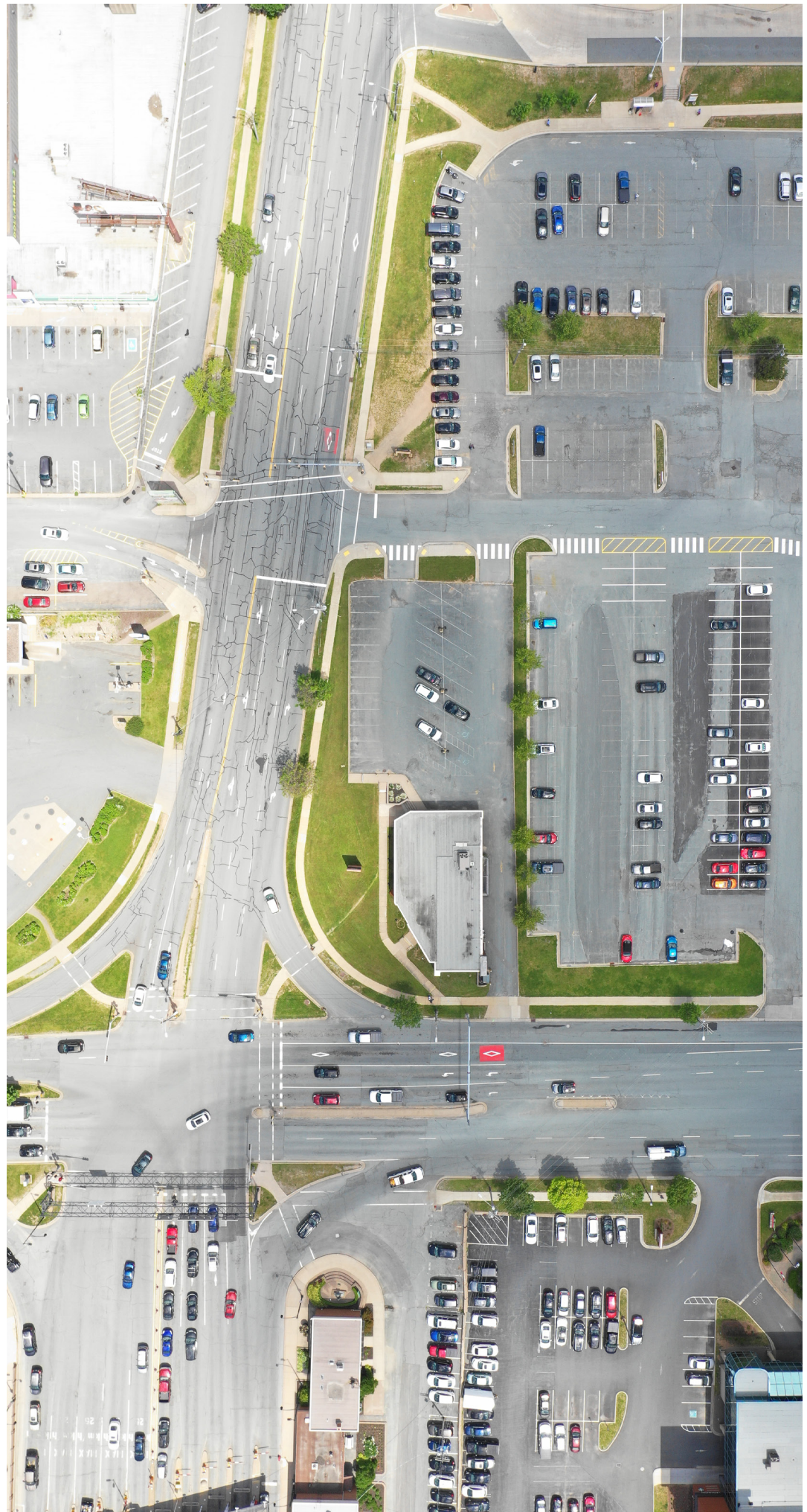
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Issued  
July 26, 2019

**Project**  
Wyse Road, Multi-Unit  
Development

**Prepared for**  
HRM Planning & Development  
Eastern Region, Alderney Gate  
40 Alderney Drive, 2nd Floor  
Dartmouth, NS

**Submitted By**  
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## APPENDICIES

- Appendix A: Traffic Counts**
- Appendix B: Trip Generation**
- Appendix C: Trip Assignment**
- Appendix D: Synchro Output**





Count

2017

Timings

2017

Timings



# 1. INTRODUCTION

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

This Transportation Impact Study follows HRM's Guidelines for the Preparation of Transportation Impact Studies, 8<sup>th</sup> Edition and general Traffic and Transportation Engineering principles for such studies. It is intended to address the transportation impacts that may be expected on the road and active transportation networks resulting from the:

- Removal of the former Scotia Bank building located in the northeast corner of the Wyse Road and Nantucket Avenue; and,
- Addition of a new multi-unit residential / commercial / office development as described in the table below.

<b>Proposed Development</b>	Dunphy Wyse Road Development
<b>Owner</b>	Alex Dunphy
<b>Location</b>	Northeast corner of: Wyse Road and Nantucket Avenue
<b>Building Details</b>	125 Residential Units 9,000 ft <sup>2</sup> Commercial / Retail Space 8,000 ft <sup>2</sup> Office Space
<b>Parking</b>	~ 105 Car Spaces

Table 1-1:

## Project Summary



Figure 1-1:

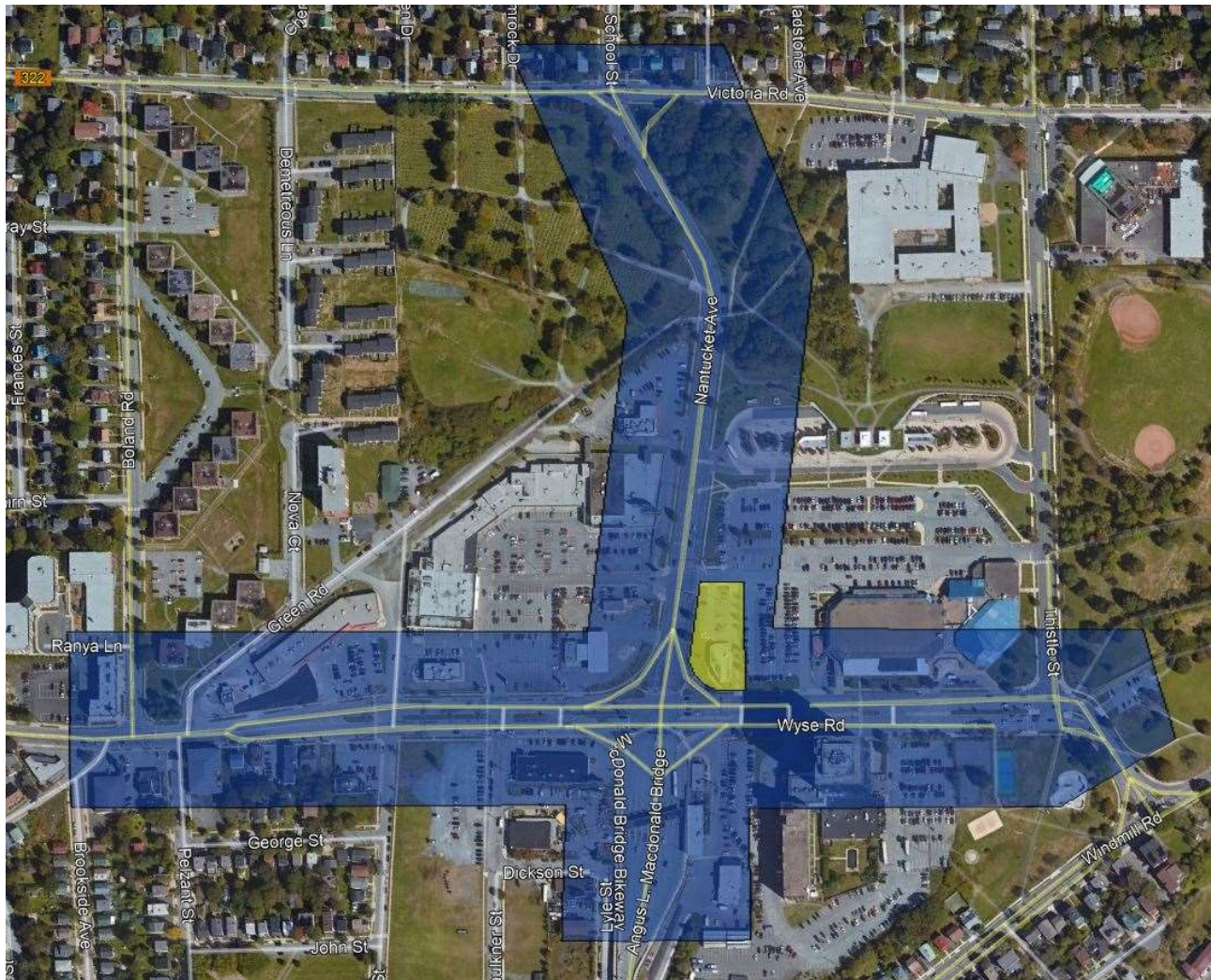
## Building Rendering

# 2. EXISTING CONDITIONS

## 2.1 Study Area

The study area is located in the northeast quadrant of the Wyse Road and Nantucket Avenue intersection, immediately northeast of the Macdonald Bridge in Dartmouth, Nova Scotia. The yellow area represents the new building development site and the blue represents the primary study area considered in this study for analysis purposes.

Figure 2-1: Study Area





## 2.2 Roadways and Intersections

The following sections provide a brief summary of each of the key roadways in the study area that are relevant to this study.

### Wyse Road

A major roadway that runs parallel to the Halifax Harbour between Windmill Road and Albro Lake Road. In the vicinity of the development, Wyse is a divided multi-lane urban roadway that provides access to various commercial driveways, accommodates significant transit traffic and provides direct access to the Macdonald Bridge vehicle, bicycle and pedestrian lanes through the signalized Nantucket Avenue intersection. Sidewalks are present on both sides of the road and numerous midblock and intersection crosswalks are present in the area. Northbound Wyse Road at Nantucket includes two dedicated left turn lanes and a transit-only left turn lane to the Macdonald Bridge and a shared through right turn lane. The southbound approach includes a double right turn lane to the Macdonald Bridge via a channelized right, two through lanes (shared with the right turn upstream of the intersection) and a dedicated left turn.



### Nantucket Avenue

Nantucket is a 4 / 5 lane urban undivided roadway that transitions to the Macdonald Bridge approach and departure lanes on the west side of the Wyse Road intersection. It includes two westbound approach lanes to Wyse Road (through only and shared through / right – left turns are restricted) and three eastbound lanes away from the Bridge. The eastbound curb lanes is restricted to transit bus traffic only through the Wyse Road intersection and becomes a dedicated left turn lane into the Sportplex parking lot. There are sidewalks on both sides of the roadway and a signalized pedestrian actuated traffic signal is located immediately on the uphill (east) side of the Sportsplex / Dartmouth Shopping Center accesses. Nantucket serves the north entrance and exit movements to and from the Dartmouth Bridge Transit Terminal.



## Victoria Road

Victoria Road is the next major traffic roadway east of the development and services traffic between Downtown Dartmouth at its south end and the Circumferential Highway (Hwy 111) at its north end, including its continuation to the north as Windmill Road. It's intersection with Nantucket Drive is signalized and is a primary route between the Macdonald Bridge Woodland Avenue / Highway 118. Near Nantucket, Victoria Road includes a northbound dedicated left and shared through/right lane and a southbound shared through/left with a dedicated right turn channelization and associated approach flare towards the Macdonald Bridge.



## Thistle Street

Thistle is a two-lane connector roadway between Wyse Road, through Victoria Road and into residential areas to the east, including and common commuter route using Maple Drive. It services the south entry and exit driveways to the Dartmouth Bridge Transit Terminal and includes an access to the Sportplex Parking lot. Traffic signals are present at both Victoria Road and Wyse Road.



## Macdonald Bridge

The Macdonald Bridge is one of the two bridges crossing the Halifax Harbour. The bridge includes lanes with a center reversing lane and is serviced by 5 approach and departure lanes (10 total) as well as bicycle and pedestrian lanes.



## 2.3 Active Transportation (AT)

The core downtown areas of both Halifax and Dartmouth have documented high cyclist and pedestrian activity (and other travel modes) in most areas. This study area is no exception with many local AT origins and destinations in the surrounding area as well as being located immediately adjacent to critical AT and transit corridors. These include the Dartmouth Bridge Transit Terminal, Dartmouth High and Bicentennial Schools, Dartmouth Common, the recently expanded and renovated Zatzman Sportsplex, Downtown Dartmouth, the Dartmouth waterfront, and various commercial and retail businesses. The development also has direct access to the dedicated bicycle and pedestrian walking lanes that cross the Macdonald Bridge connecting Dartmouth and Halifax.

The majority of routes and intersection crossings are already in place for this development and access points for the development easily connect to existing sidewalk infrastructure.

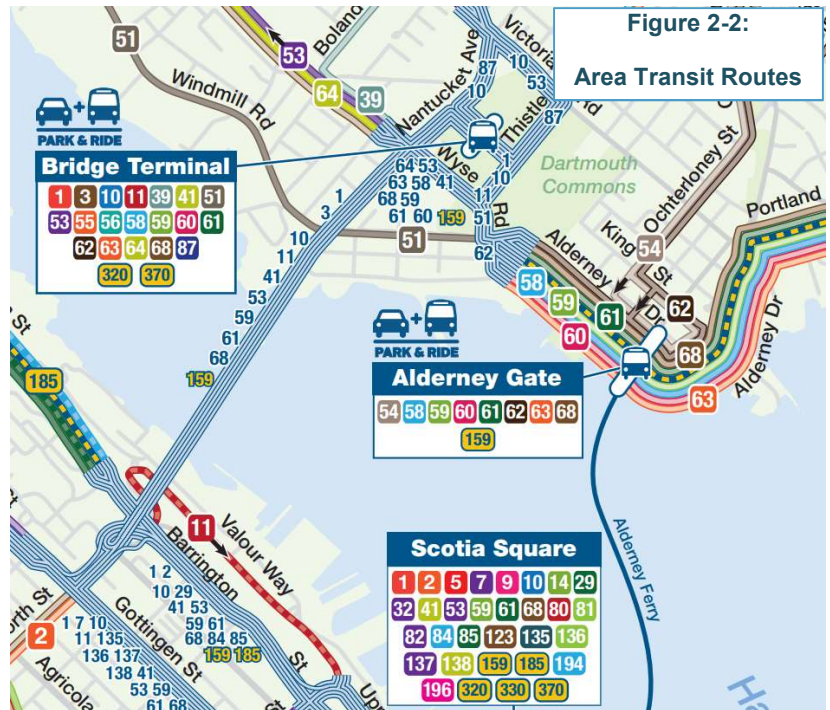
## 2.4 Vehicle Traffic

Recent and historical traffic counts were provided from HRM for all intersections in the study area. Most counts were completed during 2017 and 2018 and counts were supplemented by transit data, site observations, and general data associated with counts across the Macdonald and MacKay bridges. The baseline counts used in this analysis 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.



## 2.5 Transit

The proposed development is located immediately southwest of the Dartmouth Bridge Transit Terminal with less than 200 meters between the development and main transit terminal building. Suffice to say that the development has some of the best transit service available in the region with immediate access to over 20 different routes at the terminal or on connecting roadways. Additional routes are available at the Alderney Gate Terminal include the Alderney Ferry to Halifax which is located about 800 meters to the southeast.



## 2.6 Truck Routes

Halifax's By-Law T-400 Respecting the Establishment of Truck Routes for Certain Trucking Motor Vehicles within the HRM identifies Wyse Road and Windmill Road as Daylight routes (shown in blue) between the hours of 7 AM and 9 PM. Adjoining "Full Time" truck routes (shown in green) include Albion Lake Road and portions of Victoria Road and Windmill Road to the north (west) and the Circumferential Highway via Alderney Drive, Prince Albert or Portland Street. These routes provide direct access to the new development, though limited delivery requirements are expected at this site.



# 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 2019 and such studies frequently addresses a 5-year time horizon (2024) which includes background traffic growth, new traffic related to the Wyse Road development and any other significant transportation impacts anticipated during that period. Given the relatively low volume of traffic generated by the development relative to the total traffic on the road network, this study addresses the 2019 base year and the 2024 horizon year with the development in place.

### 3.1.2 Background Traffic

Traditional background traffic growth rates used for traffic impact studies throughout HRM have been in the 1 – 2% range though actual growth is frequently less than this and even negative in some cases. Recommendations from past regional planning studies suggest a growth rate of 0.5% background traffic growth is more appropriate for projected growth rate. For this study, we have assumed a 0.5% background traffic growth rate over the 5-year horizon to 2024 and to adjust past studies to the 2019 base year.

### 3.1.3 Analysis Period

This area of Halifax is highly commuter oriented, particularly given the proximity of the Macdonald Bridge. Therefore, the weekday AM and PM peak hours are considered to be the critical periods for the analysis.

## 3.2 The Development

The proposed development will require removal of the existing building and construction of the new mixed-use development. As there has been little activity at the existing building in recent year and when operational, the single story building generated relative low traffic volumes, no traffic has been eliminated from the network to account for removal of the building.

### 3.2.1 Trip Generation

The addition of new traffic related to the development is summarized in the table below and a more detailed summary of the trip generation rates, and background calculations are provided in Appendix B of this report.



**Table 3-1: Trip Generation Summary**

	ITE Land Use Type	AM Peak			PM Peak		
		Enter	Exit	Total	Enter	Exit	Total
Apartments	ITE 222	10	28	38	32	20	52
Office	ITE 710	11	1	12	2	10	12
Misc. Retail	ITE 820	17	16	33	11	13	24
Internal Capture Trips	-	0	0	0	-7	-7	-14
Sub-Total		38	45	83	45	43	88
Trip Reduction Factor	-	-8	-9	-17	-9	-9	-18
<b>TOTAL</b>		<b>30</b>	<b>36</b>	<b>76</b>	<b>36</b>	<b>34</b>	<b>70</b>

Given the proximity to Bridge transit hub and access to the robust active transportation network, it is expected that the development will generation traffic at rates significantly less that those estimated for “typical” mixed use developments. In the case of this development, trip reduction is expected to impact both origin related traffic (i.e. residents traveling from the development to work) as well as destination-based trips (i.e. people traveling to the office or retail portions of the development). In addition, the development is at a location that should incentivize using alternate modes of travel given the congestion frequently experienced on the Macdonald Bridge.

For these reasons, an additional trip reduction factor of 20% has been applied to the overall trip generation assumption, though in reality we would expect the reduction factor to be significantly higher and therefore result in less trips that is being assumed in this study.

### 3.3 Trip Distribution and Assignment

It is assumed that traffic will distribute itself through the network in a similar manner to the existing traffic. The new building will have a mix of inbound peak traffic and outbound peak traffic (i.e. primarily inbound office traffic and outbound residential traffic in the AM).

The adjacent intersections can experience some level of congestions related to access to the Macdonald Bridge, it is anticipated the entry and exit movements from the development may vary day-to-day depending on the volume of traffic on the adjacent streets. It is also anticipated that some drivers may elect to use different driveways accessed from the Sportsplex parking lot depending on routing and congestion levels in the area, though most of the traffic accessing the site is expected to use the Nantucket Avenue Driveway. The trip assignment assumptions and results are reflected in the spreadsheets included in Appendix C of this report.

# 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. Detailed output for each of the scenarios is provided in Appendix D of the report. The analysis included the following models for each peak:

- 2019 Existing Conditions; and,
- 2024 with Background and Development Traffic.

The trip assignment process suggests that there will some distribution of traffic to different intersections connecting the development to Nantucket Avenue, Wyse Road and Thistle Street. It is expected that the majority of traffic will enter and exit the site at the Nantucket Avenue intersection. With the exception of the intersection of Wyse Road with the Macdonald Bridge, the intersections in the study area operate at a reasonably good level of service with limited delays and queues. These individual intersections are discussed in greater detail below and detailed results for all intersections for each analysis scenario are provided in Appendix D of this report.

## 4.2 Nantucket Ave/Sportsplex/Mall Driveway

The majority of traffic is expected to enter and exit the site through this intersection, particularly given the pedestrian half-signals on the east side of the intersection that helps facilitate left turn movements into and out of the development. Signals at this intersection are pedestrian actuated with minimum green time requirements on Nantucket Road to service peak hour traffic volumes.

Traffic entering and existing the site also benefits from traffic signal operations at the Wyse Road intersection with the Macdonald Bridge which results in frequent gaps in traffic in Nantucket. The Synchro modeling results suggest that the AM peak experiences maximum volume to capacity ratio's of about 0.50 (50% capacity) today and 0.51 under 2024 development conditions with an overall intersection capacity utilization of about 53%. 95% queues on the Sportsplex driveway are about 3 vehicles and delays suggest a level of Service of B. PM peak results at this intersection are slightly better than the AM peak, presumably because volumes on Nantucket are metered to a certain extent by the signals at Wyse Road exiting the Macdonald Bridge.



## 4.3 Nantucket Ave. / Victoria Road

The first major intersection to the north of the site has very limited impact from development-based traffic which composes less than 1% of the overall traffic at the intersection in the 2024 development scenario. The heaviest movements during the AM peak hour are the southbound right turn and northbound left turn from Victoria to Nantucket and the modelling results suggest an overall intersection capacity utilization of about 73% with volume to capacity ratios remaining less than 0.60 on all movements.

PM peak traffic is impacted by the heavier volume of eastbound traffic on Nantucket making a left turn onto Victoria Road resulting in a movement v/c ratio of 0.88 and some substantial queuing. Opposing traffic on Maple is limited though so the movement operates with limited delay. Overall capacity utilization is around 77% at this intersection.

## 4.4 Wyse Rd / Macdonald Bridge / Nantucket

This intersection is one of the highest volume intersections in HRM and is characterized by double right and left turn lanes and dual through movements on each approach. Operations vary significantly day-to-day depending on the peak traffic characteristics that are often dependent on driver choices on the approaching network. The AM peak hour frequently experiences some congestion as vehicles enter onto the Macdonald Bridge from all three approaches, though queues often extend across the Macdonald Bridge from the Halifax side of the Harbour which contributes to congestion at this intersection. Exacerbating the challenges are the left turn bus movements from the northbound dedicated bus lane on Wyse Road onto the Macdonald Bridge which frequently blocks the southbound right turn movements onto the Bridge from Wyse Road.

For all these reasons, this is a difficult intersection to accurately model. The modelling result suggest that in the absence of backups on the Macdonald Bridge that limits the effectiveness of the intersection, the intersection operates with an overall capacity utilization of about 82% in the AM and PM peaks. Numerous movements operate with a V/C ratio over 0.9 and substantial queuing and delays can occur. Development related traffic at this intersection composes less than 1% of total traffic through the intersection during the peak hours and therefore would not be noticeable.

## 4.5 Wyse Road and Thistle Street

This is the first intersection south of the proposed development and similar to other intersections in the study area, has a little impact related to the development. Development traffic composes about 1% of total traffic through the intersection during the peak hours and therefore has negligible impacts on operations. V/C ratios and overall intersection capacity utilization remain below 50% during the AM peak hour with limited delay and queuing. During the PM peak the heavier southbound left to Thistle competes with the northbound through movement on Wyse resulting in v/c ratios of about 0.8, though the traffic signals help keep delays and queue lengths at reasonable levels.



# 5. CONCLUSIONS

This report has analyzed the impacts of the removal of an existing building and the addition of a new multi-unit residential development with office and retail space. The analysis shows that the development contributes a very small amount of traffic to the adjacent driveways and intersections relative to the overall traffic on the road network. Furthermore, the results show very little change to key performance parameters such as delays, queue length or volume to capacity ratios between conditions before and after the development is in place.

The surrounding road network is characterized by high volumes of commuter-based traffic, most notably related to volumes onto and off the Macdonald Bridge between Dartmouth and Halifax. This commuter traffic is quite consistent during the weekdays, though the intensity of traffic on the three directional approaches to the Bridge can vary significantly.

In general, the development fits very well into the surrounding environment being directly located on a number of core transportation routes, and has direct access to robust transit and active transportation networks. It is expected that residents of this development are highly likely to utilize both the transit and AT networks which in turn help to reduce additional vehicle traffic on the roadway.

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

Sincerely,

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Senior Transportation Engineer

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# APPENDIX A

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## Traffic Counts



# MANUAL TRAFFIC COUNTS

INTERSECTION:

NANTUCKET AVENUE AT DARTMOUTH SPORTSPLEX

WEATHER  
RECORDER

CLOUDY  
KS

DAY DATE MONTH YEAR  
TUES 7 NOV 2017

STREET: TIME:		NANTUCKET AVENUE			NANTUCKET AVENUE			MALL			DARTMOUTH SPORTSPLEX			TOTAL
		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
07:00:00 AM	07:15:00 AM	3	202	11	0	51	5	0	0	0	0	0	7	
07:15:00 AM	07:30:00 AM	8	225	13	0	60	8	0	0	0	1	1	12	
07:30:00 AM	07:45:00 AM	4	255	16	0	70	13	0	0	0	0	2	13	
07:45:00 AM	08:00:00 AM	5	248	18	0	87	6	0	0	2	2	1	7	

TOTAL	20	930	58	0	268	32	0	0	2	3	4	39	1356
PEAK	1008			300			2			46			FACTOR
15 MIN PEAK	1100			372			8			60			
PEAK HOUR FACTOR	0.92			0.81			0.25			0.77			
TWO WAY TOTALS	1315			1235			64			98			
													1.01
													1370

DAY DATE MONTH YEAR  
TUES 7 NOV 2017

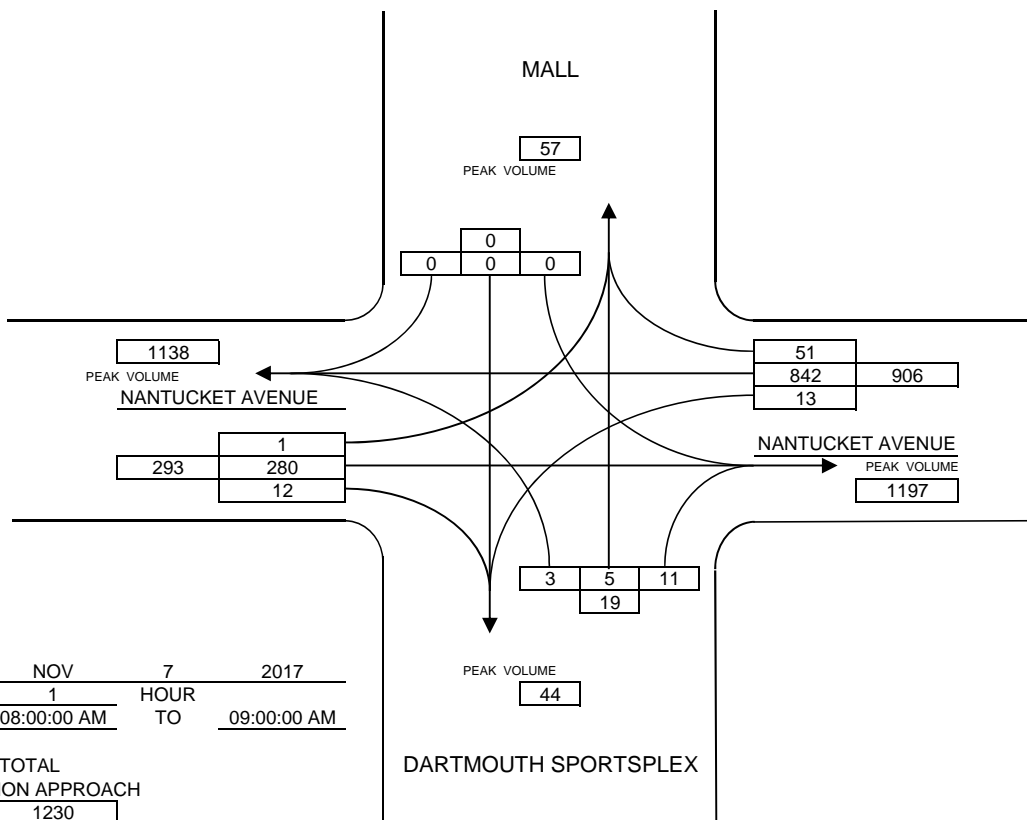
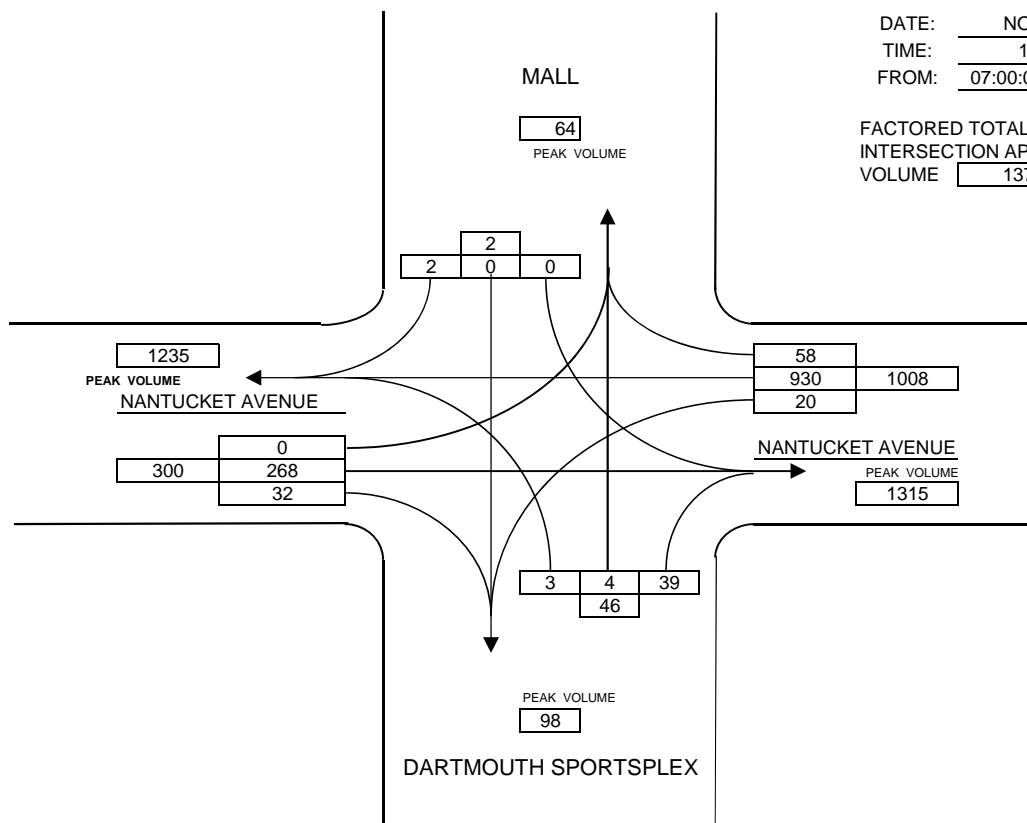
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
08:00:00 AM	08:15:00 AM	2	197	13	0	65	4	0	0	0	1	1	1	284
08:15:00 AM	08:30:00 AM	4	223	12	1	79	2	0	0	0	0	2	5	328
08:30:00 AM	08:45:00 AM	2	204	14	0	71	3	0	0	0	1	0	3	298
08:45:00 AM	09:00:00 AM	5	218	12	0	65	3	0	0	0	1	2	2	308

TOTAL	13	842	51	1	280	12	0	0	0	3	5	11	1218
PEAK	906			293			0			19			FACTOR
15 MIN PEAK	956			328			0			28			
PEAK HOUR FACTOR	0.95			0.89			0			0.68			
TWO WAY TOTALS	1197			1138			57			44			
													1.01
													1230

# VEHICULAR GRAPHIC SUMMARY SHEET

## NANTUCKET AVENUE AT DARTMOUTH SPORTSPLEX

INTERSECTION :





# MANUAL TRAFFIC COUNTS

INTERSECTION:

NANTUCKET AVENUE AT DARTMOUTH SPORTSPLEX

WEATHER  
RECORDER

CLOUDY  
KS

DAY DATE MONTH YEAR  
TUES 7 NOV 2017

STREET: TIME:		NANTUCKET AVENUE			NANTUCKET AVENUE			MALL			DARTMOUTH SPORTSPLEX			TOTAL
		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
04:00:00 PM	04:15:00 PM	0	92	19	0	183	3	0	0	3	0	0	8	308
04:15:00 PM	04:30:00 PM	1	98	9	0	197	1	0	0	3	0	0	8	317
04:30:00 PM	04:45:00 PM	0	103	16	0	201	2	0	0	4	1	0	13	340
04:45:00 PM	05:00:00 PM	0	108	22	1	200	2	0	0	2	0	0	12	347

TOTAL	1	401	66	1	781	8	0	0	12	1	0	41	1312
PEAK	468			790			12			42			FACTOR
15 MIN PEAK	520			812			16			56			
PEAK HOUR FACTOR	0.9			0.97			0.75			0.75			
TWO WAY TOTALS	1290			1204			79			51			
1.01													
1325													

DAY DATE MONTH YEAR  
TUES 7 NOV 2017

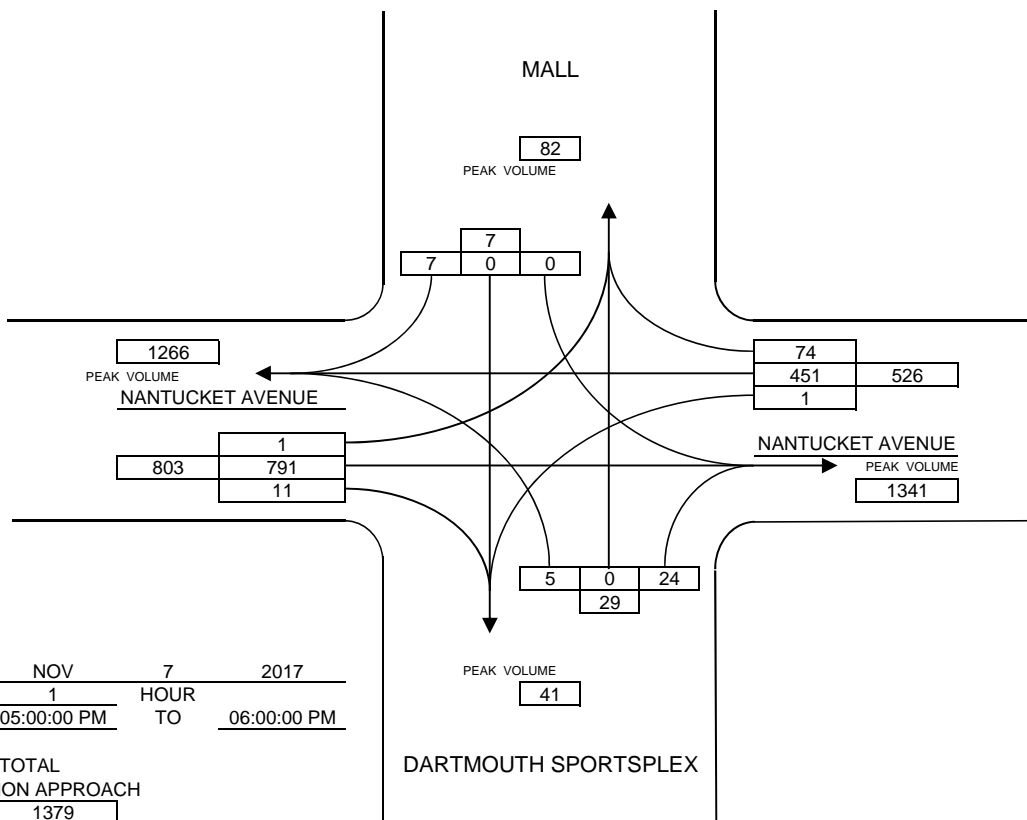
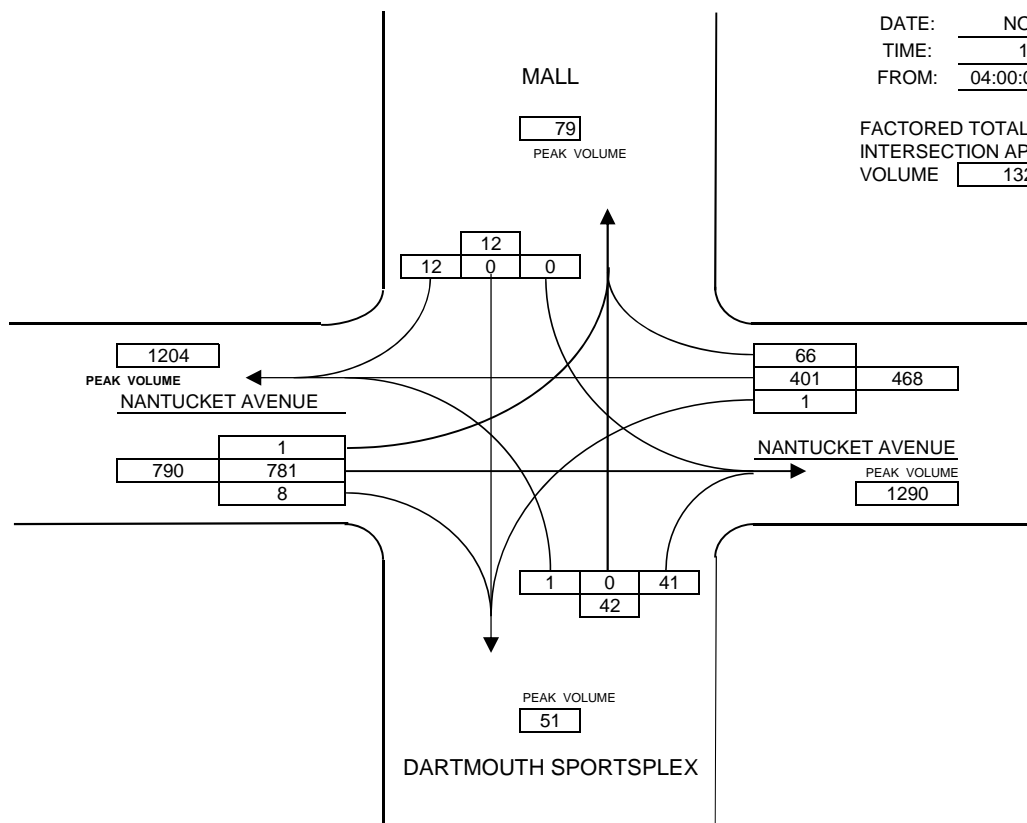
TIME:		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
15 MIN INTERVALS		L	S	R	L	S	R	L	S	R	L	S	R	
05:00:00 PM	05:15:00 PM	0	104	15	1	215	2	0	0	3	2	0	11	353
05:15:00 PM	05:30:00 PM	1	118	23	0	183	1	0	0	1	0	0	8	335
05:30:00 PM	05:45:00 PM	0	120	19	0	194	4	0	0	2	2	0	3	344
05:45:00 PM	06:00:00 PM	0	109	17	0	199	4	0	0	1	1	0	2	333

TOTAL	1	451	74	1	791	11	0	0	7	5	0	24	1365	
PEAK	526			803			7			29			FACTOR	
15 MIN PEAK	568			872			12			52				
PEAK HOUR FACTOR	0.93			0.92			0.58			0.56				
TWO WAY TOTALS	1341			1266			82			41				
														1.01
														1379

# VEHICULAR GRAPHIC SUMMARY SHEET

## NANTUCKET AVENUE AT DARTMOUTH SPORTSPLEX

INTERSECTION :





# MANUAL TRAFFIC COUNTS

INTERSECTION:

THISTLE STREET AT VICTORIA ROAD

WEATHER  
RECORDER

CLEAR  
SS

DAY DATE MONTH YEAR  
TUESDAY 17 OCT 2017

STREET: TIME: 15 MIN INTERVALS		THISTLE STREET FROM THE EAST			THISTLE STREET FROM THE WEST			VICTORIA STREET FROM THE NORTH			VICTORIA STREET FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
07:00:00 AM	07:15:00 AM	0	59	69	2	20	2	12	18	12	19	92	0	305
07:15:00 AM	07:30:00 AM	0	73	64	8	25	1	13	10	12	17	89	0	312
07:30:00 AM	07:45:00 AM	1	66	56	8	22	1	12	12	14	25	107	1	325
07:45:00 AM	08:00:00 AM	2	79	60	12	26	1	15	18	13	23	85	0	334

TOTAL	3	277	249	30	93	5	52	58	51	84	373	1	1276	
PEAK	529			128			161			458			FACTOR	
15 MIN PEAK	564			156			184			532				
PEAK HOUR FACTOR	0.94			0.82			0.88			0.86				
TWO WAY TOTALS	675			540			813			524				
														1.01
														1289

DAY DATE MONTH YEAR  
TUESDAY 17 OCT 2017

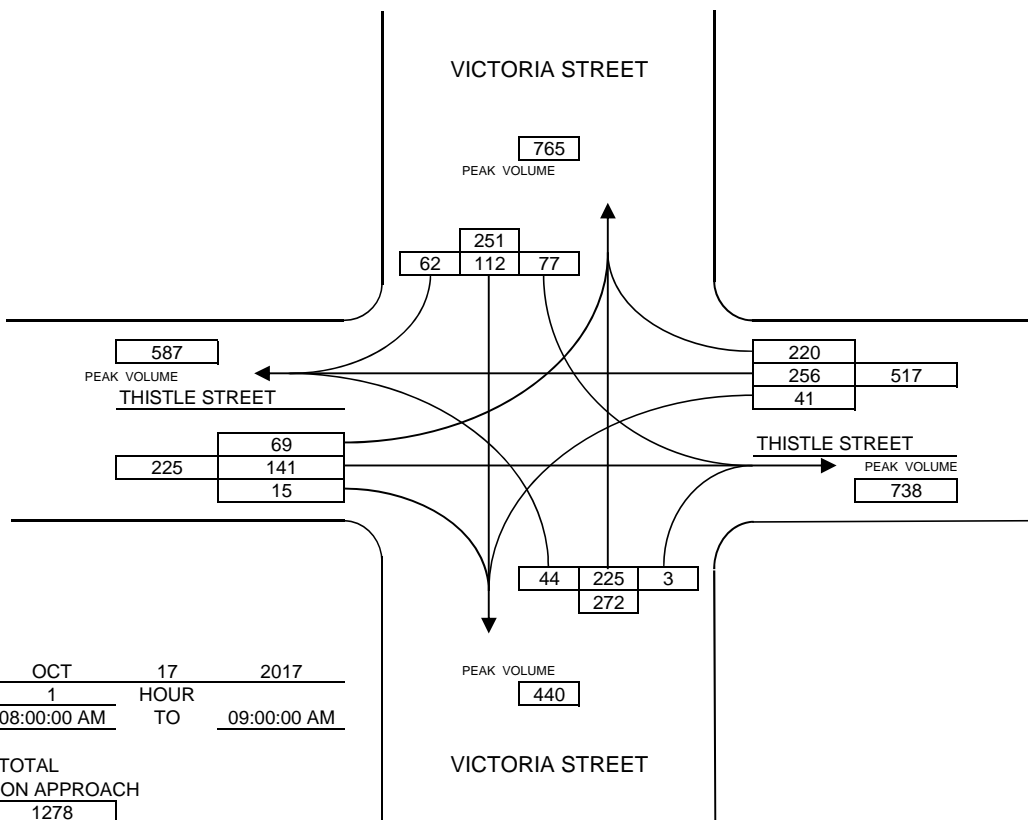
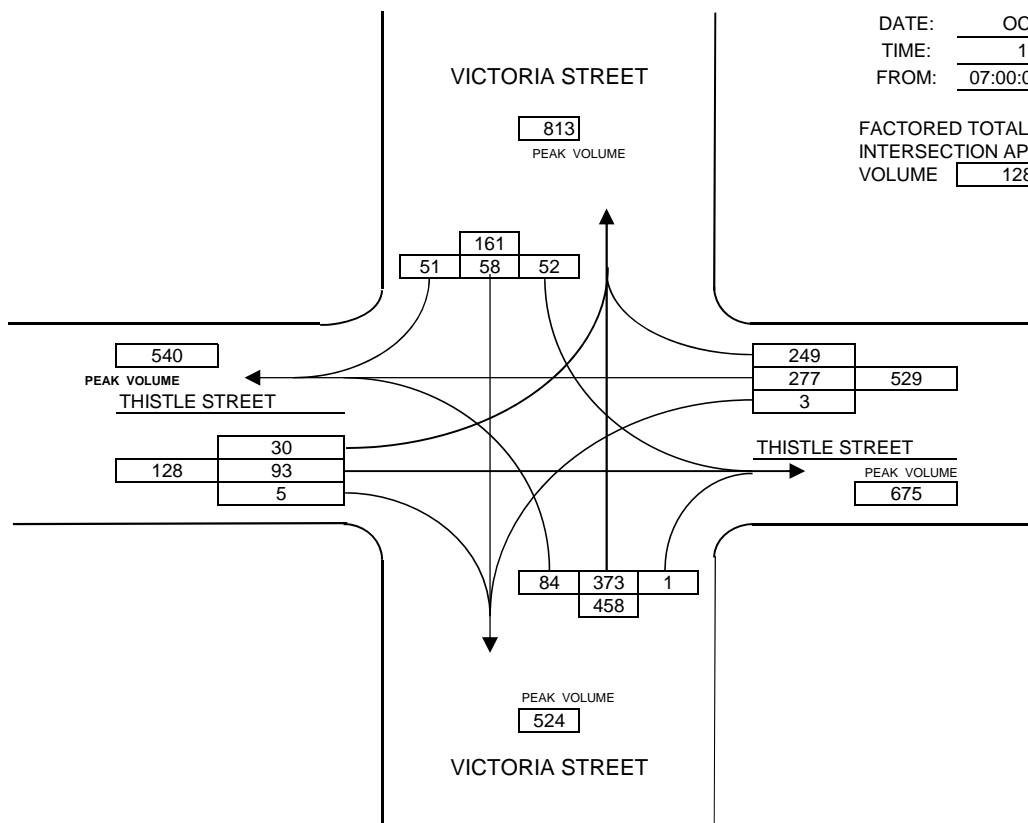
TIME: 15 MIN INTERVALS		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
08:00:00 AM	08:15:00 AM	2	48	48	22	18	3	19	28	15	12	74	1	290
08:15:00 AM	08:30:00 AM	3	72	58	23	23	5	19	29	19	10	62	1	324
08:30:00 AM	08:45:00 AM	15	75	55	13	58	5	17	24	14	2	43	1	322
08:45:00 AM	09:00:00 AM	21	61	59	11	42	2	22	31	14	20	46	0	329

TOTAL	41	256	220	69	141	15	77	112	62	44	225	3	1265	
PEAK	517			225			251			272			FACTOR	
15 MIN PEAK	580			304			268			348				
PEAK HOUR FACTOR	0.89			0.74			0.94			0.78				
TWO WAY TOTALS	738			587			765			440				
														1.01
														1278

# VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION :

THISTLE STREET AT VICTORIA ROAD



DATE: OCT 17 2017  
 TIME: 1 HOUR  
 FROM: 08:00:00 AM TO 09:00:00 AM

FACTORED TOTAL  
 INTERSECTION APPROACH  
 VOLUME 1278

# MANUAL TRAFFIC COUNTS

INTERSECTION:

THISTLE STREET AT VICTORIA ROAD

WEATHER  
RECORDER

CLEAR  
SS

DAY DATE MONTH YEAR  
TUESDAY 17 OCT 2017

STREET: TIME: 15 MIN INTERVALS		THISTLE STREET FROM THE EAST			THISTLE STREET FROM THE WEST			VICTORIA STREET FROM THE NORTH			VICTORIA STREET FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
04:00:00 PM	04:15:00 PM	1	21	21	11	124	4	50	19	8	5	47	2	313
04:15:00 PM	04:30:00 PM	3	38	40	9	143	3	69	39	8	6	58	3	419
04:30:00 PM	04:45:00 PM	0	24	25	10	111	6	59	25	11	12	77	3	363
04:45:00 PM	05:00:00 PM	1	32	35	7	117	2	66	24	21	14	45	0	364

TOTAL	5	115	121	37	495	15	244	107	48	37	227	8	1459
PEAK		241			547			399			272		
15 MIN PEAK		324			620			464			368		
PEAK HOUR FACTOR		0.74			0.88			0.86			0.74		
TWO WAY TOTALS		988			747			784			399		FACTOR
													1.01
													1474

DAY DATE MONTH YEAR  
TUESDAY 17 OCT 2017

TIME: 15 MIN INTERVALS		FROM THE EAST			FROM THE WEST			FROM THE NORTH			FROM THE SOUTH			TOTAL
		L	S	R	L	S	R	L	S	R	L	S	R	
05:00:00 PM	05:15:00 PM	0	38	26	8	116	4	64	34	17	11	78	1	397
05:15:00 PM	05:30:00 PM	2	45	25	8	123	9	56	9	9	7	45	0	338
05:30:00 PM	05:45:00 PM	1	32	28	7	112	7	56	29	18	6	36	1	333
05:45:00 PM	06:00:00 PM	0	29	38	9	117	7	57	20	19	4	46	0	346

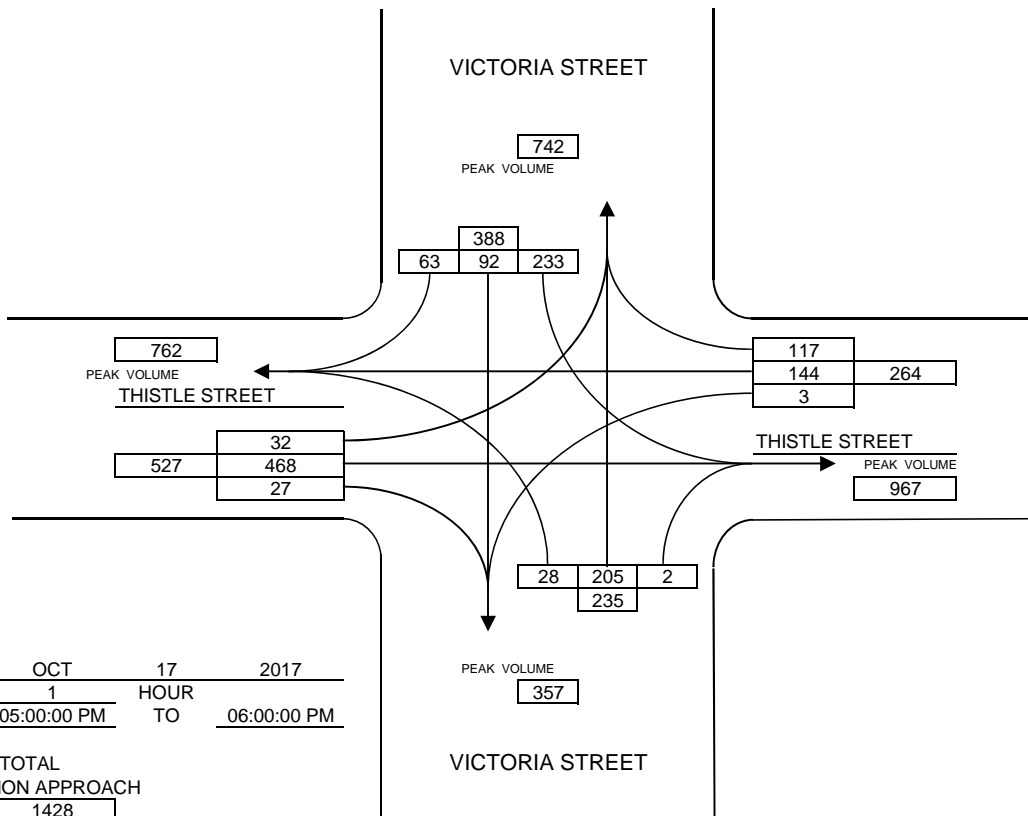
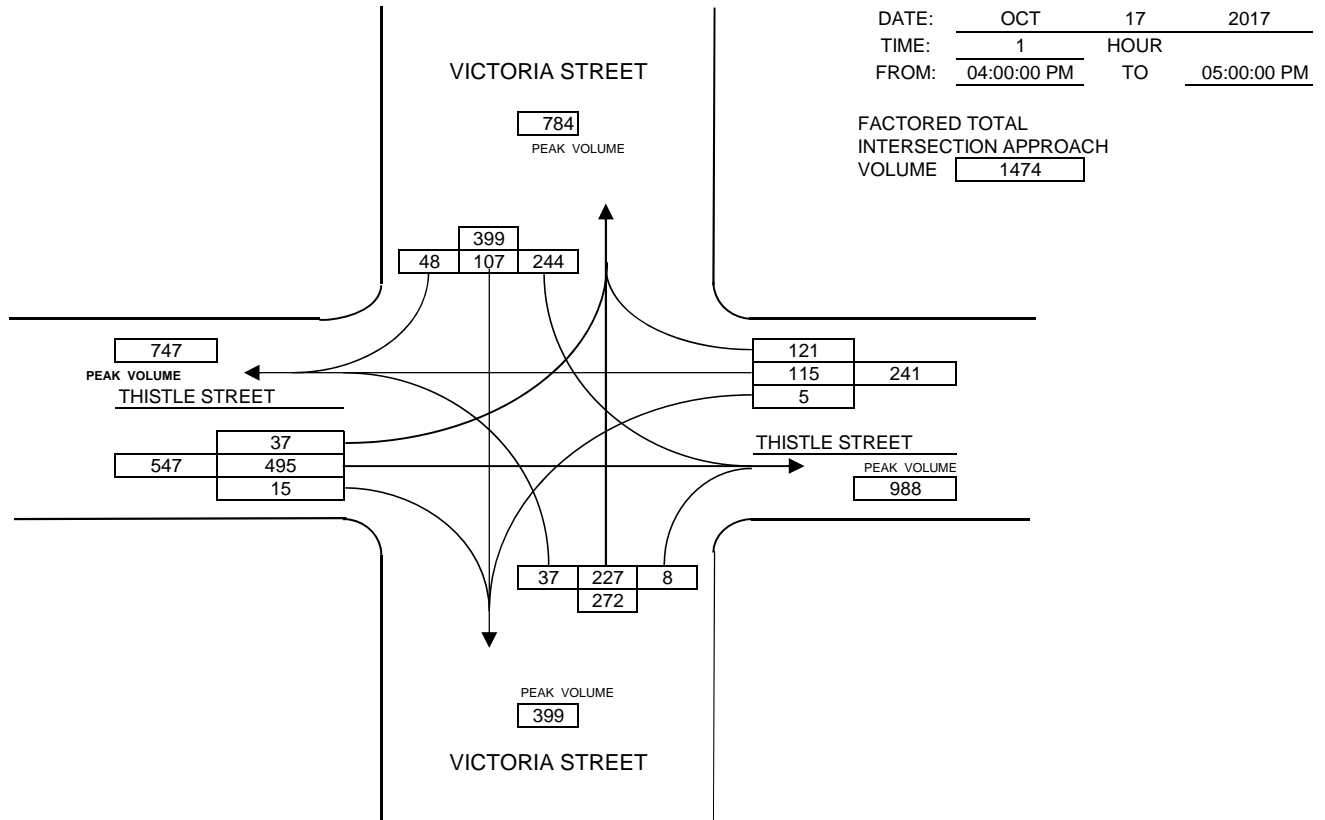
TOTAL	3	144	117	32	468	27	233	92	63	28	205	2	1414
PEAK		264			527			388			235		
15 MIN PEAK		288			560			460			360		
PEAK HOUR FACTOR		0.92			0.94			0.84			0.65		
TWO WAY TOTALS		967			762			742			357		FACTOR
													1.01
													1428



# VEHICULAR GRAPHIC SUMMARY SHEET

INTERSECTION :

THISTLE STREET AT VICTORIA ROAD





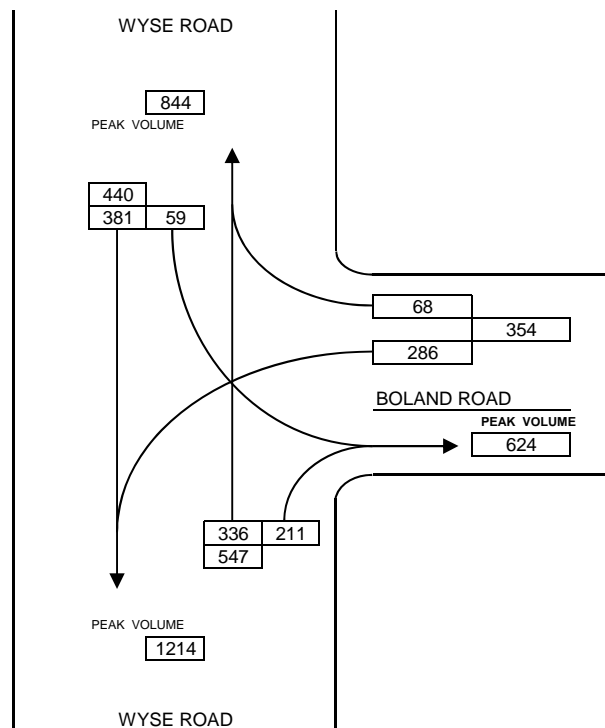
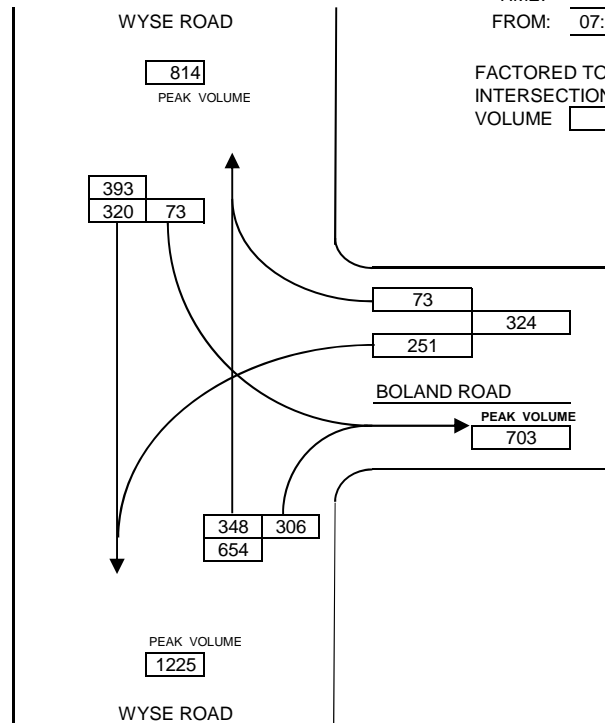
# VEHICULAR GRAPHIC SUMMARY SHEET

## BOLAND ROAD AT WYSE ROAD

INTERSECTION :

DATE: SEPT 7 2016  
 TIME: 1 HOUR  
 FROM: 07:00:00 AM TO 08:00:00 AM

FACTORED TOTAL  
 INTERSECTION APPROACH  
 VOLUME 1371



DATE: SEPT 7 2016  
 TIME: 1 HOUR  
 FROM: 08:00:00 AM TO 09:00:00 AM

FACTORED TOTAL  
 INTERSECTION APPROACH  
 VOLUME 1341





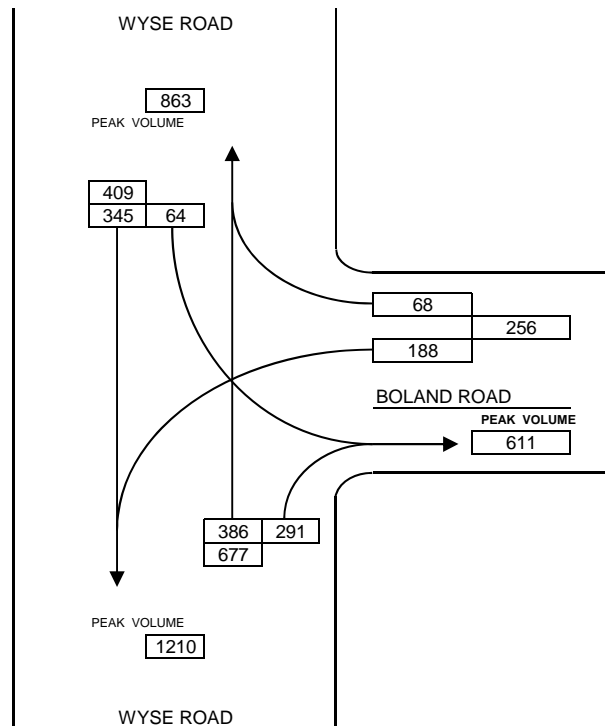
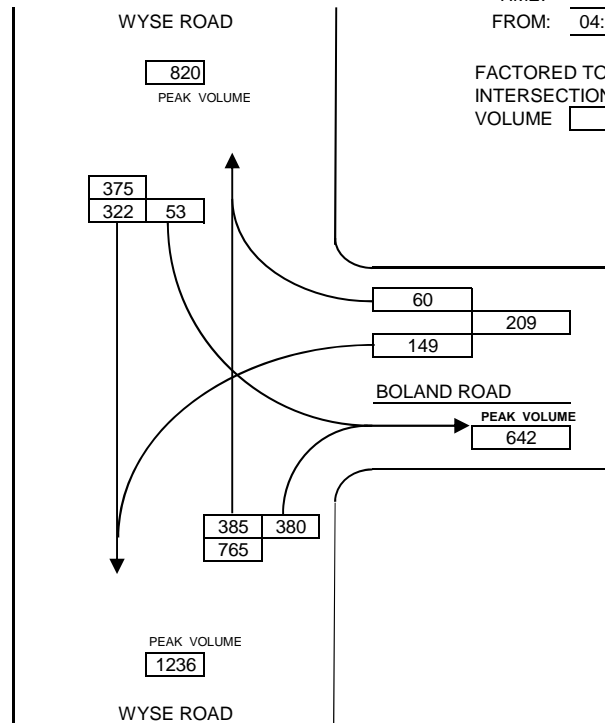
# VEHICULAR GRAPHIC SUMMARY SHEET

## BOLAND ROAD AT WYSE ROAD

INTERSECTION :

DATE: SEPT 7 2016  
 TIME: 1 HOUR  
 FROM: 04:00:00 PM TO 05:00:00 PM

FACTORED TOTAL  
 INTERSECTION APPROACH  
 VOLUME 1349



DATE: SEPT 7 2016  
 TIME: 1 HOUR  
 FROM: 05:00:00 PM TO 06:00:00 PM

FACTORED TOTAL  
 INTERSECTION APPROACH  
 VOLUME 1342

Halifax Regional Municipality (Dartmouth, NS)  
PO Box 1749

Halifax, Nova Scotia, Canada B3J 3A5  
(902) 490-4866

Count Name: NANTUCKET AVENUE AT WYSE  
ROAD  
Site Code: 17RQ330  
Start Date: 11/23/2017  
Page No: 1

## Turning Movement Data

Start Time	Wyse Road Southbound Southbound						Nantucket Ave Westbound Westbound						Wyse Road Northbound Northbound						Macdonald Bridge Eastbound Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	175	15	7	0	0	197	2	212	0	0	3	214	2	13	196	0	1	211	100	52	34	0	3	186	808
7:15 AM	201	21	18	0	2	240	3	196	0	0	2	199	6	19	197	0	5	222	120	66	45	0	7	231	892
7:30 AM	140	16	19	0	0	175	2	243	0	0	2	245	6	23	212	0	1	241	120	56	36	0	6	212	873
7:45 AM	177	28	15	0	0	220	2	225	0	0	0	227	6	16	221	0	2	243	125	53	25	0	6	203	893
Hourly Total	693	80	59	0	2	832	9	876	0	0	7	885	20	71	826	0	9	917	465	227	140	0	22	832	3466
8:00 AM	147	20	14	0	1	181	1	239	0	0	6	240	10	25	173	0	0	208	118	79	37	0	6	234	863
8:15 AM	143	34	12	0	1	189	10	194	0	0	6	204	10	27	176	0	4	213	142	61	31	0	5	234	840
8:30 AM	130	40	19	0	1	189	7	192	0	0	2	199	9	24	161	0	4	194	138	82	41	0	5	261	843
8:45 AM	127	40	21	0	2	188	5	155	1	0	2	161	10	32	124	0	1	166	131	56	43	0	2	230	745
Hourly Total	547	134	66	0	5	747	23	780	1	0	16	804	39	108	634	0	9	781	529	278	152	0	18	959	3291
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	80	40	11	0	0	131	8	74	0	0	7	82	15	21	72	0	6	108	119	93	48	0	0	260	581
11:15 AM	74	23	17	0	0	114	19	78	0	0	5	97	10	21	88	0	4	119	100	94	50	0	1	244	574
11:30 AM	76	32	13	0	0	121	10	83	0	0	5	93	15	26	118	0	3	159	128	98	61	0	1	287	660
11:45 AM	70	33	17	0	0	120	21	88	0	0	2	109	19	42	87	0	1	148	96	99	72	0	5	267	644
Hourly Total	300	128	58	0	0	486	58	323	0	0	19	381	59	110	365	0	14	534	443	384	231	0	7	1058	2459
12:00 PM	68	40	14	0	0	122	12	99	1	0	9	112	15	35	92	0	2	142	109	93	79	0	3	281	657
12:15 PM	86	30	14	0	0	130	12	72	0	0	3	84	6	50	113	0	4	169	100	114	69	0	5	283	666
12:30 PM	74	55	19	0	0	148	23	85	0	0	13	108	10	34	93	0	4	137	119	80	51	0	2	250	643
12:45 PM	79	42	17	0	0	138	15	97	0	0	2	112	13	48	93	0	5	154	147	91	66	0	7	304	708
Hourly Total	307	167	64	0	0	538	62	353	1	0	27	416	44	167	391	0	15	602	475	378	265	0	17	1118	2674
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	90	39	17	0	0	146	3	122	0	0	2	125	11	37	106	0	5	154	205	164	82	0	2	451	876
4:15 PM	71	33	10	0	1	114	8	153	0	0	3	161	6	37	128	0	4	171	233	148	63	0	12	444	890
4:30 PM	87	46	16	0	0	149	3	145	1	0	5	149	11	47	106	0	6	164	231	116	71	0	9	418	880
4:45 PM	93	38	12	0	2	143	9	145	0	0	6	154	4	41	95	0	6	140	238	181	72	0	3	491	928
Hourly Total	341	156	55	0	3	552	23	565	1	0	16	589	32	162	435	0	21	629	907	609	288	0	26	1804	3574
5:00 PM	100	31	15	0	0	146	6	128	0	0	1	134	7	50	115	0	1	172	244	147	64	0	1	455	907
5:15 PM	88	27	22	0	0	137	5	143	0	0	3	148	5	32	122	0	5	159	253	173	77	0	0	503	947
5:30 PM	94	32	7	0	0	133	2	127	0	0	1	129	10	19	115	0	0	144	276	153	70	0	0	499	905
5:45 PM	69	31	22	0	0	122	5	146	0	0	3	151	5	25	126	0	3	156	206	146	74	0	0	426	855
Hourly Total	351	121	66	0	0	538	18	544	0	0	8	562	27	126	478	0	9	631	979	619	285	0	1	1883	3614
Grand Total	2539	786	368	0	10	3693	193	3441	3	0	93	3637	221	744	3129	0	77	4094	3798	2495	1361	0	91	7654	19078
Approach %	68.8	21.3	10.0	0.0	-	-	5.3	94.6	0.1	0.0	-	-	5.4	18.2	76.4	0.0	-	-	49.6	32.6	17.8	0.0	-	-	-
Total %	13.3	4.1	1.9	0.0	-	19.4	1.0	18.0	0.0	0.0	-	19.1	1.2	3.9	16.4	0.0	-	21.5	19.9	13.1	7.1	0.0	-	40.1	-
All Vehicles (no classification)	2539	786	368	0	-	3693	193	3441	3	0	-	3637	221	744	3129	0	-	4094	3798	2495	1361	0	-	7654	19078
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	5	-	-

Halifax Regional Municipality (Dartmouth, NS)  
PO Box 1749

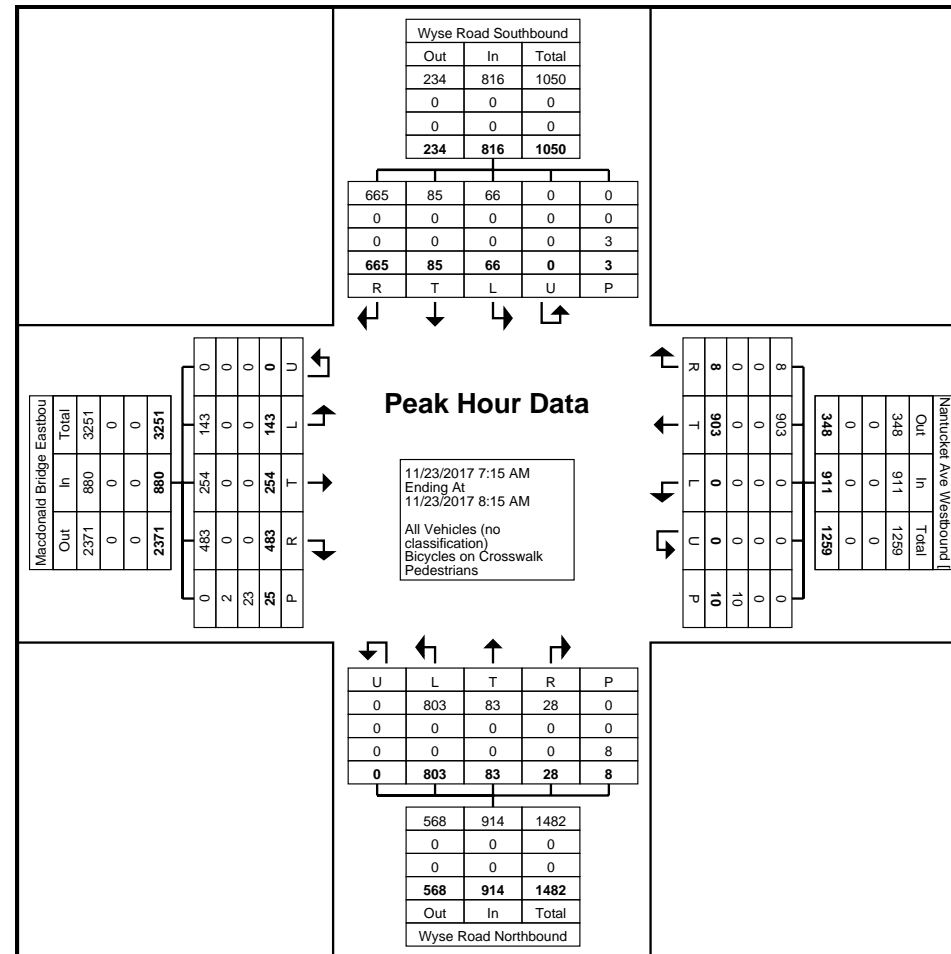
Halifax, Nova Scotia, Canada B3J 3A5  
(902) 490-4866

Count Name: NANTUCKET AVENUE AT WYSE  
ROAD  
Site Code: 17RQ330  
Start Date: 11/23/2017  
Page No: 4

### Turning Movement Peak Hour Data (7:15 AM)

Start Time	Wyse Road Southbound Southbound						Nantucket Ave Westbound Westbound						Wyse Road Northbound Northbound						Macdonald Bridge Eastbound Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:15 AM	201	21	18	0	2	240	3	196	0	0	2	199	6	19	197	0	5	222	120	66	45	0	7	231	892
7:30 AM	140	16	19	0	0	175	2	243	0	0	2	245	6	23	212	0	1	241	120	56	36	0	6	212	873
7:45 AM	177	28	15	0	0	220	2	225	0	0	0	227	6	16	221	0	2	243	125	53	25	0	6	203	893
8:00 AM	147	20	14	0	1	181	1	239	0	0	6	240	10	25	173	0	0	208	118	79	37	0	6	234	863
Total	665	85	66	0	3	816	8	903	0	0	10	911	28	83	803	0	8	914	483	254	143	0	25	880	3521
Approach %	81.5	10.4	8.1	0.0	-	-	0.9	99.1	0.0	0.0	-	-	3.1	9.1	87.9	0.0	-	-	54.9	28.9	16.3	0.0	-	-	-
Total %	18.9	2.4	1.9	0.0	-	23.2	0.2	25.6	0.0	0.0	-	25.9	0.8	2.4	22.8	0.0	-	26.0	13.7	7.2	4.1	0.0	-	25.0	-
PHF	0.827	0.759	0.868	0.000	-	0.850	0.667	0.929	0.000	0.000	-	0.930	0.700	0.830	0.908	0.000	-	0.940	0.966	0.804	0.794	0.000	-	0.940	0.986
All Vehicles (no classification)	665	85	66	0	-	816	8	903	0	0	-	911	28	83	803	0	-	914	483	254	143	0	-	880	3521
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	8.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	10	-	-	-	-	-	8	-	-	-	-	-	23	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	92.0	-	-





Turning Movement Peak Hour Data Plot (7:15 AM)

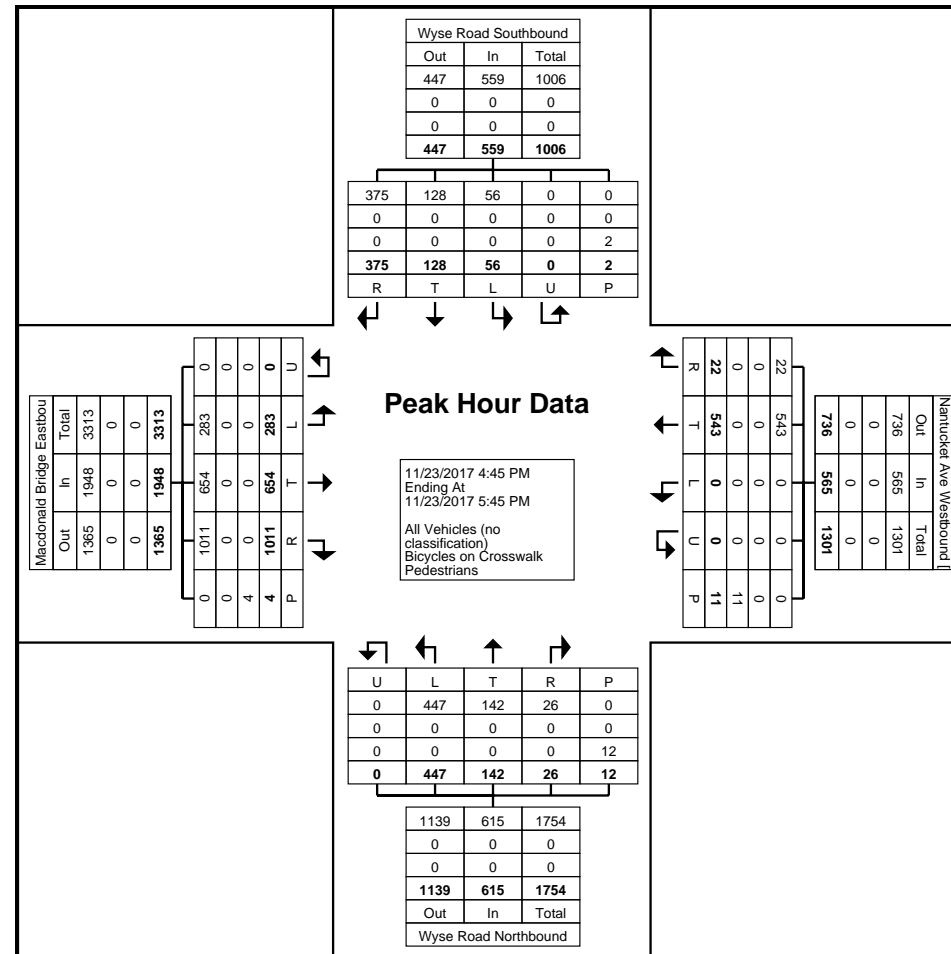
Halifax Regional Municipality (Dartmouth, NS)  
PO Box 1749

Halifax, Nova Scotia, Canada B3J 3A5  
(902) 490-4866

Count Name: NANTUCKET AVENUE AT WYSE  
ROAD  
Site Code: 17RQ330  
Start Date: 11/23/2017  
Page No: 10

### Turning Movement Peak Hour Data (4:45 PM)

Start Time	Wyse Road Southbound Southbound						Nantucket Ave Westbound Westbound						Wyse Road Northbound Northbound						Macdonald Bridge Eastbound Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:45 PM	93	38	12	0	2	143	9	145	0	0	6	154	4	41	95	0	6	140	238	181	72	0	3	491	928
5:00 PM	100	31	15	0	0	146	6	128	0	0	1	134	7	50	115	0	1	172	244	147	64	0	1	455	907
5:15 PM	88	27	22	0	0	137	5	143	0	0	3	148	5	32	122	0	5	159	253	173	77	0	0	503	947
5:30 PM	94	32	7	0	0	133	2	127	0	0	1	129	10	19	115	0	0	144	276	153	70	0	0	499	905
Total	375	128	56	0	2	559	22	543	0	0	11	565	26	142	447	0	12	615	1011	654	283	0	4	1948	3687
Approach %	67.1	22.9	10.0	0.0	-	-	3.9	96.1	0.0	0.0	-	-	4.2	23.1	72.7	0.0	-	-	51.9	33.6	14.5	0.0	-	-	-
Total %	10.2	3.5	1.5	0.0	-	15.2	0.6	14.7	0.0	0.0	-	15.3	0.7	3.9	12.1	0.0	-	16.7	27.4	17.7	7.7	0.0	-	52.8	-
PHF	0.938	0.842	0.636	0.000	-	0.957	0.611	0.936	0.000	0.000	-	0.917	0.650	0.710	0.916	0.000	-	0.894	0.916	0.903	0.919	0.000	-	0.968	0.973
All Vehicles (no classification)	375	128	56	0	-	559	22	543	0	0	-	565	26	142	447	0	-	615	1011	654	283	0	-	1948	3687
% All Vehicles (no classification)	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	11	-	-	-	-	-	12	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (4:45 PM)





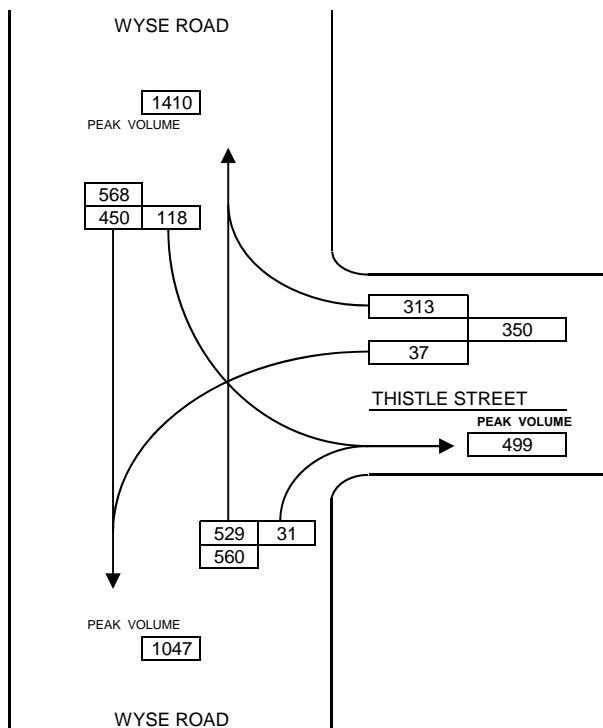
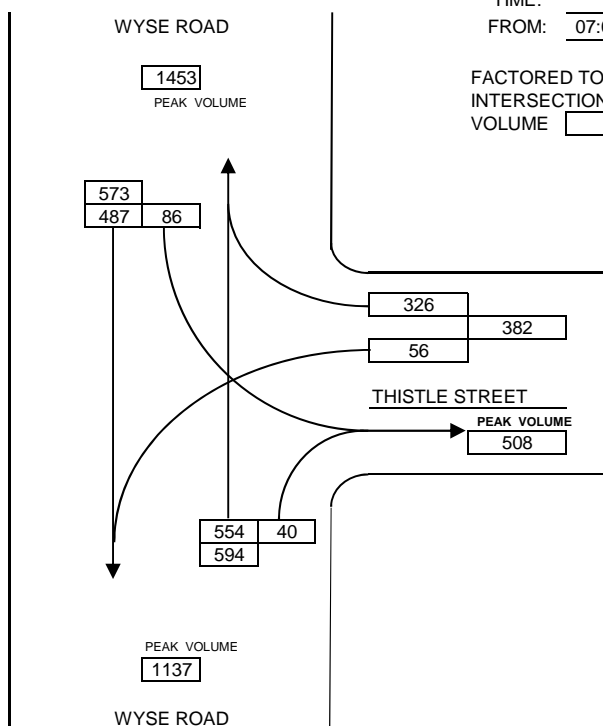
INTERSECTION :

# VEHICULAR GRAPHIC SUMMARY SHEET

## THISTLE STREET AT WYSE ROAD

DATE: AUG 24 2017  
TIME: 1 HOUR  
FROM: 07:00:00 AM TO 08:00:00 AM

FACTORED TOTAL  
INTERSECTION APPROACH  
VOLUME 1580

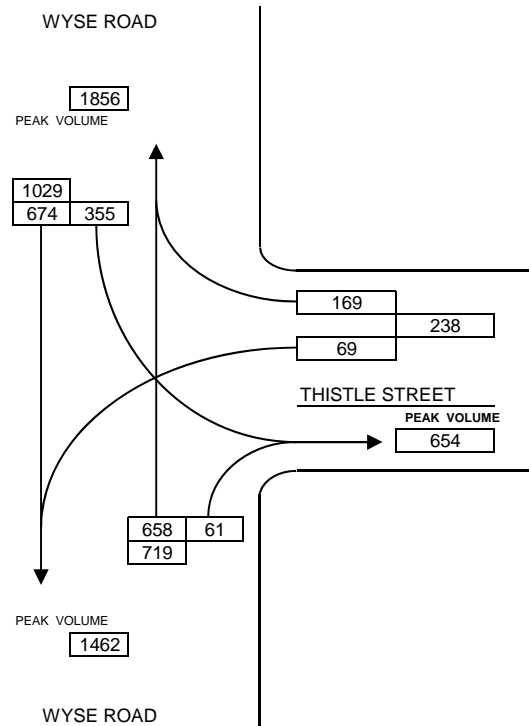


DATE: AUG 24 2017  
TIME: 1 HOUR  
FROM: 08:00:00 AM TO 09:00:00 AM

FACTORED TOTAL  
INTERSECTION APPROACH  
VOLUME 1508



**INTERSECTION :**



FACTORED TOTAL  
INTERSECTION APPROACH  
VOLUME

2026
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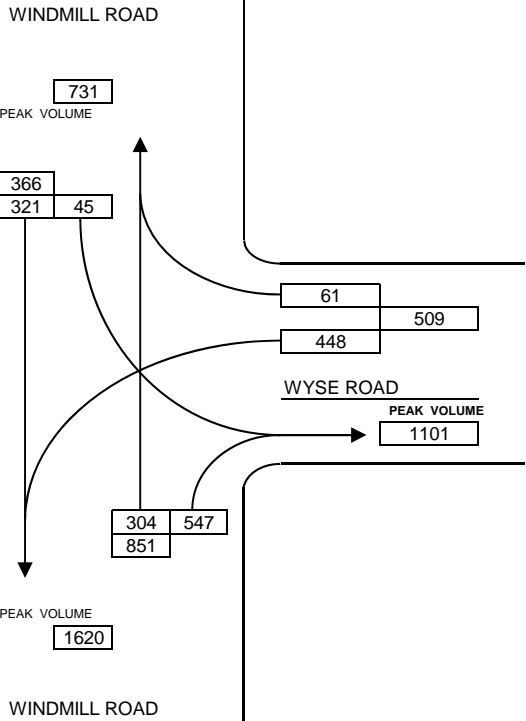
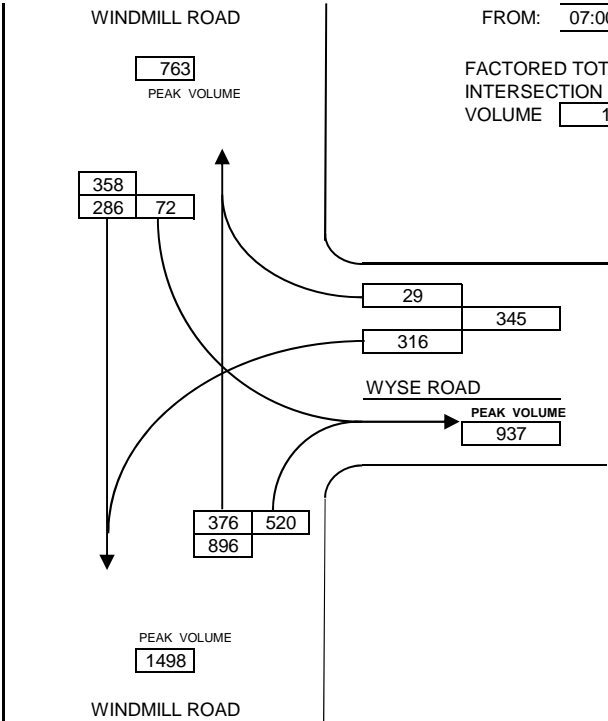


VEHICULAR GRAPHIC SUMMARY SHEET  
WINDMILL ROAD AT WYSE ROAD

INTERSECTION :

DATE: NOV 2 2017  
TIME: 1 HOUR  
FROM: 07:00:00 AM TO 08:00:00 AM

FACTORED TOTAL  
INTERSECTION APPROACH  
VOLUME 1551



DATE: NOV 2 2017  
TIME: 1 HOUR  
FROM: 08:00:00 AM TO 09:00:00 AM

FACTORED TOTAL  
INTERSECTION APPROACH  
VOLUME 1674



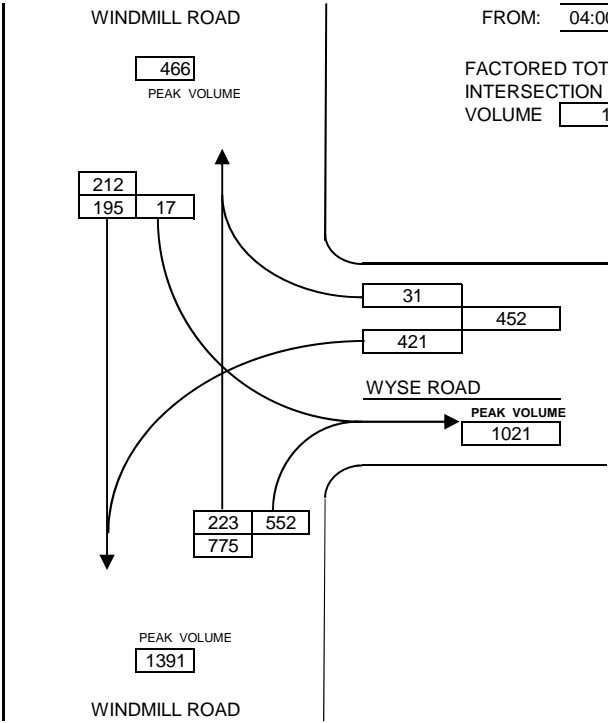


INTERSECTION :

VEHICULAR GRAPHIC SUMMARY SHEET  
WINDMILL ROAD AT WYSE ROAD

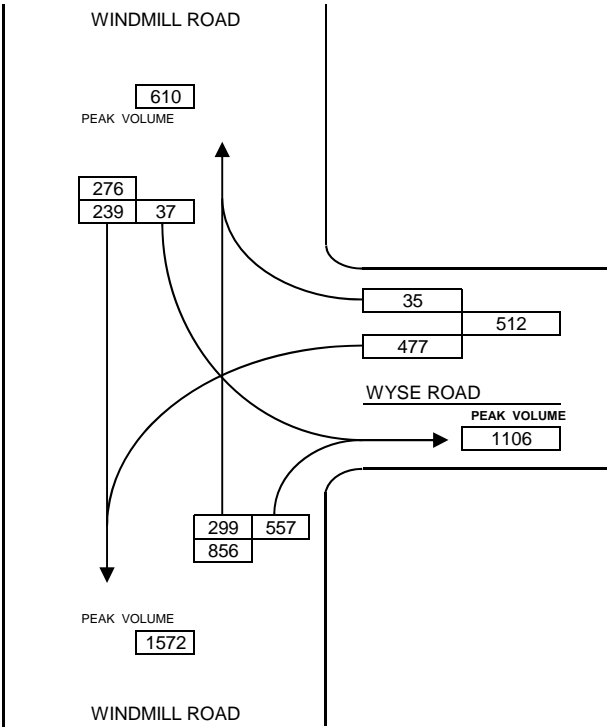
DATE: NOV 2 2017  
TIME: 1 HOUR  
FROM: 04:00:00 PM TO 05:00:00 PM

FACTORED TOTAL  
INTERSECTION APPROACH  
VOLUME 1396



DATE: NOV 2 2017  
TIME: 1 HOUR  
FROM: 05:00:00 PM TO 06:00:00 PM

FACTORED TOTAL  
INTERSECTION APPROACH  
VOLUME 1595



# APPENDIX B

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## Trip Generation

## Trip Generation Summary

Alternative: Alternative 1

Phase:

Open Date: 2019-07-24

Project: Wyse Road Development

Analysis Date: 2019-07-24

ITE	Land Use	Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic			
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
222	Apartments		335	335	670		10	28	38		32	20	52
	125 Dwelling Units												
710	Office		44	44	88		11	1	12		2	10	12
	8 Gross Floor Area 1000 SF												
826	Retail		200	199	399	✓	17	16	33		11	13	24
	9 Gross Leasable Area 1000 SF												
Unadjusted Volume			579	578	1157		38	45	83		45	43	88
Internal Capture Trips			0	0	0		0	0	0		6	6	12
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			579	578	1157		38	45	83		39	37	76

Total Weekday Average Daily Trips Internal Capture = 0 Percent

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

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 14 Percent

\* - Custom rate used for selected time period.

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

**TRIP GENERATION 2014, TRAFFICWARE, LLC**

P. 1

# APPENDIX C

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## Trip Assignment



AM - Counts

		2018				0					
						0		OUT			
						0		0%		Victoria	
						444		97%		0.99 SA	
						15		3%		IN	
TOTAL		579				135		0		TOTAL	
1474		895				593		1052			
		IN		Victoria		0%		0			
						64%		571			
						36%		324			
								Boland			
						OUT		339		IN	
								TOTAL		496	

### AM - Baseline

						0				
		2018				0	OUT			
						0	0%	Victoria	0.99 SA	
TOTAL	OUT					442	97%		IN	
						15	3%		457 TOTAL	
1467	890					134	0	22	590	1047
	IN	Victoria	0%	0		86%	0% 14%		OUT	
			64%	568	Boland					
			36%	322						
			OUT	337	156 IN					
				TOTAL	493					

[illegible]

		TOTAL	682		
	2017	IN	534	147	OUT
		<i>Thistle</i>			
				1	0%
				377	81%
				85	18%
				<i>Victoria</i>	
				1.01	SA
				IN	
				463	TOTAL
				67	529
				OUT	
				<i>Thistle</i>	
				OUT	416
				129	IN
				TOTAL	545

				TOTAL		1328			
2017		IN		1018		310		OUT	
Nantucket						39		85%	
						4		9%	
TOTAL						63		59	
65						2		IN	
OUT						6%		92%	
2%						20		3	
7%						32		53	
0%						0		89%	
0%						0		11%	
100%						2		OUT	
Nantucket						303		IN	
OUT						944		1247	
TOTAL						1247			

		TOTAL		703				
2016	IN	324	379	OUT				
Boland				306	47%	Wyse		
	OUT	23%	0%	77%	348		53%	
TOTAL	421	73	0	251	0		0%	
814	393	Wyse	19%	73			1.00	SA
	IN		81%	320			IN	
			0%	0			654	TOTAL
		OUT	0			571	1225	
			TOTAL			OUT		

				TOTAL		1259			
2017		IN		911		348		OUT	
		Nantucket				28		3%	
						83		9%	
TOTAL		OUT		234		803		88%	
1050		816				143		254 483	
IN		Wyse		8%		66		16% 29% 55%	
				10%		85		OUT	
				81%		665		Macdonald Bridge	
		OUT		2371		880		IN	
				TOTAL		3251			

[illegible][illegible]

		2018				0					
						0		OUT			
						0		0%		0.99 SA	
						453		97%		Victoria	
						15		3%		IN	
TOTAL		591								TOTAL	
1504		913				138		0		22	
		IN				605		1073			
				Victoria		0%		0			
						64%		582			
						36%		331		Boland	
						OUT		346		160	
								TOTAL		506	
										IN	

## AM - Development

[illegible]

		TOTAL		2					
		IN 1		1		OUT			
Nantucket									
		0		0%		Victoria			
		0		0%					
		2		100%					
TOTAL		5		0		1		0	
				0%		0		0	
9		4		0%		0		0	
		IN		100%		4			
				OUT		7		8	
				TOTAL		15		IN	
Nantucket									
		2		TOTAL		2		4	
		IN				OUT			

				TOTAL		4			
		IN		2		2		OUT	
		Thistle				0		0%	
						1		50%	
						1		50%	
								Victoria	
								IN	
						2		TOTAL	
TOTAL		2		50%		50%		0%	
4		2		1		1		0	
		IN		50%		1		0%	
				50%		1		50%	
				0%		0		Thistle	
		OUT		2		2		IN	
				TOTAL		4			

			To/From Thistle North	
	In	Out	In	Out
	31	36	67	2
TEST	31	36		2

To/From Thistle South	
In	Out
2	2

To/From Wyse West		To/From Wyse East	
In	Out	In	Out
3	5	4	5

		TOTAL		3		
		IN	1	2	OUT	
Boland				2		
				1		
				0		
		Wyse				
TOTAL		1	0	0	1	
1	0			0		
		IN		0		
		Wyse		0		
				0		
				0		
		OUT		0		
				TOTAL		
				1	4	
				OUT		
				TOTAL		

		TOTAL		27			
		IN 14		13		OUT	
Nantucket							
				1			
				1			
TOTAL 3		2 12 0		4		Wyse	
4 1				0 11 1		IN 6 TOTAL	
IN		Wyse		0 0 0		1 OUT 7	
				Macdonald Bridge			
		OUT 16		12		IN	
		TOTAL		28			

[illegible]

		TOTAL		14			
		IN 7		7 OUT			
Wyse				5			
				0			
				0			
						Alderney	
TOTAL		OUT 1		1 0 6		IN 5 TOTAL	
3		2		2		6	
		IN		0		OUT 11	
				0			
		OUT 0					
		TOTAL					

[illegible]

				TOTAL		277			
		IN		205		72		OUT	
Nantucket						20		3%	
						306		46%	
TOTAL						484		10	
5%						85%		10%	
1095						611		2%	
10%						174		20	
IN						13%		82	
OUT						85%		519	
						168		42	
						109		211	
						53%		13%	
						34%		OUT	
						Nantucket			
						OUT		1032	
						319		IN	
						TOTAL		1351	

				TOTAL		703			
2017		IN		550		153		OUT	
		Thistle				1		0%	
						387		81%	
TOTAL		677		259		288		3	
846		169		33%		55		31	
		IN		36%		61		23%	
				31%		53		97	
								6	
								70	
								547	
								OUT	
								Thistle	
								OUT	
								429	
								135	
								IN	
								TOTAL	
								563	

		TOTAL		1377			
2017		IN	1051	326	OUT		
Nantucket				48	69%		Sportplex
				4	6%		
				17	25%		
		6%	92%	3%			1.01 SA
TOTAL		64	60	963	28	IN	
		66	2			70	TOTAL
		Mall	0%	0	0	278	46
			0%	0	0%	86%	14%
			100%	2	Nantucket		74
		OUT		982	324	IN	
				TOTAL	1306		

		TOTAL		724				
2016		IN	333	391	OUT			
Boland				316	47%	Wyse		
	OUT	22%	0%	78%	358		53%	
TOTAL	433	75	0	258	0		0%	
836	403	Wyse	19%	75			1.00	SA
	IN		81%	328			IN	
			0%	0			674	TOTAL
		OUT		0			586	1260
		TOTAL						

				TOTAL		1318			
2017		IN		948		370		OUT	
		Nantucket				30		3%	
						86		9%	
TOTAL		OUT		243		827		88%	
1081		838				147		271 496	
		IN				16%		30% 54%	
		81%		682		Macdonald Bridge			
		OUT		2447		914		IN	
				TOTAL		3361			

		TOTAL		540				
2017		IN	406	134	OUT			
Thistle				44	7%	1.02 SA		
	OUT	85%	0%	15%	Wyse			
TOTAL	930	346	0	61		IN		
1535	604					628	TOTAL	
	IN	Wyse	15%	90				
			85%	514			575	1203
			0%	0			OUT	
			OUT	0				
			TOTAL					

	TOTAL	946			
2017	IN	350	596	OUT	
Wyse			522	58%	0.97 SA
	OUT	9% 0% 91%	374	42%	IN
TOTAL	404	30 0 320	0	0%	896 TOTAL
762	358				605 1501
	IN				OUT
	Windmill	21% 74 79% 284 0% 0			
		OUT 0			
		TOTAL			

PM - Counts

		2018				0					
						0		OUT			
								0%			
						752		96%			
						33		4%			
								Victoria		0.99 SA	
										IN	
TOTAL		1124								TOTAL	
1891		767				372		42		597	
		IN		Victoria		0%		555		1382	
						72%				OUT	
						28%		212			
								Boland			
						OUT		245		414	
								TOTAL		659	
										IN	



		2018				0					
						0		OUT			
						0		0%		Victoria	
						748		96%			
						33		4%			
										0.99 SA	
										IN	
TOTAL		1118								TOTAL	
1881		763				370		0		42	
		IN		Victoria		0%		0		594	
						72%		552		1375	
						28%		211		OUT	
								Boland			
						OUT		244		412	
								TOTAL		656	
										IN	

		2018									
						0					
						0		OUT			
						0		0%		0.99 SA	
						767		96%		Victoria	
						34		4%		IN	
						801		TOTAL			
						1929		782		1410	
								IN			
						Victoria		0%			
						0					
						379		0		43	
						609				OUT	
						72%		566		10%	
						28%		216		Boland	
						OUT		250		422	
								TOTAL		672	

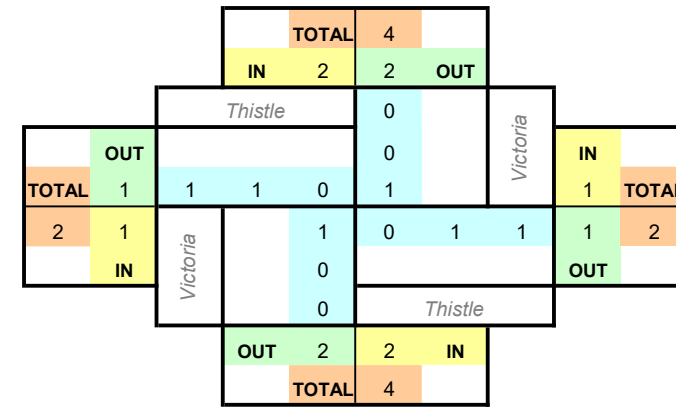
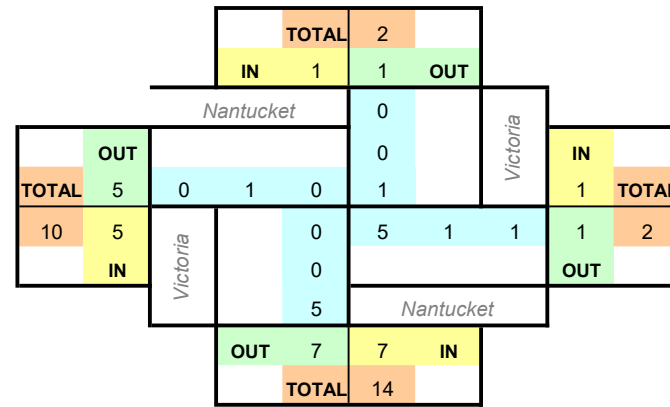
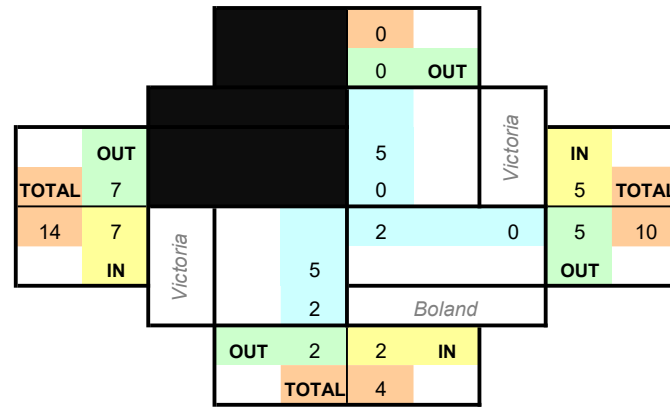
				TOTAL		189					
				IN		51		138		OUT	
						Nantucket		51		13%	
						20%		40%		40%	
						204		52%		Victoria	
						138		35%		IN	
						393		TOTAL		SA	
						1418		612		801	
								IN			
						Victoria		3%		20	
						35%		214		71%	
						62%		377		8%	
						OUT		536		831	
								TOTAL		1367	
										IN	
										Nantucket	

				TOTAL		1023					
				IN		250		774		OUT	
						Thistle		8		3%	
						50%		48%		2%	
						235		83%		Victoria	
						38		14%		IN	
						282		TOTAL		1.01 SA	
						812		413		413	
								IN			
						Victoria		61%		253	
						27%		111		7%	
						12%		50		90%	
						OUT		207		566	
								TOTAL		774	
										IN	
										Thistle	

				TOTAL		1389					
				IN		545		844		OUT	
						2017					
						Nantucket		25		83%	
						14%		86%		0%	
						0		0%		Sportaplex	
						5		17%		IN	
						30		TOTAL		1.01 SA	
						85		7		42	
								IN			
						Mall		0%		0	
						0%		0		1	
						0%		99%		1%	
						100%		7		Nantucket	
						OUT		479		832	
								TOTAL		1311	
										IN	

				TOTAL		658					
				IN		214		444		OUT	
						2016					
						Boland		390		50%	
						29%		0%		71%	
						395		50%		Wyse	
						0		0%		IN	
						784		TOTAL		1.00 SA	
						841		384		1267	
								IN			
						Wyse		14%		54	
						86%		330			
						0%		0			
						OUT		0			
								TOTAL			

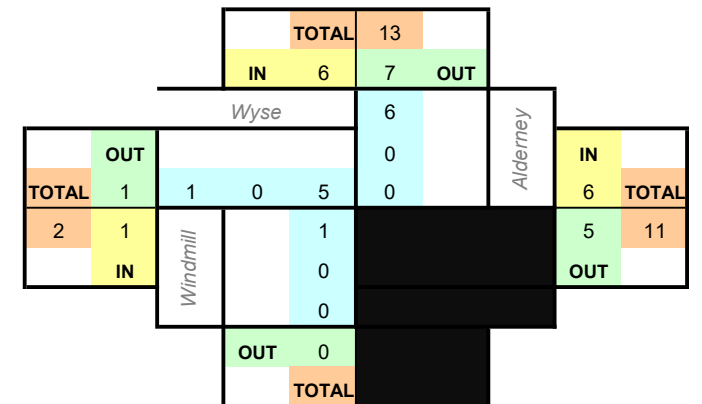
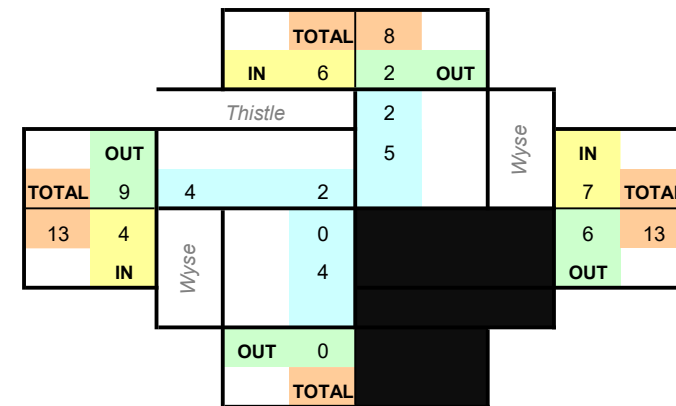
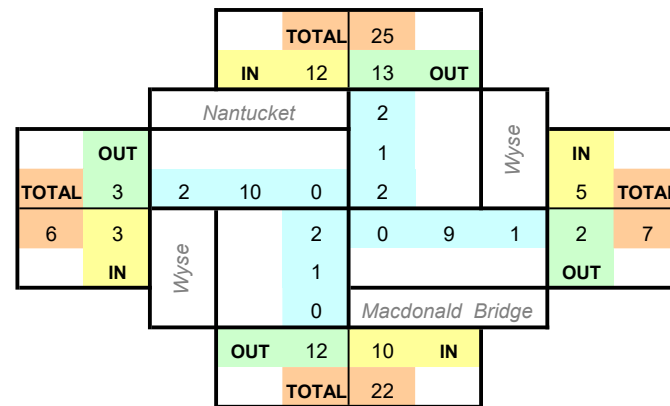
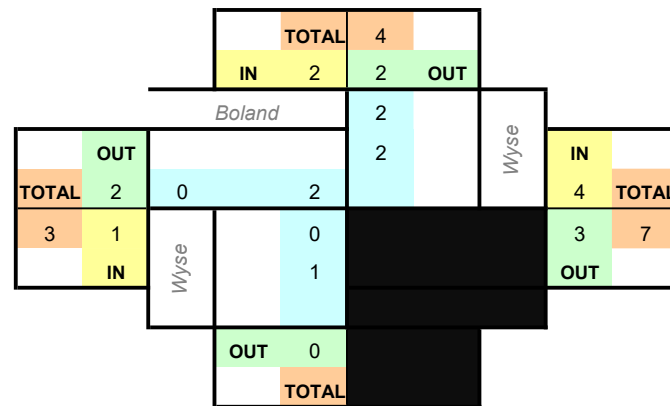
				TOTAL		1334											
				IN		579		755		OUT							
						2017											
						Nantucket											
								27		4%							
				4%		96%		0%		146		23%					
				23		557		0		458		73%					
										Wyse		1		SA			
												IN					
TOTAL		458										631		TOTAL			
1031		573															
		IN										OUT		1168		1798	
				Wyse													
						10%		57		290		671		1037			
						23%		131		15%		34%		52%			
						67%		384		Macdonald Bridge							
						OUT		1400		1997		IN					
								TOTAL		3397							



			To/From Thistle North	
	In	Out	In	Out
	31	30	61	2
TEST	31	30		2

To/From Thistle South	
In	Out
2	2

To/From Wyse West		To/From Wyse East	
In	Out	In	Out
4	4	3	3



		2018				0			
				0		OUT			
				0		0%		0.99 SA	
				772		96%		Victoria	
TOTAL		1154		34		4%		IN	
1943		789		381		0		614	
		IN		0%		0		1420	
		Victoria		72%		571		OUT	
				28%		218		Boland	
				OUT		252		424	
				TOTAL		676		IN	

				TOTAL		191				
				IN		52		OUT		
				Nantucket		51		13%		
				20%		41%		39%		
TOTAL		811		10		21		20		
1428		617		3%		20		597		
		IN	Victoria	35%	214	71%	8%	21%	174	
				62%	382	Nantucket		409		
				OUT	543	838	IN	OUT		
				TOTAL	1381					

				TOTAL		1027			
		2017		IN		252		OUT	
				Thistle		8		3%	
		OUT		50%		48%		2%	
TOTAL		400		126		120		5	
814		414		61%		254		38	
		IN		27%		111		7%	
				12%		50		514	
						Thistle		17	
				OUT		209		568	
						TOTAL		778	
								IN	

				TOTAL		1403			
				IN		552		OUT	
				2017					
				Nantucket		32		65%	
				14%		85%		1%	
TOTAL		78		77		467		8	
85		7		0%		0		1	
		IN		0%		0		0%	
				100%		7		1	
						Nantucket		819	
				OUT		491		845	
						TOTAL		1336	
								IN	
								OUT	
								1.01 SA	
								IN	
								TOTAL	
								49	
								32	
								81	
								OUT	
								</	

				TOTAL		662			
				IN		216		OUT	
				2016					
				Boland		392		50%	
				28%		0%		72%	
				62		0		155	
TOTAL		458		62		0		155	
844		385		14%		54			
		IN		86%		331			
				0%		0			
				OUT		0			
				TOTAL					

				TOTAL		1359			
				IN		591		OUT	
				2017					
				Nantucket		29		5%	
				4%		96%		0%	
				147		23%		1 SA	
TOTAL		461		25		567		0	
1037		576		10%		59		290 680 1038	
		IN		23%		132		1170 1805	
				67%		384		OUT	
				Macdonald Bridge					
				OUT		1412		2007 IN	
				TOTAL		3419			

				TOTAL		692			
				IN		255		OUT	
				2017					
				Thistle		66		9%	
				71%		0%		29%	
				693		91%		1.02 SA	
TOTAL		874		181		0		74	
1954		1080		0		0		0%	
		IN		0		0%		IN	
				34%		371		783	
				66%		709		1542	
				0%		0		OUT	
				OUT		0			
				TOTAL					

				TOTAL		1113			
				IN		515		OUT	
				2017					
				Wyse		560		65%	
				7%		0%		93%	
TOTAL		333		36		0		479	
609		275		14%		38			
		IN		86%		238			
				0%		0			
				OUT		0			
				TOTAL					

















# APPENDIX D

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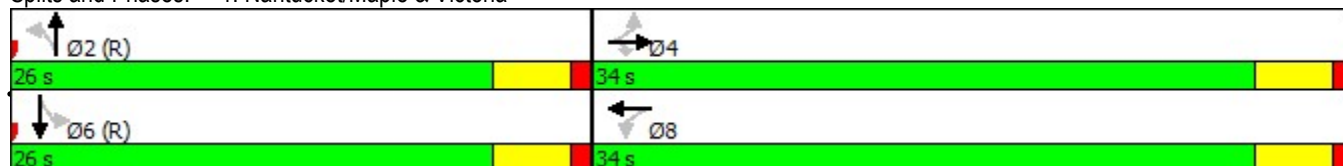
## Synchro Output

1: Nantucket/Maple & Victoria  
2019 Existing Conditions

AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	80	502	328	298	159	40	20	169
Future Volume (vph)	10	80	502	328	298	159	40	20	169
Lane Group Flow (vph)	0	98	546	357	346	173	156	0	217
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	34.0	34.0	34.0	34.0	34.0	26.0	26.0	26.0	26.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5		4.5
Lead/Lag									
Lead-Lag Optimize?									
Act Effct Green (s)		29.5	29.5	29.5	29.5	21.5	21.5		21.5
Actuated g/C Ratio		0.49	0.49	0.49	0.49	0.36	0.36		0.36
v/c Ratio		0.11	0.52	0.56	0.38	0.42	0.23		0.34
Control Delay		8.7	3.0	15.0	10.8	18.6	6.1		15.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		8.7	3.0	15.0	10.8	18.6	6.1		15.6
LOS		A	A	B	B	B	A		B
Approach Delay		3.8			13.0		12.7		15.6
Approach LOS		A			B		B		B
Queue Length 50th (m)		5.7	0.0	27.0	22.6	14.7	3.2		17.4
Queue Length 95th (m)		12.4	13.5	50.3	39.2	30.3	13.8		32.6
Internal Link Dist (m)		111.2			124.5		270.1		84.9
Turn Bay Length (m)			10.0	30.0					
Base Capacity (vph)		879	1055	635	910	408	667		643
Starvation Cap Reductn		0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0		0
Reduced v/c Ratio		0.11	0.52	0.56	0.38	0.42	0.23		0.34
Intersection Summary									
Cycle Length: 60									
Actuated Cycle Length: 60									
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.56									
Intersection Signal Delay: 10.1					Intersection LOS: B				
Intersection Capacity Utilization 71.1%					ICU Level of Service C				
Analysis Period (min) 15									












Splits and Phases: 1: Nantucket/Maple & Victoria





### 3: Nantucket & Mall/Sportsplex 2019 Existing Conditions

AM Peak

						
Lane Group	EBR	WBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	4	271	32	20	939
Future Volume (vph)	5	4	271	32	20	939
Lane Group Flow (vph)	5	49	295	35	0	1107
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		8	2			6
Permitted Phases	4			2	6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	25.0	25.0	65.0	65.0	65.0	65.0
Total Split (%)	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5
Lead/Lag						
Lead-Lag Optimize?						
Act Effect Green (s)	20.5	20.5	60.5	60.5		60.5
Actuated g/C Ratio	0.23	0.23	0.67	0.67		0.67
v/c Ratio	0.01	0.12	0.12	0.03		0.50
Control Delay	0.0	11.7	5.4	1.8		8.1
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	0.0	11.7	5.4	1.8		8.1
LOS	A	B	A	A		A
Approach Delay		11.7	5.0			8.1
Approach LOS		B	A			A
Queue Length 50th (m)	0.0	1.0	8.8	0.0		45.0
Queue Length 95th (m)	0.0	10.0	13.3	2.8		58.6
Internal Link Dist (m)		68.8	76.6			62.0
Turn Bay Length (m)						
Base Capacity (vph)	481	406	2378	1075		2232
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	0.01	0.12	0.12	0.03		0.50

#### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

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

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 7.5

Intersection LOS: A

Intersection Capacity Utilization 51.3%

ICU Level of Service A



















Analysis Period (min) 15

Splits and Phases: 3: Nantucket & Mall/Sportsplex



4: Macdonald Bridge/Nantucket & Wyse  
2019 Existing Conditions

AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	66	85	665	803	83	143	254	483	903
Future Volume (vph)	66	85	665	803	83	143	254	483	903
Lane Group Flow (vph)	72	454	361	873	120	155	276	525	991
Turn Type	Perm	NA	Prot	Prot	NA	Prot	NA	Perm	NA
Protected Phases		4	4	3	8	5	2		6
Permitted Phases	4							2	
Detector Phase	4	4	4	3	8	5	2	2	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	22.6	22.6	22.6	19.8	42.4	13.6	47.6	47.6	34.0
Total Split (%)	25.1%	25.1%	25.1%	22.0%	47.1%	15.1%	52.9%	52.9%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	None	None	None	None	None	Max	Max	Max
Act Effct Green (s)	15.2	15.2	15.2	15.3	35.0	9.1	43.2	43.2	29.6
Actuated g/C Ratio	0.17	0.17	0.17	0.18	0.40	0.10	0.50	0.50	0.34
v/c Ratio	0.33	0.86dr	0.88	1.00	0.16	0.84	0.11	0.50	0.83
Control Delay	35.4	23.9	39.5	67.3	13.7	76.4	12.5	3.1	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.8
Total Delay	35.4	23.9	39.5	67.3	13.7	76.4	12.5	3.1	83.1
LOS	D	C	D	E	B	E	B	A	F
Approach Delay		31.2			60.9		17.7		83.1
Approach LOS		C			E		B		F
Queue Length 50th (m)	11.2	22.9	32.0	~60.8	10.5	28.3	9.7	0.0	87.7
Queue Length 95th (m)	23.8	40.1	#84.3	#86.5	21.5	#64.1	14.6	16.4	#122.2
Internal Link Dist (m)		98.2			42.0		84.7		76.6
Turn Bay Length (m)									
Base Capacity (vph)	263	773	453	877	793	184	2517	1048	1198
Starvation Cap Reductn	0	0	0	0	0	0	0	0	306
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	0.27	0.59	0.80	1.00	0.15	0.84	0.11	0.50	1.11

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 87.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 49.0

Intersection LOS: D

Intersection Capacity Utilization 79.2%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

#### 4: Macdonald Bridge/Nantucket & Wyse 2019 Existing Conditions

AM Peak

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

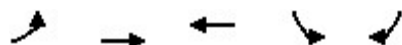
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 4: Macdonald Bridge/Nantucket & Wyse



10: Wyse & Thistle  
2019 Existing Conditions

AM Peak



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	88	497	565	57	333
Future Volume (vph)	88	497	565	57	333
Lane Group Flow (vph)	96	540	659	62	362
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	2!	6!	
Permitted Phases	4				6
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	29.0	29.0	31.0	31.0	31.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Act Effect Green (s)	24.5	24.5	26.5	26.5	26.5
Actuated g/C Ratio	0.41	0.41	0.44	0.44	0.44
v/c Ratio	0.31	0.37	0.42	0.08	0.40
Control Delay	15.7	13.3	12.0	10.1	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	13.3	12.0	10.1	2.9
LOS	B	B	B	B	A
Approach Delay		13.7	12.0	4.0	
Approach LOS		B	B	A	
Queue Length 50th (m)	7.2	21.9	22.5	3.9	0.0
Queue Length 95th (m)	17.8	32.9	40.2	9.8	12.6
Internal Link Dist (m)		184.1	98.1	65.2	
Turn Bay Length (m)					30.0
Base Capacity (vph)	305	1445	1556	781	901
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	0.31	0.37	0.42	0.08	0.40

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

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

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 10.6

Intersection LOS: B

Intersection Capacity Utilization 45.0%

ICU Level of Service A

Analysis Period (min) 15


















! Phase conflict between lane groups.

Splits and Phases: 10: Wyse & Thistle



1: Nantucket/Maple & Victoria  
2024 With Development

AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	82	519	339	306	168	42	20	174
Future Volume (vph)	10	82	519	339	306	168	42	20	174
Lane Group Flow (vph)	0	100	564	368	355	183	164	0	222
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	34.0	34.0	34.0	34.0	34.0	26.0	26.0	26.0	26.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5		4.5
Lead/Lag									
Lead-Lag Optimize?									
Act Effect Green (s)		29.5	29.5	29.5	29.5	21.5	21.5		21.5
Actuated g/C Ratio		0.49	0.49	0.49	0.49	0.36	0.36		0.36
v/c Ratio		0.11	0.53	0.58	0.39	0.45	0.24		0.35
Control Delay		8.7	3.2	15.5	10.9	19.2	6.1		15.7
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		8.7	3.2	15.5	10.9	19.2	6.1		15.7
LOS		A	A	B	B	B	A		B
Approach Delay		4.0			13.3		13.0		15.7
Approach LOS		A			B		B		B
Queue Length 50th (m)		5.8	0.5	28.0	23.3	15.8	3.4		17.9
Queue Length 95th (m)		12.5	14.4	52.4	40.4	32.3	14.2		33.3
Internal Link Dist (m)		111.2			124.5		270.1		84.9
Turn Bay Length (m)			10.0	30.0					
Base Capacity (vph)		879	1059	633	911	404	671		643
Starvation Cap Reductn		0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0		0
Reduced v/c Ratio		0.11	0.53	0.58	0.39	0.45	0.24		0.35

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

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

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 10.3

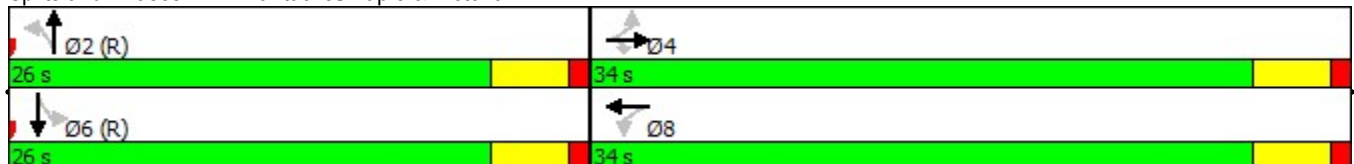
Intersection LOS: B

Intersection Capacity Utilization 73.0%

ICU Level of Service D












Analysis Period (min) 15

Splits and Phases: 1: Nantucket/Maple & Victoria



### 3: Nantucket & Mall/Sportsplex 2024 With Development

AM Peak



















						
Lane Group	EBR	WBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	4	278	46	28	963
Future Volume (vph)	5	4	278	46	28	963
Lane Group Flow (vph)	5	74	302	50	0	1142
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		8	2			6
Permitted Phases	4			2	6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	25.0	25.0	65.0	65.0	65.0	65.0
Total Split (%)	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5
Lead/Lag						
Lead-Lag Optimize?						
Act Effct Green (s)	20.5	20.5	60.5	60.5		60.5
Actuated g/C Ratio	0.23	0.23	0.67	0.67		0.67
v/c Ratio	0.01	0.18	0.13	0.05		0.51
Control Delay	0.0	13.4	5.4	1.6		8.3
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	0.0	13.4	5.4	1.6		8.3
LOS	A	B	A	A		A
Approach Delay		13.4	4.9			8.3
Approach LOS		B	A			A
Queue Length 50th (m)	0.0	3.2	9.1	0.0		47.2
Queue Length 95th (m)	0.0	14.2	13.6	3.4		61.5
Internal Link Dist (m)		68.8	76.6			62.0
Turn Bay Length (m)						
Base Capacity (vph)	475	419	2378	1080		2221
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	0.01	0.18	0.13	0.05		0.51
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.51						
Intersection Signal Delay: 7.7				Intersection LOS: A		
Intersection Capacity Utilization 52.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 3: Nantucket & Mall/Sportsplex



4: Macdonald Bridge/Nantucket & Wyse  
2024 With Development

AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	69	87	682	827	86	147	271	496	938
Future Volume (vph)	69	87	682	827	86	147	271	496	938
Lane Group Flow (vph)	75	466	370	899	126	160	295	539	1031
Turn Type	Perm	NA	Prot	Prot	NA	Prot	NA	Perm	NA
Protected Phases		4	4	3	8	5	2		6
Permitted Phases	4							2	
Detector Phase	4	4	4	3	8	5	2	2	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	22.6	22.6	22.6	22.0	44.6	13.8	45.4	45.4	31.6
Total Split (%)	25.1%	25.1%	25.1%	24.4%	49.6%	15.3%	50.4%	50.4%	35.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	None	None	None	None	None	Max	Max	Max
Act Effct Green (s)	15.5	15.5	15.5	17.4	37.4	9.3	41.0	41.0	27.2
Actuated g/C Ratio	0.18	0.18	0.18	0.20	0.43	0.11	0.47	0.47	0.31
v/c Ratio	0.34	0.87dr	0.89	0.91	0.16	0.85	0.12	0.52	0.94
Control Delay	35.5	24.4	41.5	49.0	12.4	77.4	13.8	3.5	47.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.9
Total Delay	35.5	24.4	41.5	49.0	12.4	77.4	13.8	3.5	91.9
LOS	D	C	D	D	B	E	B	A	F
Approach Delay		32.2			44.5		18.5		91.9
Approach LOS		C			D		B		F
Queue Length 50th (m)	11.7	24.2	34.3	57.4	10.3	29.2	10.9	0.0	96.9
Queue Length 95th (m)	24.8	41.7	#88.7	#82.0	21.1	#65.6	16.3	17.6	#140.9
Internal Link Dist (m)		98.2			42.0		84.7		76.6
Turn Bay Length (m)									
Base Capacity (vph)	261	773	452	1001	836	188	2384	1028	1098
Starvation Cap Reductn	0	0	0	0	0	0	0	0	236
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	0.29	0.60	0.82	0.90	0.15	0.85	0.12	0.52	1.20
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 87.4									
Natural Cycle: 90									
Control Type: Actuated-Uncoordinated									
Maximum v/c Ratio: 0.94									
Intersection Signal Delay: 47.5					Intersection LOS: D				
Intersection Capacity Utilization 81.4%					ICU Level of Service D				
Analysis Period (min) 15									
# 95th percentile volume exceeds capacity, queue may be longer.									

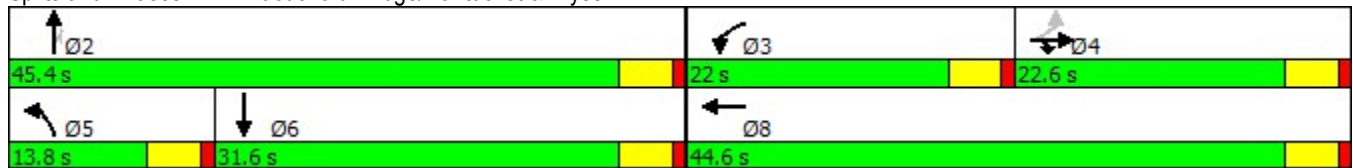
# 4: Macdonald Bridge/Nantucket & Wyse 2024 With Development

AM Peak

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

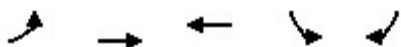
Splits and Phases: 4: Macdonald Bridge/Nantucket & Wyse





10: Wyse & Thistle  
2024 With Development

AM Peak



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	90	514	584	61	346
Future Volume (vph)	90	514	584	61	346
Lane Group Flow (vph)	98	559	683	66	376
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	2!	6!	
Permitted Phases	4				6
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	29.0	29.0	31.0	31.0	31.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Act Effect Green (s)	24.5	24.5	26.5	26.5	26.5
Actuated g/C Ratio	0.41	0.41	0.44	0.44	0.44
v/c Ratio	0.33	0.39	0.44	0.08	0.41
Control Delay	16.1	13.5	12.1	10.1	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	13.5	12.1	10.1	3.0
LOS	B	B	B	B	A
Approach Delay		13.9	12.1	4.0	
Approach LOS		B	B	A	
Queue Length 50th (m)	7.4	22.8	23.5	4.2	0.0
Queue Length 95th (m)	18.3	34.2	41.7	10.2	12.8
Internal Link Dist (m)		184.1	98.1	65.2	
Turn Bay Length (m)					30.0
Base Capacity (vph)	298	1445	1555	781	909
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	0.33	0.39	0.44	0.08	0.41

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

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

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 10.7

Intersection LOS: B

Intersection Capacity Utilization 46.5%

ICU Level of Service A

Analysis Period (min) 15

















! Phase conflict between lane groups.

Splits and Phases: 10: Wyse & Thistle



1: Nantucket/Maple & Victoria  
2019 Existing Conditions

PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	20	209	368	134	199	577	65	20	20
Future Volume (vph)	20	209	368	134	199	577	65	20	20
Lane Group Flow (vph)	0	249	400	146	270	627	255	0	55
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.6	22.6	22.6	22.6	22.6	37.4	37.4	37.4	37.4
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	62.3%	62.3%	62.3%	62.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5		4.5
Lead/Lag									
Lead-Lag Optimize?									
Act Effct Green (s)		18.1	18.1	18.1	18.1	32.9	32.9		32.9
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.55	0.55		0.55
v/c Ratio		0.46	0.58	0.49	0.48	0.85	0.26		0.06
Control Delay		20.4	8.4	24.0	19.2	25.9	3.0		5.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		20.4	8.4	24.0	19.2	25.9	3.0		5.6
LOS		C	A	C	B	C	A		A
Approach Delay		13.0			20.9		19.3		5.6
Approach LOS		B			C		B		A
Queue Length 50th (m)		23.1	7.5	13.7	23.0	55.2	3.5		2.1
Queue Length 95th (m)		41.8	28.9	29.7	42.6	#120.3	12.4		6.3
Internal Link Dist (m)		111.2			124.5		270.1		84.9
Turn Bay Length (m)			10.0	30.0					
Base Capacity (vph)		538	694	297	559	736	994		877
Starvation Cap Reductn		0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0		0
Reduced v/c Ratio		0.46	0.58	0.49	0.48	0.85	0.26		0.06
Intersection Summary									
Cycle Length: 60									
Actuated Cycle Length: 60									
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green									
Natural Cycle: 60									
Control Type: Pretimed									
Maximum v/c Ratio: 0.85									
Intersection Signal Delay: 17.2					Intersection LOS: B				
Intersection Capacity Utilization 75.5%					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.									

1: Nantucket/Maple & Victoria  
2019 Existing Conditions

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










PM Peak

Splits and Phases: 1: Nantucket/Maple & Victoria



### 3: Nantucket & Mall/Sportsplex 2019 Existing Conditions

PM Peak

							
Lane Group	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	7	0	1	799	11	330	456
Future Volume (vph)	7	0	1	799	11	330	456
Lane Group Flow (vph)	8	31	0	869	12	0	937
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		8		2			6
Permitted Phases	4		2		2	6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	25.0	25.0	65.0	65.0	65.0	65.0	65.0
Total Split (%)	27.8%	27.8%	72.2%	72.2%	72.2%	72.2%	72.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5
Lead/Lag							
Lead-Lag Optimize?							
Act Effect Green (s)	20.5	20.5		60.5	60.5		60.5
Actuated g/C Ratio	0.23	0.23		0.67	0.67		0.67
v/c Ratio	0.01	0.08		0.38	0.01		0.95dl
Control Delay	0.0	13.1		7.1	1.8		13.1
Queue Delay	0.0	0.0		1.3	0.0		0.0
Total Delay	0.0	13.1		8.3	1.8		13.1
LOS	A	B		A	A		B
Approach Delay		13.1		8.3			13.1
Approach LOS		B		A			B
Queue Length 50th (m)	0.0	0.7		32.1	0.0		48.6
Queue Length 95th (m)	0.0	7.9		42.3	1.3		73.3
Internal Link Dist (m)		68.8		76.6			62.0
Turn Bay Length (m)							
Base Capacity (vph)	692	393		2272	1070		1301
Starvation Cap Reductn	0	0		1116	0		0
Spillback Cap Reductn	0	0		0	0		0
Storage Cap Reductn	0	0		0	0		0
Reduced v/c Ratio	0.01	0.08		0.75	0.01		0.72

#### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

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

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 10.8

Intersection LOS: B

Intersection Capacity Utilization 62.1%

ICU Level of Service B

Analysis Period (min) 15



















dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 3: Nantucket & Mall/Sportsplex



4: Macdonald Bridge/Nantucket & Wyse  
2019 Existing Conditions

PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	56	128	375	447	142	283	654	1011	543
Future Volume (vph)	56	128	375	447	142	283	654	1011	543
Lane Group Flow (vph)	61	343	204	486	182	308	711	1099	614
Turn Type	Perm	NA	Prot	Prot	NA	Prot	NA	Perm	NA
Protected Phases		4	4	3	8	5	2		6
Permitted Phases	4							2	
Detector Phase	4	4	4	3	8	5	2	2	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	14.6	37.1	24.8	52.9	52.9	28.1
Total Split (%)	25.0%	25.0%	25.0%	16.2%	41.2%	27.6%	58.8%	58.8%	31.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	None	None	None	None	None	Max	Max	Max
Act Effct Green (s)	10.1	10.1	10.1	10.1	24.7	17.9	48.5	48.5	26.1
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.30	0.22	0.59	0.59	0.32
v/c Ratio	0.42	0.62	0.57	0.79	0.33	0.80	0.24	0.91	0.55
Control Delay	41.7	18.7	11.9	46.5	22.4	47.4	8.7	18.9	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Total Delay	41.7	18.7	11.9	46.5	22.4	47.4	8.7	18.9	27.2
LOS	D	B	B	D	C	D	A	B	C
Approach Delay		18.8			39.9		19.6		27.2
Approach LOS		B			D		B		C
Queue Length 50th (m)	9.4	11.7	0.0	27.6	21.5	46.3	18.1	53.8	44.1
Queue Length 95th (m)	21.2	25.0	20.2	#47.7	38.1	#89.8	29.6	#209.1	69.1
Internal Link Dist (m)		98.2			42.0		84.7		76.6
Turn Bay Length (m)									
Base Capacity (vph)	262	836	475	614	729	437	3000	1211	1119
Starvation Cap Reductn	0	0	0	0	0	0	0	0	193
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	0.23	0.41	0.43	0.79	0.25	0.70	0.24	0.91	0.66
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 82.2									
Natural Cycle: 90									
Control Type: Actuated-Uncoordinated									
Maximum v/c Ratio: 0.91									
Intersection Signal Delay: 24.0					Intersection LOS: C				
Intersection Capacity Utilization 77.7%					ICU Level of Service D				
Analysis Period (min) 15									
# 95th percentile volume exceeds capacity, queue may be longer.									

# 4: Macdonald Bridge/Nantucket & Wyse 2019 Existing Conditions

PM Peak

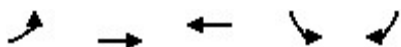
Queue shown is maximum after two cycles.

Splits and Phases: 4: Macdonald Bridge/Nantucket & Wyse



10: Wyse & Thistle  
2019 Existing Conditions

PM Peak



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	362	687	671	70	172
Future Volume (vph)	362	687	671	70	172
Lane Group Flow (vph)	393	747	796	76	187
Turn Type	Prot	NA	NA	Prot	Perm
Protected Phases	7			6	
Permitted Phases		4	8		6
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	55.0	26.0	25.0	25.0
Total Split (%)	36.3%	68.8%	32.5%	31.3%	31.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Act Effect Green (s)	24.5	50.5	21.5	20.5	20.5
Actuated g/C Ratio	0.31	0.63	0.27	0.26	0.26
v/c Ratio	0.73	0.33	0.84	0.17	0.34
Control Delay	34.0	7.4	37.0	24.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	34.0	7.4	37.0	24.4	5.9
LOS	C	A	D	C	A
Approach Delay		16.6	37.0	11.3	
Approach LOS		B	D	B	
Queue Length 50th (m)	55.6	26.0	62.3	9.4	0.0
Queue Length 95th (m)	#90.2	35.5	#92.3	20.2	15.0
Internal Link Dist (m)		184.1	98.1	65.2	
Turn Bay Length (m)					30.0
Base Capacity (vph)	542	2233	947	453	544
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	0.73	0.33	0.84	0.17	0.34

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

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

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 23.3

Intersection LOS: C

Intersection Capacity Utilization 56.0%

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: 10: Wyse & Thistle





1: Nantucket/Maple & Victoria  
2024 with Development

PM Peak













									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	20	214	382	139	204	597	67	21	21
Future Volume (vph)	20	214	382	139	204	597	67	21	21
Lane Group Flow (vph)	0	255	415	151	277	649	262	0	57
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.6	22.6	22.6	22.6	22.6	37.4	37.4	37.4	37.4
Total Split (%)	37.7%	37.7%	37.7%	37.7%	37.7%	62.3%	62.3%	62.3%	62.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5	4.5		4.5
Lead/Lag									
Lead-Lag Optimize?									
Act Effct Green (s)		18.1	18.1	18.1	18.1	32.9	32.9		32.9
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.55	0.55		0.55
v/c Ratio		0.47	0.60	0.52	0.50	0.88	0.26		0.07
Control Delay		20.6	8.9	24.9	19.5	29.2	3.0		5.7
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		20.6	8.9	24.9	19.5	29.2	3.0		5.7
LOS		C	A	C	B	C	A		A
Approach Delay		13.4			21.4		21.7		5.7
Approach LOS		B			C		C		A
Queue Length 50th (m)		23.7	8.5	14.3	23.8	59.1	3.6		2.2
Queue Length 95th (m)		42.7	31.1	30.9	43.9	#126.9	12.7		6.5
Internal Link Dist (m)		111.2			124.5		270.1		84.9
Turn Bay Length (m)			10.0	30.0					
Base Capacity (vph)		538	697	292	559	735	996		874
Starvation Cap Reductn		0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0		0
Reduced v/c Ratio		0.47	0.60	0.52	0.50	0.88	0.26		0.07
Intersection Summary									
Cycle Length: 60									
Actuated Cycle Length: 60									
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green									
Natural Cycle: 60									
Control Type: Pretimed									
Maximum v/c Ratio: 0.88									
Intersection Signal Delay: 18.5					Intersection LOS: B				
Intersection Capacity Utilization 77.2%					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: 1: Nantucket/Maple & Victoria



### 3: Nantucket & Mall/Sportsplex 2024 with Development

PM Peak



















							
Lane Group	EBR	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	7	0	1	819	24	38	467
Future Volume (vph)	7	0	1	819	24	38	467
Lane Group Flow (vph)	8	53	0	891	26	0	633
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		8		2			6
Permitted Phases	4		2		2	6	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	64.0	64.0	64.0	64.0	64.0
Total Split (%)	28.9%	28.9%	71.1%	71.1%	71.1%	71.1%	71.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5
Lead/Lag							
Lead-Lag Optimize?							
Act Effct Green (s)	21.5	21.5		59.5	59.5		59.5
Actuated g/C Ratio	0.24	0.24		0.66	0.66		0.66
v/c Ratio	0.01	0.12		0.40	0.02		0.32
Control Delay	0.0	14.3		7.7	2.2		6.6
Queue Delay	0.0	0.0		1.4	0.0		0.0
Total Delay	0.0	14.3		9.0	2.2		6.6
LOS	A	B		A	A		A
Approach Delay		14.3		8.9			6.6
Approach LOS		B		A			A
Queue Length 50th (m)	0.0	2.5		34.7	0.0		21.2
Queue Length 95th (m)	0.0	11.8		45.6	2.5		29.8
Internal Link Dist (m)		68.8		76.6			62.0
Turn Bay Length (m)							
Base Capacity (vph)	693	425		2234	1055		1969
Starvation Cap Reductn	0	0		1078	0		0
Spillback Cap Reductn	0	0		0	0		0
Storage Cap Reductn	0	0		0	0		0
Reduced v/c Ratio	0.01	0.12		0.77	0.02		0.32
Intersection Summary							
Cycle Length: 90							
Actuated Cycle Length: 90							
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green							
Natural Cycle: 45							
Control Type: Pretimed							
Maximum v/c Ratio: 0.40							
Intersection Signal Delay: 8.1				Intersection LOS: A			
Intersection Capacity Utilization 54.6%				ICU Level of Service A			
Analysis Period (min) 15							

Splits and Phases: 3: Nantucket & Mall/Sportsplex



#### 4: Macdonald Bridge/Nantucket & Wyse 2024 with Development

PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	59	132	384	460	147	290	680	1038	567
Future Volume (vph)	59	132	384	460	147	290	680	1038	567
Lane Group Flow (vph)	64	352	208	500	192	315	739	1128	643
Turn Type	Perm	NA	Prot	Prot	NA	Prot	NA	Perm	NA
Protected Phases		4	4	3	8	5	2		6
Permitted Phases	4							2	
Detector Phase	4	4	4	3	8	5	2	2	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	14.6	37.1	25.0	52.9	52.9	27.9
Total Split (%)	25.0%	25.0%	25.0%	16.2%	41.2%	27.8%	58.8%	58.8%	31.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes
Recall Mode	None	None	None	None	None	None	Max	Max	Max
Act Effct Green (s)	10.3	10.3	10.3	10.1	24.9	18.2	48.5	48.5	25.8
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.30	0.22	0.59	0.59	0.31
v/c Ratio	0.44	0.62	0.58	0.82	0.34	0.81	0.25	0.93	0.58
Control Delay	42.2	18.7	11.8	48.3	22.4	47.7	8.9	22.7	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Total Delay	42.2	18.7	11.8	48.3	22.4	47.7	8.9	22.7	28.2
LOS	D	B	B	D	C	D	A	C	C
Approach Delay		18.8			41.1		21.6		28.2
Approach LOS		B			D		C		C
Queue Length 50th (m)	10.0	12.0	0.0	28.7	22.7	47.4	19.2	65.9	47.3
Queue Length 95th (m)	22.0	25.5	20.2	#50.2	39.6	#92.4	31.2	#222.6	73.2
Internal Link Dist (m)		98.2			42.0		84.7		76.6
Turn Bay Length (m)									
Base Capacity (vph)	259	839	477	612	727	441	2992	1207	1103
Starvation Cap Reductn	0	0	0	0	0	0	0	0	177
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	0.25	0.42	0.44	0.82	0.26	0.71	0.25	0.93	0.69
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 82.4									
Natural Cycle: 90									
Control Type: Actuated-Uncoordinated									
Maximum v/c Ratio: 0.93									
Intersection Signal Delay: 25.5					Intersection LOS: C				
Intersection Capacity Utilization 79.5%					ICU Level of Service D				
Analysis Period (min) 15									
# 95th percentile volume exceeds capacity, queue may be longer.									

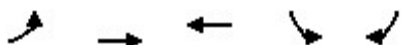
Queue shown is maximum after two cycles.

Splits and Phases: 4: Macdonald Bridge/Nantucket & Wyse



10: Wyse & Thistle  
2024 with Development

PM Peak



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	371	709	693	74	181
Future Volume (vph)	371	709	693	74	181
Lane Group Flow (vph)	403	771	825	80	197
Turn Type	Prot	NA	NA	Prot	Perm
Protected Phases	7			6	
Permitted Phases		4	8		6
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	56.0	27.0	24.0	24.0
Total Split (%)	36.3%	70.0%	33.8%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Act Effect Green (s)	24.5	51.5	22.5	19.5	19.5
Actuated g/C Ratio	0.31	0.64	0.28	0.24	0.24
v/c Ratio	0.74	0.34	0.83	0.19	0.37
Control Delay	35.0	7.0	35.5	25.4	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	7.0	35.5	25.4	6.2
LOS	C	A	D	C	A
Approach Delay		16.6	35.5	11.7	
Approach LOS		B	D	B	
Queue Length 50th (m)	57.5	26.0	64.1	10.1	0.0
Queue Length 95th (m)	#98.7	35.2	#94.1	21.5	15.7
Internal Link Dist (m)		184.1	98.1	65.2	
Turn Bay Length (m)					30.0
Base Capacity (vph)	542	2278	991	431	534
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	0.74	0.34	0.83	0.19	0.37

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

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

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 22.9

Intersection LOS: C

Intersection Capacity Utilization 57.2%

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: 10: Wyse & Thistle

