FOXBURROW SENIORS HOUSING

Traffic Impact Study

Draft Report

16 October 2024

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Project No.: 242101

Project Name: Foxburrow Seniors Housing Traffic Impact Study

Prepared for:

Halifax Regional Municipality

Client:

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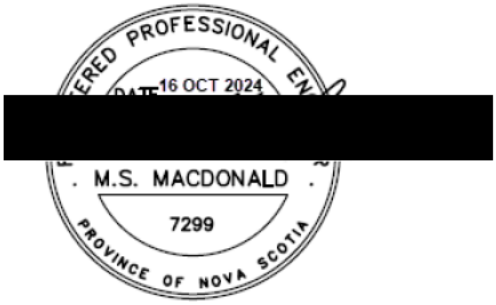

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Revision	Submission Date	Notes
0	11 Oct 2024	Draft Report Issued for Client Review
1	16 Oct 2024	Draft Report Issued for HRM Review

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1 INTRODUCTION

1.1 Overview

Pearlite Integrity Engineering Ltd. retained Harbourside Transportation Consultants to complete a Traffic Impact Study (TIS), as per Halifax Regional Municipality (HRM) requirements, relating to the development application for a proposed residential development on Beaver Bank Road in Beaver Bank, NS. The scope of the TIS was developed in consultation with HRM staff. The TIS follows the HRM *Guidelines for the Preparation of Traffic Impact Studies*[1].

1.2 Study Area

The subject site (PID 41517525) is located at Civic No. 328-324 Beaver Bank Road. The study area includes the segment of Beaver Bank Road between the subject site and Millwood Drive/Stokil Drive. Figure 1 illustrates the study area and the location of the subject site.

Two intersections are included in the study area:

- Beaver Bank Road and Millwood Drive/Stokil Drive (signalized), and
- Beaver Bank Road and Windgate Drive (unsignalized).

2 EXISTING TRANSPORTATION INFRASTRUCTURE

2.1 Roadways

Beaver Bank Road is a north-south arterial roadway that connects to Highway 101, Sackville Drive and the community of Beaver Bank. The posted speed limit is 60 km/h at the location of the site driveway. Along the frontage of the site, Beaver Bank Road has a two-lane cross section and a posted speed limit of 60km/h. The speed limit changes to 50 km/h approximately 90 meters south of the site driveway. There is a sidewalk on the east side of the roadway.

Millwood Drive is and east-west collector roadway that connects a residential neighbourhood to Beaver Bank Road. Millwood Drive has a two-lane cross section and a posted speed limit of 50 km/h. There is a sidewalk on the north side of the roadway near Beaver Bank Road.

Stokil Drive is an east-west collector road that a residential neighbourhood to Beaver Bank Road. Stokil Drive has a two-lane cross section and a posted speed limit of 50 km/h. There is a sidewalk on the north side of the roadway and a short segment on the south side of the roadway near Beaver Bank Road.

Windgate Drive is an east-west collector roadway that runs between Windsor Junction Road and Beaver Bank Road. Windgate Drive has a two-lane cross section and a posted speed limit is 70 km/h. There are no paved shoulders or sidewalks.

[1] Guidelines for the Preparation of Transportation Impact Studies, 8th Revision. Halifax Regional Municipality, September 2007.

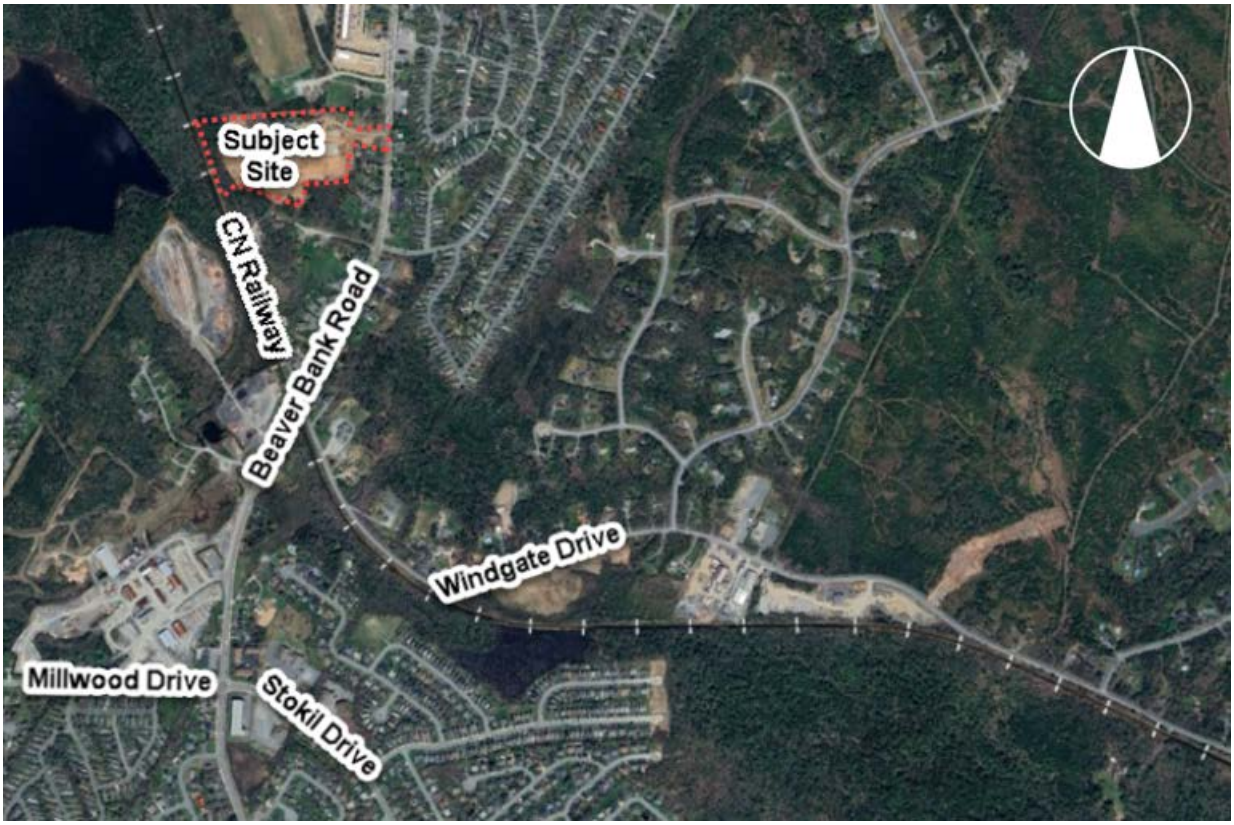

Figure 1: Site Context

2.2 Intersections

The intersection of Beaver Bank Road and Millwood Drive/Stokil Drive is a signalized intersection. All approach to the intersection include a shared through and right turn lane and an auxiliary left turn lane. There are crosswalks on all four approaches at the signalized intersection of Beaver Bank Road and Millwood Drive/Stokil Drive.

The intersection of Beaver Bank Road and Windgate Drive is an unsignalized intersection with stop-control on the Windgate Drive approach. The intersection has single lane approach except for the southbound approach which includes auxiliary left turn lane. There are rail crossing signal structures at the intersection, but the railway is not in use.

2.3 Transit

Beaver Bank Road is serviced by two Halifax Transit Route: 86 Beaver Bank and 186 Beaver Bank Express. Transit stops are located on Beaver Bank Road near the intersection with Welkin Drive, approximately 150 metres north of the site driveway.

2.4 Traffic Volumes

Recent turning movement count data at the two study intersections and a link volume count at Civic No. 345 Beaver Bank Road were obtained from HRM.

Figure 2 illustrates the existing weekday morning (AM) and afternoon (PM) peak hour traffic volumes at the study intersections. **Appendix A** contains the existing count data.

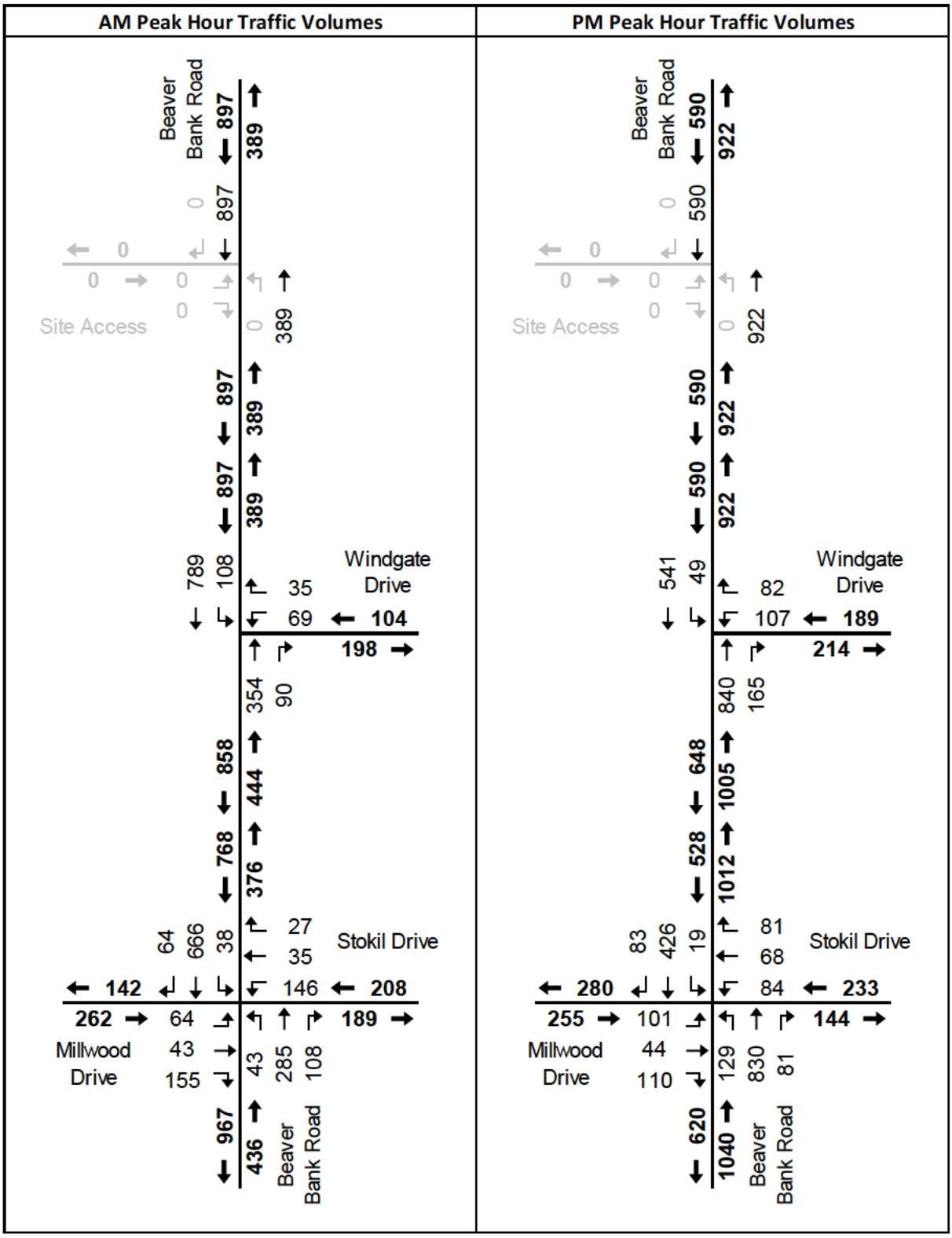

Figure 2: Existing Traffic Volumes

3 DEVELOPMENT CONCEPT

3.1 Development Description

The proposed development plan consists of three mid-rise residential buildings, with a total of 399 residential units. These units are expected to be exclusively for senior citizens. Access to the development is proposed through one driveway on Beaver Bank Road. The proposed site development plan is shown in Figure 3 The full build-out of the site is expected by 2029.

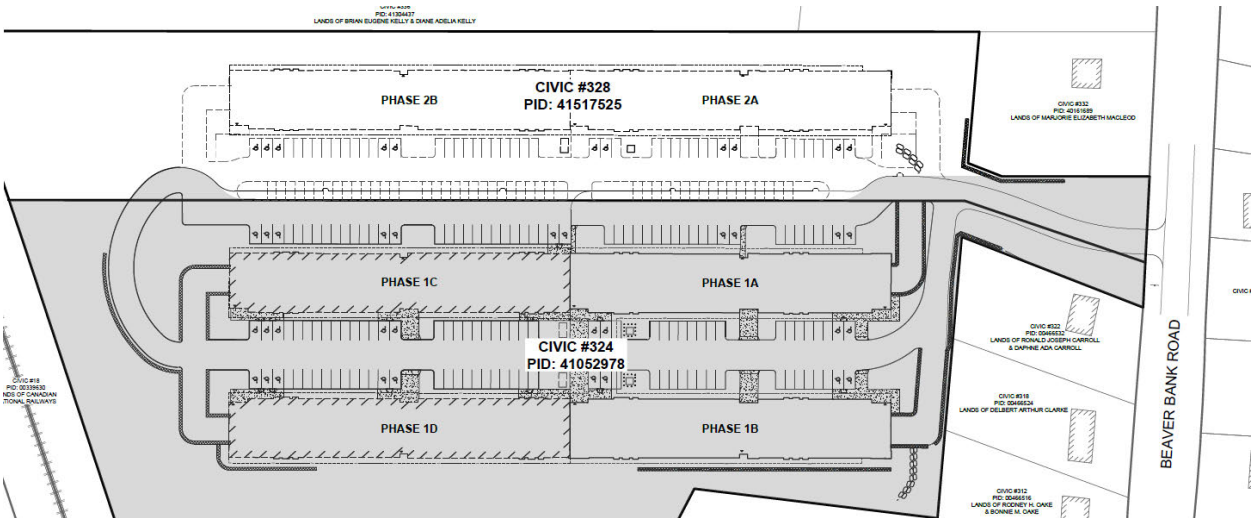

Figure 3: Site Development Plan

3.2 Access Sight Distance

A sight distance review was completed at the site access point on Beaver Bank Road to confirm that the sight lines meet the minimum stopping and intersection sight distance requirements of the Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads*[2].

The minimum stopping and decision sight distance requirements for a two-lane roadway with a design speed of 70 km/h (posted speed limit + 10 km/h) are:

- Minimum stopping sight distance = 105 metres;
- Minimum turning sight distance – right-turn from stop = 130 metres; and
- Minimum turning sight distance – left-turn from stop = 150 metres.

The stopping sight distance requirement of 105 meters is met in both directions on Beaver Bank Road. The sight line north of the access (looking to the left) meets the minimum intersection sight distance for a right-turn of 130 meters. The sight line south of the access (looking to the right) meets the minimum intersection sight distance for a left turn of 150 meters. The sight triangles should be cleared of vegetation.

[2] Geometric Design Guide for Canadian Roads, Transportation Association of Canada, June 2017.

3.3 Site-Generated Traffic

3.3.1 Trip Generation

The Institute of Transportation Engineers (ITE) *Trip Generation Manual*[3] was used to estimate the vehicle trip generation for the subject site. Land use code 221 Multifamily Housing (Mid-Rise), General Urban/Suburban was used for the proposed development. Table 1 summarizes the trip generation rates for the land use code.

Table 1: Trip Generation Rates

Land Use	AM Peak Hour			PM Peak Hour		
	Equation	Entering	Exiting	Equation	Entering	Exiting
221 Multifamily Housing (Mid-Rise)	T = 0.44(X) – 11.61	23%	77%	T = 0.39(X) + 0.34	61%	39%
Note: Units are in dwelling unit for residential uses.						

Table 2 summarizes the weekday AM and PM peak hour trip generation estimates for the subject site . On a typical weekday, the site is estimated to generate 164 vehicle trips in the AM peak hour (38 trips entering and 126 trips exiting) and 156 vehicle trips in the PM peak hour (95 trips entering and 61 trips exiting).

Table 2: Trip Generation Estimates

Land Use	Qty	AM Peak Hour			PM Peak Hour		
		Total	Entering	Exiting	Total	Entering	Exiting
221 Multifamily Housing (Mid-Rise)	399	164	38	126	156	95	61
Note: Units are in dwelling unit for residential uses.							

3.3.2 Trip Assignment and Distribution

Site-generated trips were assigned to the site driveway on Beaver Bank Road. Trips were distributed onto Beaver Bank Road based on existing travel patterns observed in the volume count at 345 Beaver Bank Road. Table 3 summarizes the trip distribution assumptions. Trips were distributed to each turning movement at each intersection based on the existing turning movements counts.

Table 3: Trip Distribution Assumptions

Direction of Travel		AM	PM
Beaver Bank Road	Northbound	21%	70%
	Southbound	79%	30%

Figure 4 illustrates the site-generated traffic volumes for the weekday AM and PM peak hours.

[3] Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, September 2021.

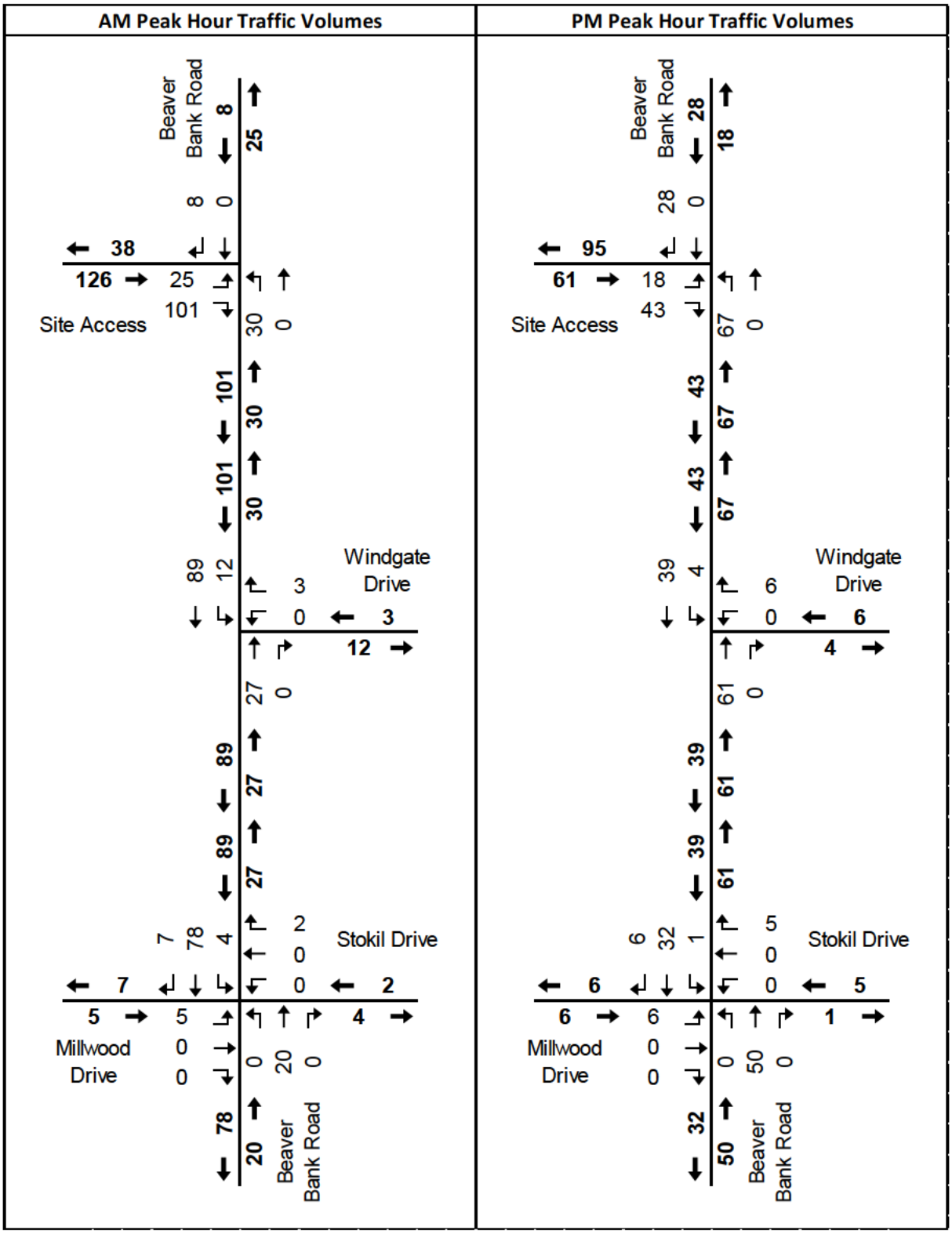

Figure 4: Site-Generated Traffic

4 TRAFFIC VOLUME FORECASTS

4.1 Study Horizon

One horizon year, five years after the full build out of the site (Year 2034) was assessed to estimate the impact of the development on the study area intersections. Future traffic volumes in the study area are estimated to consist of background traffic growth and traffic generated by the subject site.

4.2 Background Growth

Generalized background traffic growth represents growth that is expected to occur without the proposed development. The existing traffic volumes were factored using an annual growth rate of 1.0 percent to reflect background growth.

Figure 5 illustrates the future background traffic volumes for the weekday AM and PM peak hours.

4.3 Future Total Traffic Volumes

The future total traffic volumes consist of the future background volumes with the addition of the trips generated by the residential development (Refer to Figure 4).

Figure 6 illustrates the future total traffic volumes for the weekday AM and PM peak hours.

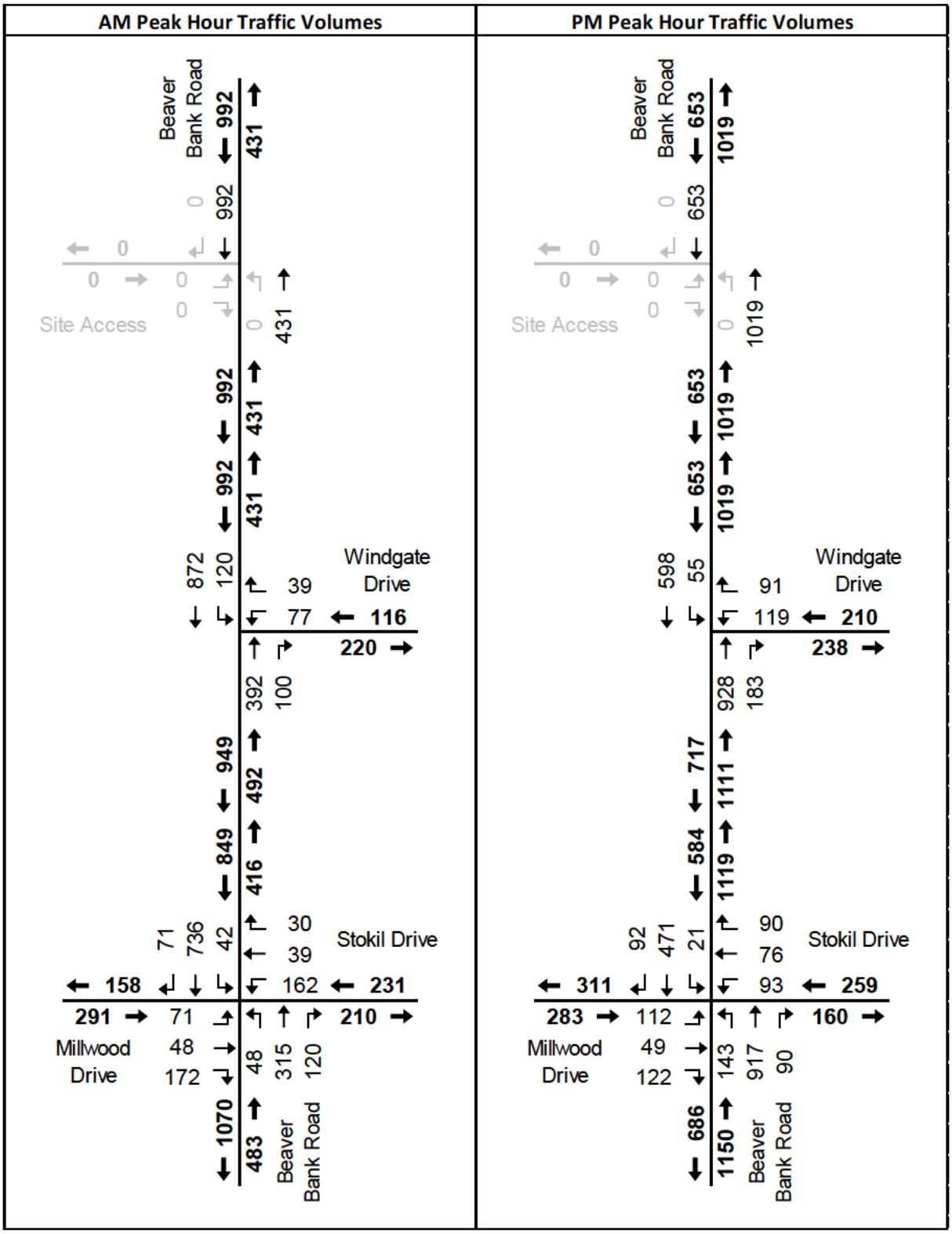

Figure 5: Future Background Traffic Volumes

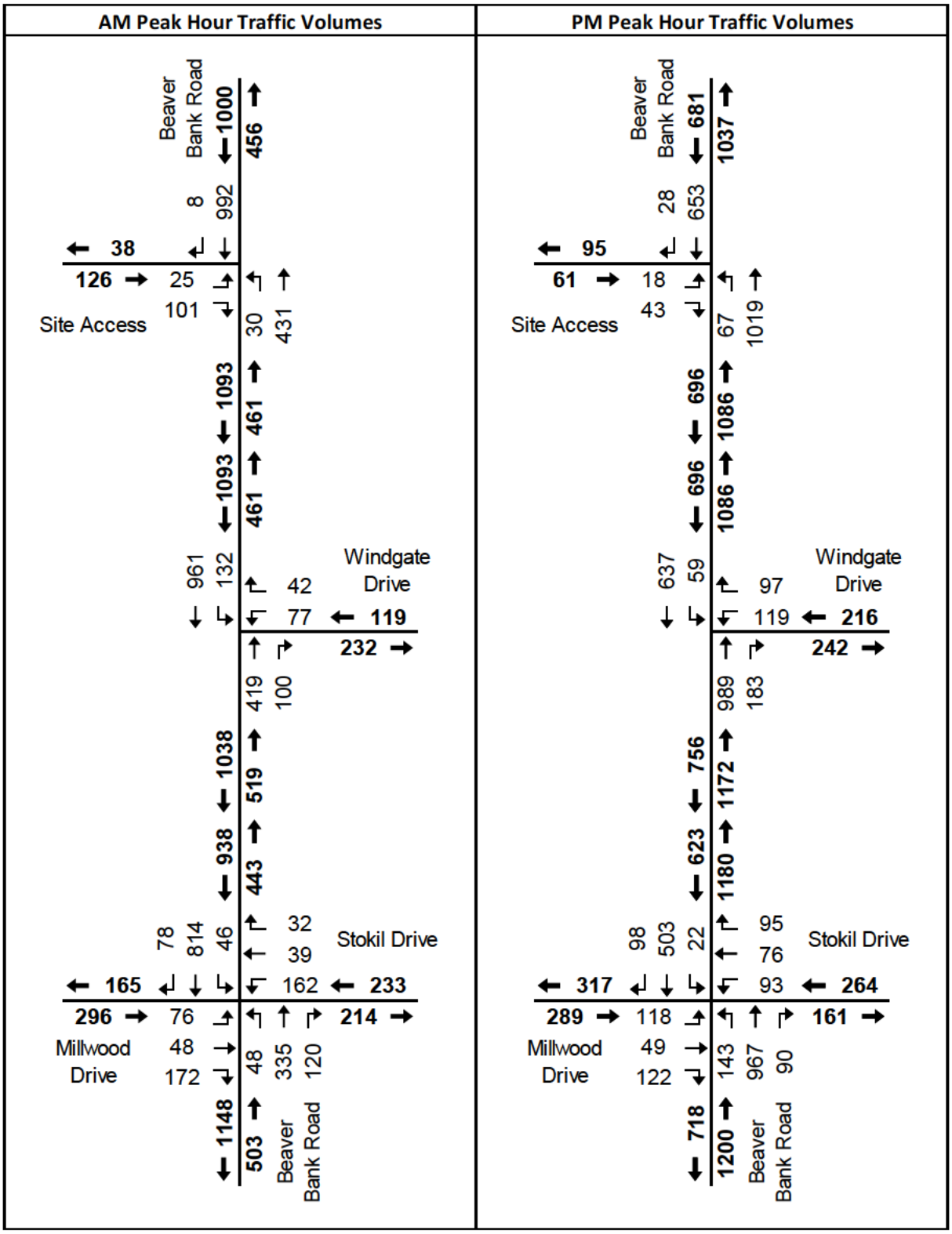

Figure 6: Future Total Traffic Volumes

5 TRAFFIC OPERATIONS ANALYSIS

5.1 Methodology

Synchro Studio 12 software was used to develop base models of the study intersections reflecting the existing weekday AM and weekday PM peak hours. Specific model input parameters include:

- Existing lane configurations and traffic control;
- Current timings and phasing for the signalized intersections (provided by HRM);
- Traffic volumes derived from the traffic counts;
- Conflicting pedestrian volumes derived from the traffic counts;
- Calculated peak hour factors (PHF) for each movement;
- Heavy vehicle percentages for each movement derived from the traffic counts; and
- Synchro default values for all other inputs.

The base models were used to assess existing operations at the study intersections. The base models were then modified to reflect future traffic volumes and the site access point to assess future operations to determine the impact of the development on traffic operations and the need for mitigation measures.

The methodology of the *Highway Capacity Manual*[4] was used to assess the study intersections. The intersection operational analysis considered four performance measures:

- average delay per vehicle;
- level of service (LOS);
- volume-to-capacity ratio (v/c); and
- 95th percentile queue.

The criteria outlined in HRM's *Guidelines for the Preparation of Traffic Impact Studies* ere used to identify critical movements:

- the overall volume-to-capacity ratio of an intersection exceeds 0.85;
- the volume-to-capacity ratio of an individual through movement or shared through/turning movement exceeds 0.85;
- the volume-to-capacity ratio of an exclusive turning movement exceeds 1.0; and
- an exclusive turning movement generates queues which exceed the available turning lane storage space.

Critical operations signify that mitigation measures may need to be considered.

5.2 Existing Operations

Traffic operations at the study intersections were evaluated using the base models. Table 4 and Table 5 summarize the results of the analysis for the AM and PM peak hours. **Appendix B** contains the supporting detailed Synchro reports.

[4] Highway Capacity Manual, 7th edition, Transportation Research Board, 2022.

The following critical movements are identified:

- Beaver Bank Road & Millwood Drive/Stokil Drive:
  - AM: The westbound left movement (Stokil Drive) operates at LOS E. The v/c ratio for the southbound through/right movement (Beaver Bank Road) exceeds the threshold of 0.85 for a through lane (v/c = 0.87).
  - PM: The v/c ratio for the northbound through/right movement (Beaver Bank Road) exceeds the threshold of 0.85 for a through lane (v/c = 0.90).
- Beaver Bank Road & Windgate Drive:
  - AM/PM: The westbound left and right movements (Windgate Drive) operate at LOS F. The volumes for these movements exceed the capacity of the shared left/right lane (AM v/c = 1.16; PM v/c = 1.93).
  - PM: The overall intersection operates at LOS F.

Table 4: Existing Operations, AM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	64	43	155	**262**	146	35	27	**208**	43	285	108	**436**	38	666	64	**768**	**1674**
		Delay (s)	34.4	41.2	>	**39.5**	56.1	30.1	>	**47.7**	9.6	17.0	>	**16.2**	7.8	33.4	>	**31.8**	**31.2**
		LOS	C	D	>	**D**	E	C	>	**D**	A	B	>	**B**	A	C	>	**C**	**C**
		v/c	0.23	0.76	>		0.74	0.25	>		0.22	0.47	>		0.10	0.87	>		
		95th% Q (m)	23.5	42.0	>		58.2	22.8	>		8.5	89.5	>		7.3	253.0	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TWSC	Volume (vph)	-	-	-		69	-	35	**104**	-	354	90	**444**	108	789	-	**897**	**1445**
		Delay (s)	-	-	-		194.8	-	>	####	-	0	>	**0.0**	9.0	0.0	-	**1.4**	**17.9**
		LOS	-	-	-		F	-	>	**F**	-	A	>	**A**	A	A	-	**A**	**C**
		v/c	-	-	-		1.16	-	>		-	-	>		0.15	-	-		
		95th% Q (m)	-	-	-		8.8	-	>		-	0.0	>		0.5	0.0	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	>		40.0	340.0	-		

Table 5: Existing Operations, PM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	101	44	110	**255**	84	68	81	**233**	129	830	81	**1040**	19	426	83	**528**	**2056**
		Delay (s)	53.7	32.2	>	**42.1**	37.2	52.4	>	**47.6**	9.6	34.5	>	**30.7**	9.1	21.5	>	**20.9**	**31.9**
		LOS	D	C	>	**D**	D	D	>	**D**	A	C	>	**C**	A	C	>	**C**	**C**
		v/c	0.71	0.59	>		0.35	0.75	>		0.38	0.90	>		0.14	0.59	>		
		95th% Q (m)	32.4	40.4	>		29.0	54.9	>		19.7	324.2	>		4.2	132.7	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TWSC	Volume (vph)	-	-	-		107	-	82	**189**	-	840	165	**1005**	49	541	-	**590**	**1784**
		Delay (s)	-	-	-		511.6	-	>	####	-	0	>	**0.0**	11.3	0.0	-	**1.0**	**57.2**
		LOS	-	-	-		F	-	>	**F**	-	A	>	**A**	B	A	-	**A**	**F**
		v/c	-	-	-		1.93	-	>		-	-	>		0.10	-	-		
		95th% Q (m)	-	-	-		18.4	-	>		-	0.0	>		0.3	0.0	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	>		40.0	340.0	-		

5.3 Future Background Operations

Traffic operations at the study intersections were evaluated using the future background traffic volumes. No changes were made to the lane configuration and traffic control. Table 6 and Table 7 summarize the results of the analysis for the AM and PM peak hours. **Appendix C** contains the supporting detailed Synchro reports.

The following critical movements are identified:

- Beaver Bank Road & Millwood Drive/Stokil Drive:
  - AM: The westbound left movement (Stokil Drive) is expected to deteriorate to LOS F, volumes will be approaching capacity (v/c = 0.97). The overall westbound approach is expected to operate at LOS E. The v/c ratio for the southbound through/right movement (Beaver Bank Road) is expected to continue to exceed the threshold of 0.85 for a through lane (v/c = 0.91).
  - PM: The northbound through/right movement (Beaver Bank Road) is expected to deteriorate to LOS E, volumes are expected to exceed capacity (v/c = 1.01). The eastbound left movement (Millwood Drive) is expected to deteriorate to LOS E.
- Beaver Bank Road & Windgate Drive:
  - AM/PM: The westbound left and right movements (Windgate Drive) are expected to continue to operate at LOS F and exceed capacity. Operations for the overall intersection are expected to deteriorate to LOS E in the AM peak hour and continue to operate at LOS F during the PM peak hour.

Background traffic growth will contribute to the deterioration of existing operational issues at the study intersections. Mitigation measures will be required to accommodate background traffic growth at the intersection of Beaver Bank Road and Windgate Drive.

Table 6: Future Background Operations, AM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	71	48	172	**291**	162	39	30	**231**	48	315	120	**483**	42	736	71	**849**	**1854**
		Delay (s)	35.4	49.6	>	**46.1**	97.4	31.1	>	**76.1**	12.1	17.8	>	**17.2**	8.3	38.0	>	**36.2**	**38.1**
		LOS	D	D	>	**D**	F	C	>	**E**	B	B	>	**B**	A	D	>	**D**	**D**
		v/c	0.27	0.83	>		0.97	0.29	>		0.31	0.49	>		0.11	0.91	>		
		95th% Q (m)	25.8	49.4	>		63.0	25.3	>		9.6	105.3	>		8.2	308.3	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TWSC	Volume (vph)	-	-	-		77	-	39	**116**	-	392	100	**492**	120	872	-	**992**	**1600**
		Delay (s)	-	-	-		423.9	-	>	**424**	-	0.0	>	**0.0**	9.3	0.0	-	**1.4**	**38.2**
		LOS	-	-	-		F	-	>	**F**	-	A	>	**A**	A	A	-	**A**	**E**
		v/c	-	-	-		1.69	-	>		-	-	>		0.17	-	-		
		95th% Q (m)	-	-	-		13.1	-	>		-	0.0	>		0.6	0.0	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	>		40.0	340.0	-		

Table 7: Future Background Operations, PM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	112	49	122	**283**	93	76	90	**259**	143	917	90	**1150**	21	471	92	**584**	**2276**
		Delay (s)	63.6	38.6	>	**50.1**	39.6	54.5	>	**49.9**	11.5	55.1	>	**48.5**	10.2	24.7	>	**24.0**	**42.8**
		LOS	E	D	>	**D**	D	D	>	**D**	B	E	>	**D**	B	C	>	**C**	**D**
		v/c	0.81	0.69	>		0.44	0.77	>		0.46	1.01	>		0.17	0.66	>		
		95th% Q (m)	36.0	47.0	>		31.8	62.4	>		22.9	390.9	>		4.7	159.2	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TWSC	Volume (vph)	-	-	-		119	-	91	**210**	-	928	183	**1111**	55	598	-	**653**	**1974**
		Delay (s)	-	-	-		926.0	-	>	**926**	-	0.0	>	**0.0**	12.2	0.0	-	**1.1**	**104**
		LOS	-	-	-		F	-	>	**F**	-	A	>	**A**	B	A	-	**A**	**F**
		v/c	-	-	-		2.83	-	>		-	-	>		0.13	-	-		
		95th% Q (m)	-	-	-		24.3	-	>		-	0.0	>		0.4	0.0	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	>		40.0	340.0	-		

5.4 Background Mitigation

5.4.1 Traffic Signal Warrant

The Transportation Association of Canada (TAC) *Traffic Signal and Pedestrian Head Warrant Handbook*[5] provides guidance on the assessment of the need for traffic control signals at intersections. The procedure uses a "cumulative factors methodology" to identify if traffic control signals are warranted based on factors such as geometry, operating parameters, local demographics and pedestrian and vehicular volumes and conflicts. To warrant the installation of a traffic control signal, an intersection must score a minimum of 100 cumulative warrant points.

The traffic signal warrant analysis was completed for the intersection of Beaver Bank Road and Windgate Drive. **Appendix D** contains the warrant analysis worksheets. The intersection scored a total of 91 points based on existing traffic volumes and 111 points based on future background total traffic volumes. A traffic signal will be warranted at the intersection of Beaver Bank Road and Windgate Drive to accommodate background traffic volumes.

5.4.2 Future Background Operations with Mitigation

Traffic operations at the study intersections were evaluated using the future background traffic volumes and the proposed traffic signals at the intersection of Beaver Bank Road and Windgate Drive. A northbound right turn lane on Beaver Bank Road will also be required at the intersection to maintain the v/c ratio for the northbound through movement below the HRM threshold of 0.85. Signal timings were optimized at the intersection of Beaver Bank Road and Millwood Drive/Stokil Drive. Table 8 and Table 9 summarize the results of the analysis for the AM and PM peak hours. **Appendix E** contains the supporting detailed Synchro reports.

The proposed traffic signal and change to the northbound lane configuration will restore operations at the intersection of Beaver Bank Road and Windgate Drive to acceptable levels of service during both peak hours.

The following changes are identified at the intersection Beaver Bank Road and Millwood Drive/Stokil Drive with optimized signal timings:

- AM Peak Hour:
  - The westbound left movement (Stokil Drive) is expected to improve to from LOS F to LOS E and the v/c ratio will improve from 0.97 to 0.83. The overall westbound approach is expected to continue to operate at LOS E, however, average delay is expected to reduce by approximately 20 seconds per vehicle.
  - The v/c ratio for the southbound through/right movement (Beaver Bank Road) is expected to increase from 0.91 to 0.93.
- PM Peak Hour:
  - The optimized timings increase the green time on Beaver Bank Road to improve operations for the over capacity northbound through movement, leading to deterioration of operations for some minor street movements.

[6] Traffic Signal and Pedestrian Head Warrant Handbook, Transportation Association of Canada, June 2014.

- The northbound through/right movement (Beaver Bank Road) is expected to improve to from LOS E to LOS D and the v/c ratio will improve from 1.01 to 0.95. Average delay on the northbound approach is expected to reduce by approximately 12 seconds per vehicle.
- The eastbound left movement (Millwood Drive) is expected to deteriorate from LOS E to LOS F and the v/c ratio will deteriorate from 0.81 to 0.97.
- The westbound through/right movement (Stokil Drive) is expected to deteriorate to LOS E, the v/c ratio for the movement will remain below the threshold of 0.85.

Changes to the signal timings cannot restore operations to acceptable levels of service at the intersection Beaver Bank Road and Millwood Drive/Stokil Drive. Increasing capacity at the intersection would require widening Beaver Bank Road. It is noted that there are long term plans for the extension of Margeson Drive north of Trunk 1, this parallel route may provide some traffic relief to Beaver Bank Road.

Table 8: Future Background Operations with Mitigation, AM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	71	48	172	**291**	162	39	30	**231**	48	315	120	**483**	42	763	71	**876**	**1881**
		Delay (s)	38.2	53.5	>	**49.7**	66.9	32.0	>	**55.7**	13.2	18.1	>	**17.6**	8.4	41.8	>	**39.7**	**37.9**
		LOS	D	D	>	**D**	E	C	>	**E**	B	B	>	**B**	A	D	>	**D**	**D**
		v/c	0.28	0.84	>		0.83	0.25	>		0.33	0.50	>		0.12	0.93	>		
		95th% Q (m)	27.1	53.7	>		65.6	26.2	>		9.1	99.4	>		7.7	296.8	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TCS	Volume (vph)	-	-	-		77	-	39	**116**	-	392	100	**492**	120	872	-	**992**	**1600**
		Delay (s)	-	-	-		29.9	-	>	**29.9**	-	7	1.5	**5.8**	7.4	16.3	-	**14.9**	**13.5**
		LOS	-	-	-		C	-	>	**C**	-	A	A	**A**	A	B	-	**B**	**B**
		v/c	-	-	-		0.52	-	>		-	0.36	0.12		0.29	0.8	-		
		95th% Q (m)	-	-	-		27.0	-	>		-	48.3	4.1		15.8	175.8	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	25.0		40.0	340.0	-		

Table 9: Future Background Operations with Mitigation, PM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	112	49	122	**283**	93	76	90	**259**	143	917	90	**1150**	21	471	92	**584**	**2276**
		Delay (s)	104.1	45.0	>	**72.2**	49.2	62.3	>	**58.2**	9.9	41.4	>	**36.6**	9.7	21.9	>	**21.3**	**40.6**
		LOS	F	D	>	**E**	D	E	>	**E**	A	D	>	**D**	A	C	>	**C**	**D**
		v/c	0.97	0.73	>		0.53	0.81	>		0.43	0.95	>		0.19	0.62	>		
		95th% Q (m)	39.2	50.8	>		34.4	66.6	>		20.8	381.9	>		4.3	150.9	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TCS	Volume (vph)	-	-	-		119	-	91	**210**	-	928	183	**1111**	55	598	-	**653**	**1974**
		Delay (s)	-	-	-		37.8	-	>	**37.8**	-	18.9	3.7	**16.2**	18.5	11.0	-	**11.7**	**17.0**
		LOS	-	-	-		D	-	>	**D**	-	B	A	**B**	B	B	-	**B**	**B**
		v/c	-	-	-		0.69	-	>		-	0.84	0.21		0.45	0.6	-		
		95th% Q (m)	-	-	-		58.7	-	>		-	183.1	13.6		13.1	82.8	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	25.0		40.0	340.0	-		

5.5 Future Total Operations

Traffic operations at the study intersections and the proposed site driveway were evaluated using the future total traffic volumes. The proposed mitigation measures required to accommodate background growth are included in this scenario. The proposed site access intersection was modelled with a northbound left turn lane on Beaver Bank Road and a shared left/right lane on the driveway approach. Refer to Section 6 for the left turn lane warrant analysis.

Table 10 and Table 11 summarizes the results of the analysis for the AM and PM peak hours. **Appendix F** contains the supporting detailed Synchro reports.

The following critical movements are identified:

- Beaver Bank Road & Millwood Drive/Stokil Drive:
  - AM: The eastbound through/right movement (Millwood Drive) is expected to deteriorate to LOS E and the v/c ratio is expected to exceed the threshold of 0.85 for a through lane (v/c = 0.87). The westbound left movement (Stokil Drive) is expected to continue to operate at LOS E. The v/c ratio for the southbound through (Beaver Bank Road) is expected to increase from 0.93 to 0.98. Average delay per vehicle at the intersection is expected to increase by approximately 5.5 seconds per vehicle.
  - PM: The eastbound left movement (Millwood Drive) is expected to continue to operate at LOS F and is expected to exceed capacity. The overall eastbound approach will deteriorate from LOS E to LOS F. The westbound through movement (Stokil Drive) is expected to continue to operate at LOS E. The v/c ratio for the northbound through is expected to increase from 0.95 to 1.00. Average delay per vehicle at the intersection is expected to increase by approximately 6.0 seconds per vehicle.
- Beaver Bank Road & Site Access:
  - AM: The eastbound left and right movements (Site Access) are expected to operate at LOS F, however, the v/c ratio is expected to be well below the threshold of 0.85 for a shared lane (v/c = 0.67).
  - PM: The eastbound left and right movements (Site Access) are expected to operate at LOS E, however, the v/c ratio is expected to be well below the threshold of 0.85 for a shared lane (v/c = 0.42).

There are existing and background operational issues at the intersection of Beaver Bank Road and Millwood Drive/Stokil Drive. As previously noted, these issues cannot be significantly improved without the widening of Beaver Bank Road or the provision of an alternative route. As a result, these issues will continue to deteriorate with the addition of the site generated traffic. Volumes on Beaver Bank Road are expected to be near or over the capacity of a single through lane. It is noted that traffic generated by the development is expected to account for approximately 6% of total traffic volume at the intersection during the AM peak hour and approximately 4% during the PM peak hour.

Table 10: Future Total Operations, AM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	76	48	172	**296**	162	39	32	**233**	48	335	120	**503**	46	814	78	**938**	**1970**
		Delay (s)	39.5	57.6	>	**52.9**	76.4	31.9	>	**61.8**	16.3	18.0	>	**17.8**	8.4	51.0	>	**48.4**	**43.3**
		LOS	D	E	>	**D**	E	C	>	**E**	B	B	>	**B**	A	D	>	**D**	**D**
		v/c	0.32	0.87	>		0.88	0.31	>		0.36	0.50	>		0.13	0.98	>		
		95th% Q (m)	28.6	53.7	>		62.0	26.5	>		9.8	106.1	>		8.4	350.6	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TCS	Volume (vph)	-	-	-		77	-	42	**119**	-	419	100	**519**	132	961	-	**1093**	**1731**
		Delay (s)	-	-	-		36.6	-	>	**36.6**	-	6.6	1.3	**5.5**	7.2	17.9	-	**16.3**	**14.9**
		LOS	-	-	-		D	-	>	**D**	-	A	A	**A**	A	B	-	**B**	**B**
		v/c	-	-	-		0.57	-	>		-	0.36	0.11		0.31	0.84	-		
		95th% Q (m)	-	-	-		31.5	-	>		-	51.0	3.8		17.1	216.6	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	25.0		40.0	340.0	-		
3: Beaver Bank Road & Site Access	TWSC	Volume (vph)	25	-	101	**126**	-	-	-		30	431	-	**461**	-	992	8	**1000**	**1587**
		Delay (s)	51.8	-	>	**51.8**	-	-	-		10.9	0.0	-	**0.7**	-	0.0	>	**0.0**	**4.3**
		LOS	F	-	>	**F**	-	-	-		B	A	-	**A**	-	A	>	**A**	**A**
		v/c	0.67	-	>		-	-	-		0.05	-	-		-	-	>		
		95th% Q (m)	4.1	-	>		-	-	-		0.2	0.0	-		-	0.0	>		
		Storage (m)	0.0	-	>		-	-	-		25.0	-	-		-	-	>		

Table 11: Future Total Operations, PM Peak Hour

Intersection	Control Type	Measure	Eastbound				Westbound				Northbound				Southbound				Overall
			Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
1: Beaver Bank Road & Millwood Drive/Stokil Drive	TCS	Volume (vph)	118	49	122	**289**	93	76	95	**264**	143	967	90	**1200**	22	503	98	**623**	**2376**
		Delay (s)	121.0	44.2	>	**80.4**	48.7	63.0	>	**58.6**	10.7	52.2	>	**46.1**	10.0	23.6	>	**23.0**	**46.6**
		LOS	F	D	>	**F**	D	E	>	**E**	B	D	>	**D**	A	C	>	**C**	**D**
		v/c	1.04	0.72	>		0.52	0.82	>		0.46	1.00	>		0.19	0.66	>		
		95th% Q (m)	41.9	50.8	>		34.4	68.6	>		20.7	410.8	>		4.4	168.9	>		
		Storage (m)	90.0	-	>		50.0	-	>		90.0	870.0	>		60.0	600.0	>		
2: Beaver Bank Road & Windgate Drive	TCS	Volume (vph)	-	-	-		119	-	97	**216**	-	989	183	**1172**	59	637	-	**696**	**2084**
		Delay (s)	-	-	-		44.4	-	>	**44.4**	-	20.5	3.8	**17.7**	27.4	11.3	-	**12.7**	**18.8**
		LOS	-	-	-		D	-	>	**D**	-	C	A	**B**	C	B	-	**B**	**B**
		v/c	-	-	-		0.73	-	>		-	0.86	0.20		0.56	0.63	-		
		95th% Q (m)	-	-	-		67.1	-	>		-	215.4	14.3		17.9	92.7	-		
		Storage (m)	-	-	-		-	-	>		-	600.0	25.0		40.0	340.0	-		
3: Beaver Bank Road & Site Access	TWSC	Volume (vph)	18	-	43	**61**	-	-	-		67	1019	-	**1086**	-	653	28	**681**	**1828**
		Delay (s)	44.1	-	>	**44.1**	-	-	-		9.5	0.0	-	**0.6**	-	0.0	>	**0.0**	**1.8**
		LOS	E	-	>	**E**	-	-	-		A	A	-	**A**	-	A	>	**A**	**A**
		v/c	0.42	-	>		-	-	-		0.08	-	-		-	-	>		
		95th% Q (m)	1.9	-	>		-	-	-		0.3	0.0	-		-	0.0	>		
		Storage (m)	0.0	-	>		-	-	-		25.0	-	-		-	-	>		

6 LEFT TURN LANE WARRANT

The Ministry of Transportation of Ontario (MTO) *Design Supplement for the TAC Geometric Design Guide for Canadian Roads*[6] provides guidance on the assessment of the need for left turn lanes at unsignalized intersections. The methodology uses a series of nomographs to identify if a left turn lane is warranted based on factors such as design speed, advancing volumes, and left turn volume as a percentage of advancing volumes and opposing volumes.

The left turn lane warrant analysis was completed for the northbound left turn from Beaver Bank Road onto the proposed site driveway using the future total traffic volumes. A design speed of 70 km/h (posted speed limit + 10 km/h) was used for the left turn lane warrant analysis.

Figure 7 illustrates the left turn warrant analysis. The northbound left turn volume is expected to represent approximately 6% of the advancing volume during both peak hours. The analysis indicates that a northbound left turn lane with a storage length of 25 metres will be warranted on Beaver Bank Road at the site driveway.

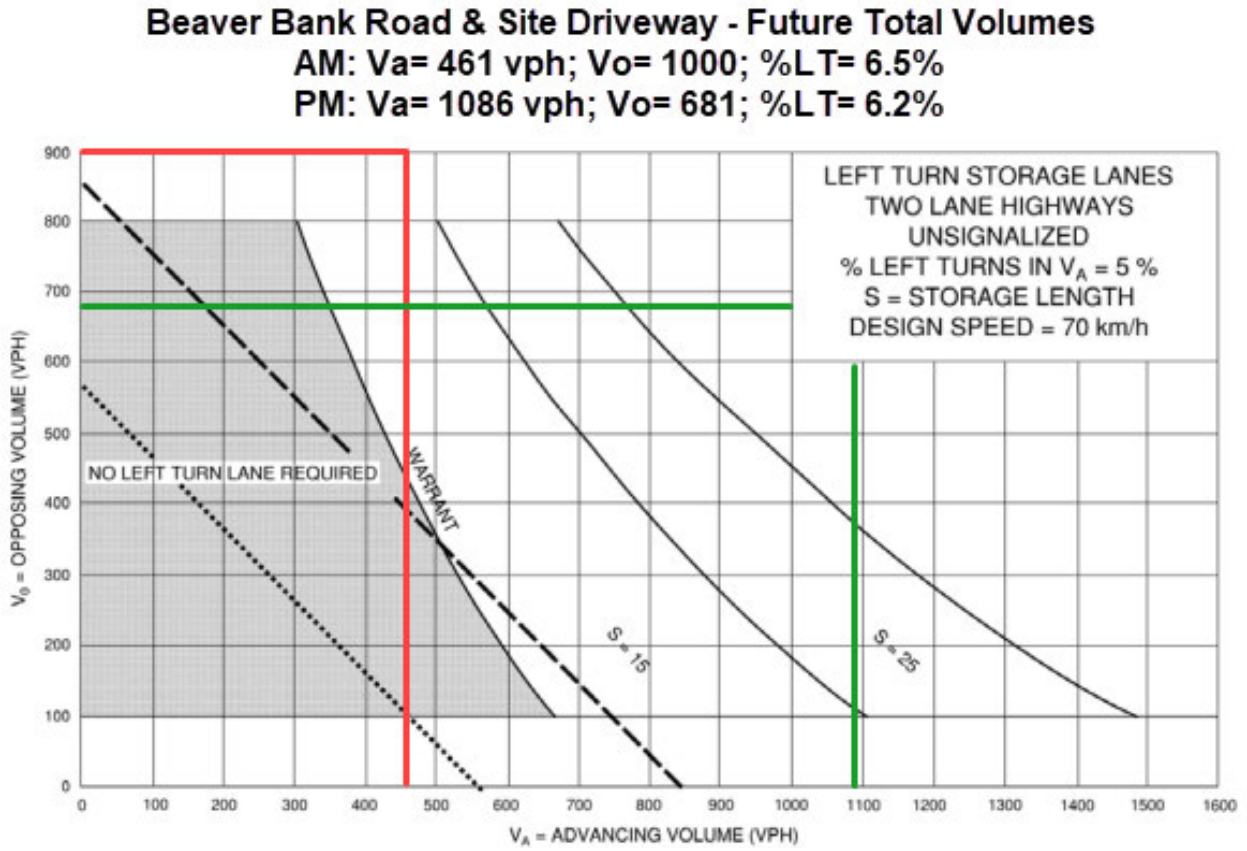

Figure 7: Left Turn Lane Warrant for Site Driveway

[5] Design Supplement for TAC Geometric Design Guide for Canadian Roads, Appendix 9 for Chapter 9 Intersections, Ministry of Transportation of Ontario, June 2017.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Pearlite Integrity Engineering Ltd. retained Harbourside Transportation Consultants to complete a Traffic Impact Study, as per Halifax Regional Municipality (HRM) requirements, for a residential development at Civic No. 328-324 Beaver Bank Road in Beaver Bank, NS.

The proposed residential development will consist of three buildings, with a total of 399 residential units. The units are expected to be exclusively for senior citizens. Access to the site is proposed through a driveway on Beaver Bank Road.

Based on the investigations carried out, it is concluded that:

- **Site-Generated Traffic:** The residential development is estimated to generate 164 trips in the AM peak hour and 156 trips in the PM peak hour.
- **Access Sight Distance**: The site access is expected to have adequate intersection and stopping sight distances.
- **Existing Operations:** There are existing operational concerns at the intersection of Beaver Bank Road and Millwood Drive/Stokil Drive for the through movements on Beaver Bank Road. There are also existing operational concerns at the intersection of Beaver Bank Road and Windgate Drive for the Windgate Drive approach.
- **Future Background Operations:** Background traffic growth will contribute to the deterioration of existing operational issues at the study intersections. Mitigation measures will be required to accommodate background traffic growth at the intersection of Beaver Bank Road and Windgate Drive. Traffic signals will be warranted at the intersection of Beaver Bank Road and Windgate Drive.
- **Future Background Operations with Mitigations:** Traffic signals and the addition of a northbound right turn lane is expected to restore operations to acceptable levels of service at the intersection of Beaver Bank Road and Windgate Drive. Changes to the signal timings can improve operations at the intersection of Beaver Bank Road and Millwood Drive/Stokil Drive, however, operational issues will remain without significant improvements to increase capacity such as widening Beaver Bank Road or providing an alternative corridor.
- **Future Total Operations:** The existing and background operational issues at the intersection of Beaver Bank Road and Millwood Drive/Stokil Drive will continue to deteriorate with the addition of the site generated traffic. Volumes on Beaver Bank Road are expected to be near or over the capacity of a single through lane. Traffic generated by the development is expected to account for approximately 6% of total traffic volume at the intersection during the AM peak hour and approximately 4% during the PM peak hour. The intersection of Beaver Bank Road and Windgate Drive will operate at adequate levels of service.
- **Left Turn Lane Warrant:** A left turn lane with 25 meters of storage will be warranted for the northbound left turn at the site driveway on Beaver Bank Road.

7.2 Recommendations

Based on the findings of the study, the following mitigation measures are recommended:

- Signal timings should be adjusted at the intersection of Beaver Bank Road and Millwood Drive/Stokil Drive as development progresses.
- A left turn lane should be provided on Beaver Bank Road at the proposed site driveway. The left turn lane should provide a minimum of 25 meters of storage length.
- Traffic signals and a northbound right turn lane should be implemented at the intersection of Beaver Bank Road and Windgate Drive. It is noted that this improvement is required to accommodate background traffic growth and is required without the proposed development.

APPENDIX A: TRAFFIC COUNT DATA

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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

Count Name: 22RQ704
Site Code: Beaver Bank Rd at Millwood Dr and Stokil Dr
Start Date: 11/01/2022

Turning Movement Data

Start Time	Beaver Bank Rd Southbound					Stokil Dr Westbound					Beaver Bank Rd Northbound					Millwood Dr Eastbound					
	Southbound					Westbound					Northbound					Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:00 AM	17	223	5	0	245	6	10	31	0	47	9	43	7	0	59	30	4	13	0	47	398
7:15 AM	13	198	6	0	217	7	9	27	0	43	12	58	4	0	74	31	7	9	0	47	381
7:30 AM	15	192	5	0	212	10	9	34	0	53	26	73	8	0	107	36	6	17	0	59	431
7:45 AM	16	164	10	0	190	5	8	33	0	46	29	64	13	0	106	38	10	13	0	61	403
Hourly Total	61	777	26	0	864	28	36	125	0	189	76	238	32	0	346	135	27	52	0	214	1613
8:00 AM	24	171	14	0	209	7	10	42	0	59	25	69	10	0	104	46	14	20	0	80	452
8:15 AM	9	139	9	0	157	5	8	37	0	50	28	79	12	0	119	35	13	14	0	62	388
8:30 AM	11	183	5	0	199	3	9	33	0	45	19	65	25	0	109	30	7	10	0	47	400
8:45 AM	11	155	5	0	171	4	8	26	0	38	11	67	21	0	99	38	5	10	0	53	361
Hourly Total	55	648	33	0	736	19	35	138	0	192	83	280	68	0	431	149	39	54	0	242	1601
9:00 AM	15	97	3	0	115	4	0	22	0	26	8	69	24	0	101	43	4	7	0	54	296
9:15 AM	12	130	8	0	150	2	6	22	0	30	11	71	14	0	96	22	1	11	0	34	310
9:30 AM	6	128	2	0	136	0	4	23	0	27	16	87	15	0	118	24	1	12	0	37	318
9:45 AM	9	121	3	0	133	4	4	24	0	32	8	83	14	0	105	14	3	7	0	24	294
Hourly Total	42	476	16	0	534	10	14	91	0	115	43	310	67	0	420	103	9	37	0	149	1218
10:00 AM	6	105	2	0	113	2	5	19	0	26	9	82	12	0	103	21	4	3	0	28	270
10:15 AM	8	106	1	0	115	7	7	16	0	30	4	87	11	0	102	18	6	12	0	36	283
10:30 AM	8	94	7	0	109	4	6	17	0	27	6	90	9	0	105	14	3	13	0	30	271
10:45 AM	16	104	6	0	126	3	3	21	0	27	14	86	15	0	115	11	4	6	0	21	289
Hourly Total	38	409	16	0	463	16	21	73	0	110	33	345	47	0	425	64	17	34	0	115	1113
11:00 AM	10	108	2	0	120	6	3	19	0	28	16	99	17	0	132	25	4	10	0	39	319
11:15 AM	8	82	3	0	93	2	4	19	0	25	15	96	17	0	128	29	0	15	0	44	290
11:30 AM	8	104	5	0	117	4	2	16	0	22	17	98	24	0	139	15	0	10	0	25	303
11:45 AM	9	129	0	0	138	2	6	24	0	32	23	99	35	0	157	18	8	16	0	42	369
Hourly Total	35	423	10	0	468	14	15	78	0	107	71	392	93	0	556	87	12	51	0	150	1281
12:00 PM	9	122	5	0	136	3	7	20	0	30	19	98	21	0	138	22	4	14	0	40	344
12:15 PM	11	89	5	0	105	5	3	15	0	23	17	104	17	0	138	21	4	7	0	32	298
12:30 PM	4	119	3	0	126	3	9	18	0	30	23	108	31	0	162	21	6	5	0	32	350
12:45 PM	12	112	2	0	126	8	6	16	0	30	22	126	20	0	168	22	4	6	0	32	356
Hourly Total	36	442	15	0	493	19	25	69	0	113	81	436	89	0	606	86	18	32	0	136	1348
1:00 PM	9	87	7	0	103	4	1	17	0	22	24	117	18	0	159	18	2	13	0	33	317
1:15 PM	14	88	9	0	111	5	5	26	0	36	12	114	19	0	145	16	6	16	0	38	330
1:30 PM	17	123	5	0	145	7	6	13	0	26	18	117	11	0	146	23	1	15	0	39	356
1:45 PM	5	80	6	0	91	3	4	11	0	18	18	120	16	0	154	18	6	14	0	38	301
Hourly Total	45	378	27	0	450	19	16	67	0	102	72	468	64	0	604	75	15	58	0	148	1304
2:00 PM	8	104	6	0	118	7	9	28	0	44	20	132	22	0	174	11	4	10	0	25	361
2:15 PM	14	98	3	0	115	7	6	17	0	30	23	129	30	0	182	17	8	10	0	35	362
2:30 PM	10	109	8	0	127	5	7	26	0	38	16	131	32	0	179	31	7	9	0	47	391
2:45 PM	6	115	5	0	126	4	2	23	0	29	18	120	14	0	152	23	5	6	0	34	341

Hourly Total	38	426	22	0	486	23	24	94	0	141	77	512	98	0	687	82	24	35	0	141	1455
3:00 PM	12	106	5	0	123	2	5	16	0	23	25	141	35	0	201	14	3	17	0	34	381
3:15 PM	10	86	2	0	98	7	13	25	0	45	30	175	29	0	234	23	6	12	0	41	418
3:30 PM	17	106	3	0	126	9	13	29	0	51	31	169	38	0	238	30	4	17	0	51	466
3:45 PM	18	85	6	0	109	14	8	18	0	40	18	174	46	0	238	33	7	25	0	65	452
Hourly Total	57	383	16	0	456	32	39	88	0	159	104	659	148	0	911	100	20	71	0	191	1717
4:00 PM	17	107	8	0	132	19	9	21	0	49	24	187	28	0	239	18	11	21	0	50	470
4:15 PM	18	69	10	0	97	17	14	27	0	58	20	189	35	0	244	28	10	23	0	61	460
4:30 PM	26	115	7	0	148	29	14	22	0	65	18	203	18	0	239	34	8	40	0	82	534
4:45 PM	25	107	3	0	135	26	19	20	0	65	17	207	44	0	268	23	10	18	0	51	519
Hourly Total	86	398	28	0	512	91	56	90	0	237	79	786	125	0	990	103	39	102	0	244	1983
5:00 PM	15	107	5	0	127	9	16	21	0	46	25	220	24	0	269	25	13	15	0	53	495
5:15 PM	17	97	4	0	118	17	19	21	0	57	21	200	43	0	264	28	13	28	0	69	508
5:30 PM	21	112	5	0	138	20	12	24	0	56	23	208	27	0	258	25	7	23	0	55	507
5:45 PM	14	106	4	0	124	12	13	27	0	52	19	185	50	0	254	27	4	23	0	54	484
Hourly Total	67	422	18	0	507	58	60	93	0	211	88	813	144	0	1045	105	37	89	0	231	1994
6:00 PM	11	83	4	0	98	7	10	19	0	36	24	138	40	0	202	37	10	27	0	74	410
6:15 PM	18	133	4	0	155	14	6	16	0	36	20	139	29	0	188	23	8	17	0	48	427
6:30 PM	19	114	5	0	138	3	6	15	0	24	22	110	34	0	166	38	6	17	0	61	389
6:45 PM	10	93	4	0	107	5	8	12	0	25	17	116	45	0	178	20	7	18	0	45	355
Hourly Total	58	423	17	0	498	29	30	62	0	121	83	503	148	0	734	118	31	79	0	228	1581
Grand Total	618	5605	244	0	6467	358	371	1068	0	1797	890	5742	1123	0	7755	1207	288	694	0	2189	18208
Approach %	9.6	86.7	3.8	0.0	-	19.9	20.6	59.4	0.0	-	11.5	74.0	14.5	0.0	-	55.1	13.2	31.7	0.0	-	-
Total %	3.4	30.8	1.3	0.0	35.5	2.0	2.0	5.9	0.0	9.9	4.9	31.5	6.2	0.0	42.6	6.6	1.6	3.8	0.0	12.0	-
Motorcycles	0	1	0	0	1	0	1	0	0	1	1	2	0	0	3	0	0	1	0	1	6
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	0.1	0.1	0.0	0.0	-	0.0	0.0	0.0	0.1	-	0.0	0.0
Cars & Light Goods	596	5341	237	0	6174	348	360	1027	0	1735	851	5437	1081	0	7369	1165	282	677	0	2124	17402
% Cars & Light Goods	96.4	95.3	97.1	-	95.5	97.2	97.0	96.2	-	96.5	95.6	94.7	96.3	-	95.0	96.5	97.9	97.6	-	97.0	95.6
Buses	1	42	2	0	45	6	8	32	0	46	30	54	7	0	91	8	4	4	0	16	198
% Buses	0.2	0.7	0.8	-	0.7	1.7	2.2	3.0	-	2.6	3.4	0.9	0.6	-	1.2	0.7	1.4	0.6	-	0.7	1.1
Single-Unit Trucks	18	180	5	0	203	3	2	9	0	14	8	210	35	0	253	34	2	12	0	48	518
% Single-Unit Trucks	2.9	3.2	2.0	-	3.1	0.8	0.5	0.8	-	0.8	0.9	3.7	3.1	-	3.3	2.8	0.7	1.7	-	2.2	2.8
Articulated Trucks	3	41	0	0	44	1	0	0	0	1	0	39	0	0	39	0	0	0	0	0	84
% Articulated Trucks	0.5	0.7	0.0	-	0.7	0.3	0.0	0.0	-	0.1	0.0	0.7	0.0	-	0.5	0.0	0.0	0.0	-	0.0	0.5

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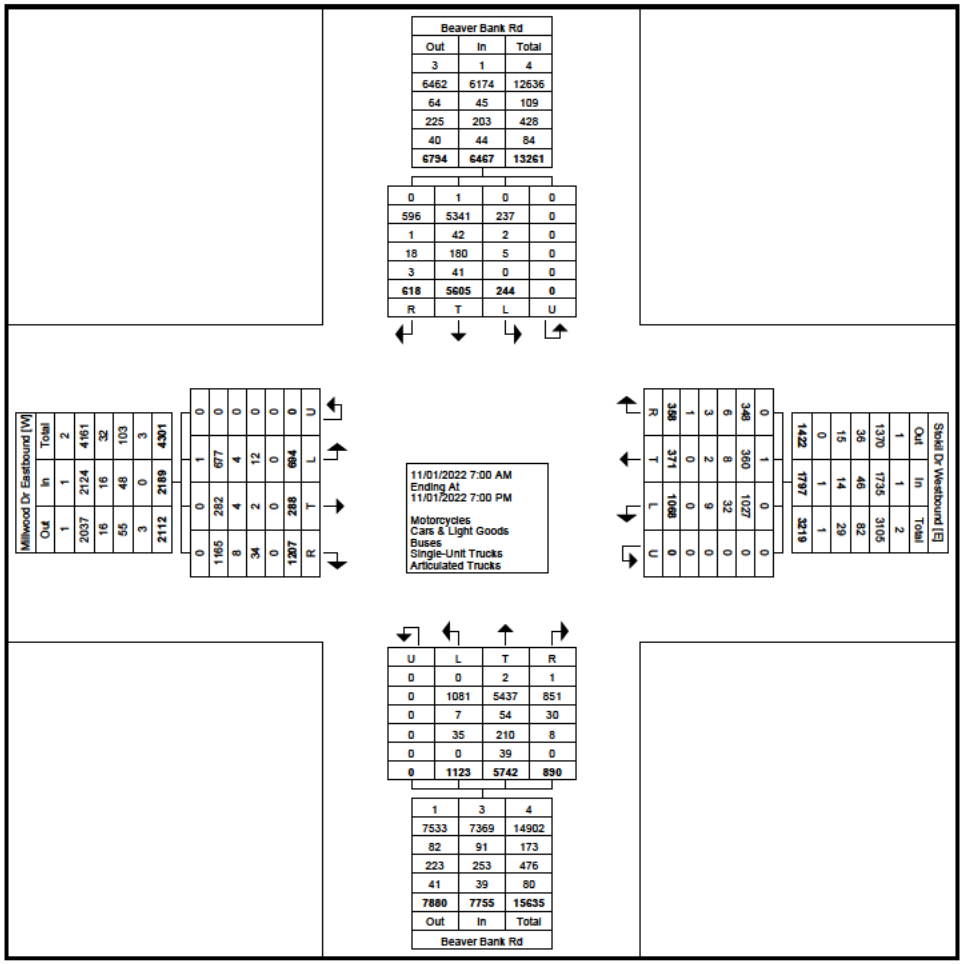

Turning Movement Data Plot

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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

Count Name: 22RQ704
Site Code: Beaver Bank Rd at Millwood Dr and Stokil Dr
Start Date: 11/01/2022

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Beaver Bank Rd Southbound					Stokil Dr Westbound					Beaver Bank Rd Northbound					Millwood Dr Eastbound					
	Southbound					Westbound					Northbound					Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
7:30 AM	15	192	5	0	212	10	9	34	0	53	26	73	8	0	107	36	6	17	0	59	431
7:45 AM	16	164	10	0	190	5	8	33	0	46	29	64	13	0	106	38	10	13	0	61	403
8:00 AM	24	171	14	0	209	7	10	42	0	59	25	69	10	0	104	46	14	20	0	80	452
8:15 AM	9	139	9	0	157	5	8	37	0	50	28	79	12	0	119	35	13	14	0	62	388
Total	64	666	38	0	768	27	35	146	0	208	108	285	43	0	436	155	43	64	0	262	1674
Approach %	8.3	86.7	4.9	0.0	-	13.0	16.8	70.2	0.0	-	24.8	65.4	9.9	0.0	-	59.2	16.4	24.4	0.0	-	-
Total %	3.8	39.8	2.3	0.0	45.9	1.6	2.1	8.7	0.0	12.4	6.5	17.0	2.6	0.0	26.0	9.3	2.6	3.8	0.0	15.7	-
PHF	0.667	0.867	0.679	0.000	0.906	0.675	0.875	0.869	0.000	0.881	0.931	0.902	0.827	0.000	0.916	0.842	0.768	0.800	0.000	0.819	0.926
Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	1.6	-	0.4	0.1
Cars & Light Goods	62	644	37	0	743	26	34	143	0	203	98	266	42	0	406	151	42	63	0	256	1608
% Cars & Light Goods	96.9	96.7	97.4	-	96.7	96.3	97.1	97.9	-	97.6	90.7	93.3	97.7	-	93.1	97.4	97.7	98.4	-	97.7	96.1
Buses	0	7	1	0	8	0	1	2	0	3	9	8	1	0	18	1	1	0	0	2	31
% Buses	0.0	1.1	2.6	-	1.0	0.0	2.9	1.4	-	1.4	8.3	2.8	2.3	-	4.1	0.6	2.3	0.0	-	0.8	1.9
Single-Unit Trucks	2	14	0	0	16	1	0	1	0	2	1	10	0	0	11	3	0	0	0	3	32
% Single-Unit Trucks	3.1	2.1	0.0	-	2.1	3.7	0.0	0.7	-	1.0	0.9	3.5	0.0	-	2.5	1.9	0.0	0.0	-	1.1	1.9
Articulated Trucks	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
% Articulated Trucks	0.0	0.2	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.4	0.0	-	0.2	0.0	0.0	0.0	-	0.0	0.1

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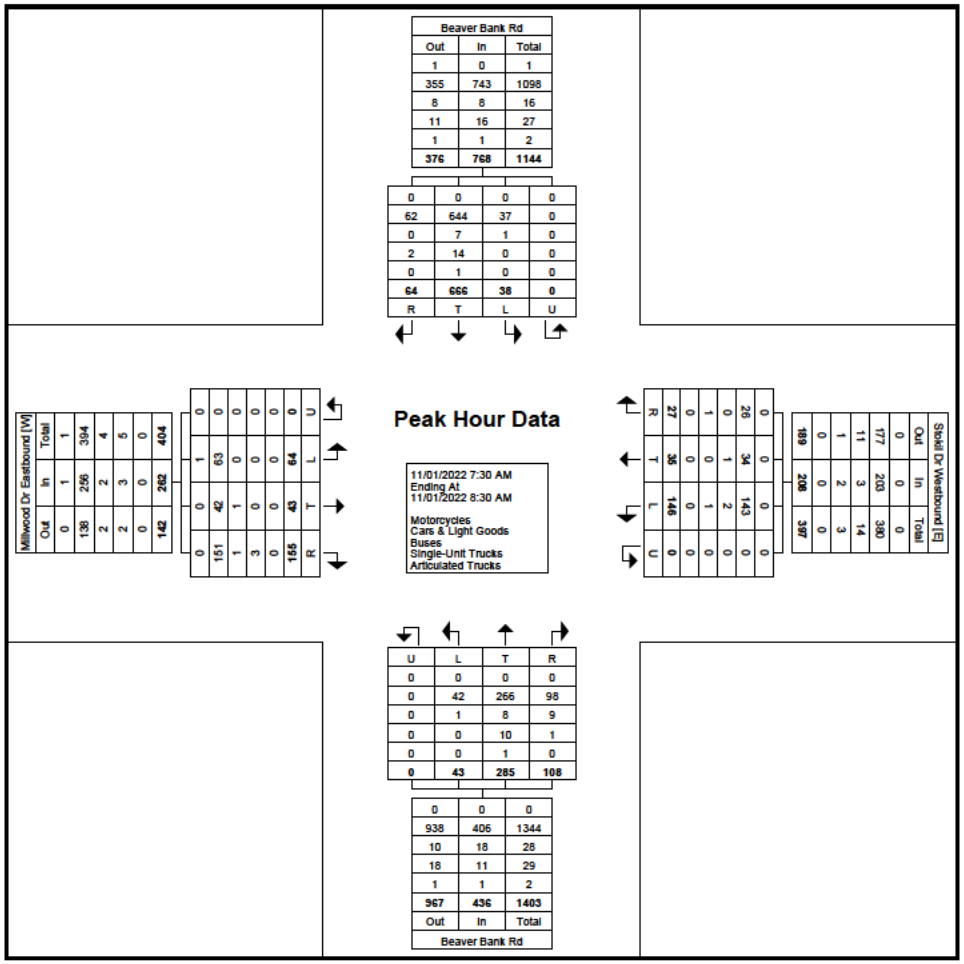

Turning Movement Peak Hour Data Plot (7:30 AM)

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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

Count Name: 22RQ704
Site Code: Beaver Bank Rd at Millwood Dr and Stokil Dr
Start Date: 11/01/2022

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Beaver Bank Rd Southbound					Stokil Dr Westbound					Beaver Bank Rd Northbound					Millwood Dr Eastbound					
	Southbound					Westbound					Northbound					Eastbound					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
4:30 PM	26	115	7	0	148	29	14	22	0	65	18	203	18	0	239	34	8	40	0	82	534
4:45 PM	25	107	3	0	135	26	19	20	0	65	17	207	44	0	268	23	10	18	0	51	519
5:00 PM	15	107	5	0	127	9	16	21	0	46	25	220	24	0	269	25	13	15	0	53	495
5:15 PM	17	97	4	0	118	17	19	21	0	57	21	200	43	0	264	28	13	28	0	69	508
Total	83	426	19	0	528	81	68	84	0	233	81	830	129	0	1040	110	44	101	0	255	2056
Approach %	15.7	80.7	3.6	0.0	-	34.8	29.2	36.1	0.0	-	7.8	79.8	12.4	0.0	-	43.1	17.3	39.6	0.0	-	-
Total %	4.0	20.7	0.9	0.0	25.7	3.9	3.3	4.1	0.0	11.3	3.9	40.4	6.3	0.0	50.6	5.4	2.1	4.9	0.0	12.4	-
PHF	0.798	0.926	0.679	0.000	0.892	0.698	0.895	0.955	0.000	0.896	0.810	0.943	0.733	0.000	0.967	0.809	0.846	0.631	0.000	0.777	0.963
Motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Motorcycles	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	83	411	19	0	513	81	68	78	0	227	78	808	124	0	1010	106	43	96	0	245	1995
% Cars & Light Goods	100.0	96.5	100.0	-	97.2	100.0	100.0	92.9	-	97.4	96.3	97.3	96.1	-	97.1	96.4	97.7	95.0	-	96.1	97.0
Buses	0	2	0	0	2	0	0	4	0	4	2	4	1	0	7	1	1	2	0	4	17
% Buses	0.0	0.5	0.0	-	0.4	0.0	0.0	4.8	-	1.7	2.5	0.5	0.8	-	0.7	0.9	2.3	2.0	-	1.6	0.8
Single-Unit Trucks	0	13	0	0	13	0	0	2	0	2	1	15	4	0	20	3	0	3	0	6	41
% Single-Unit Trucks	0.0	3.1	0.0	-	2.5	0.0	0.0	2.4	-	0.9	1.2	1.8	3.1	-	1.9	2.7	0.0	3.0	-	2.4	2.0
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.4	0.0	-	0.3	0.0	0.0	0.0	-	0.0	0.1

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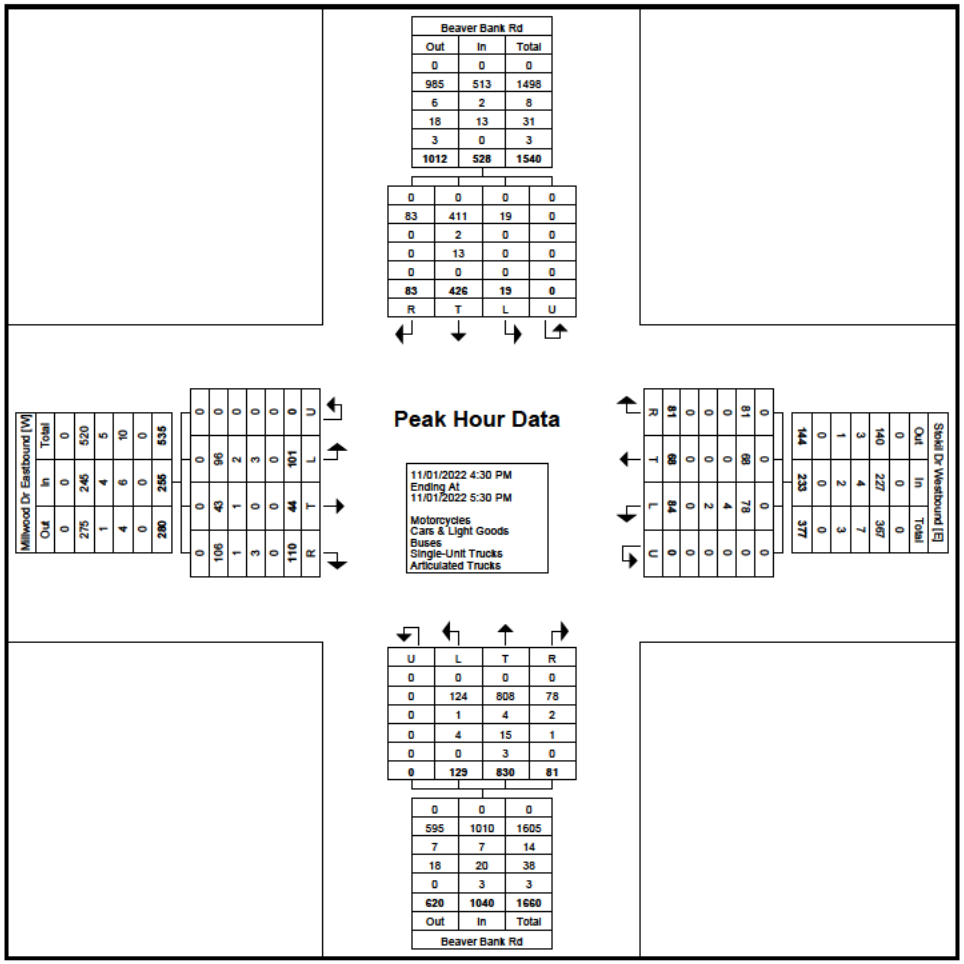

Turning Movement Peak Hour Data Plot (4:30 PM)

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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

Count Name: 23RQ632
Site Code: Beaver Bank Rd at Windgate Dr
Start Date: 06/22/2023

Turning Movement Data

Start Time	Beaver Bank Rd Southbound					Windgate Dr Westbound					Beaver Bank Rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	196	21	0	0	217	9	12	0	3	21	17	50	0	0	67	305
7:15 AM	191	21	1	0	213	9	16	0	0	25	28	94	0	0	122	360
7:30 AM	223	24	0	0	247	12	25	0	0	37	22	96	0	0	118	402
7:45 AM	208	40	0	0	248	10	12	0	2	22	19	89	0	0	108	378
Hourly Total	818	106	1	0	925	40	65	0	5	105	86	329	0	0	415	1445
8:00 AM	167	23	0	0	190	4	16	0	0	20	21	75	0	0	96	306
8:15 AM	161	16	0	0	177	7	21	0	2	28	19	80	0	0	99	304
8:30 AM	184	18	0	0	202	6	18	0	1	24	21	85	0	0	106	332
8:45 AM	148	27	0	0	175	4	18	0	0	22	27	71	0	0	98	295
Hourly Total	660	84	0	0	744	21	73	0	3	94	88	311	0	0	399	1237
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	88	11	0	0	99	6	30	0	1	36	20	93	0	0	113	248
11:15 AM	116	13	0	0	129	16	22	0	0	38	19	77	0	0	96	263
11:30 AM	110	18	0	0	128	17	15	0	2	32	28	109	0	0	137	297
11:45 AM	115	16	0	0	131	11	22	0	0	33	24	120	0	0	144	308
Hourly Total	429	58	0	0	487	50	89	0	3	139	91	399	0	0	490	1116
12:00 PM	115	15	0	0	130	10	29	0	2	39	28	120	0	0	148	317
12:15 PM	93	13	0	0	106	9	16	0	1	25	20	137	0	0	157	288
12:30 PM	115	13	0	0	128	11	23	0	0	34	32	110	0	0	142	304
12:45 PM	102	14	0	0	116	13	16	0	0	29	20	97	0	0	117	262
Hourly Total	425	55	0	0	480	43	84	0	3	127	100	464	0	0	564	1171
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	122	10	0	0	132	27	25	0	1	52	26	210	0	0	236	420
4:15 PM	134	17	0	0	151	14	28	0	1	42	46	204	0	0	250	443
4:30 PM	118	7	0	0	125	26	25	0	1	51	32	204	0	0	236	412
4:45 PM	126	13	0	0	139	12	24	0	2	36	35	225	0	0	260	435
Hourly Total	500	47	0	0	547	79	102	0	5	181	139	843	0	0	982	1710
5:00 PM	122	16	0	0	138	25	29	0	0	54	41	218	0	0	259	451
5:15 PM	128	8	0	0	136	24	32	0	0	56	48	219	1	0	268	460
5:30 PM	165	12	0	0	177	21	22	0	1	43	41	178	0	0	219	439
5:45 PM	139	19	0	0	158	10	27	0	4	37	32	196	0	0	228	423
Hourly Total	554	55	0	0	609	80	110	0	5	190	162	811	1	0	974	1773
Grand Total	3386	405	1	0	3792	313	523	0	24	836	666	3157	1	0	3824	8452
Approach %	89.3	10.7	0.0	-	-	37.4	62.6	0.0	-	-	17.4	82.6	0.0	-	-	-
Total %	40.1	4.8	0.0	-	44.9	3.7	6.2	0.0	-	9.9	7.9	37.4	0.0	-	45.2	-
All Vehicles (no classification)	3386	405	1	-	3792	313	523	0	-	836	666	3157	1	-	3824	8452
% 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
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	5	-	-	-	-	0	-	-

% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	20.8	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	19	-	-	-	-	0	-	-	
% Pedestrians	-	-	-	-	-	-	-	-	79.2	-	-	-	-	-	-	-	

Halifax Regional Municipality (Dartmouth, NS)
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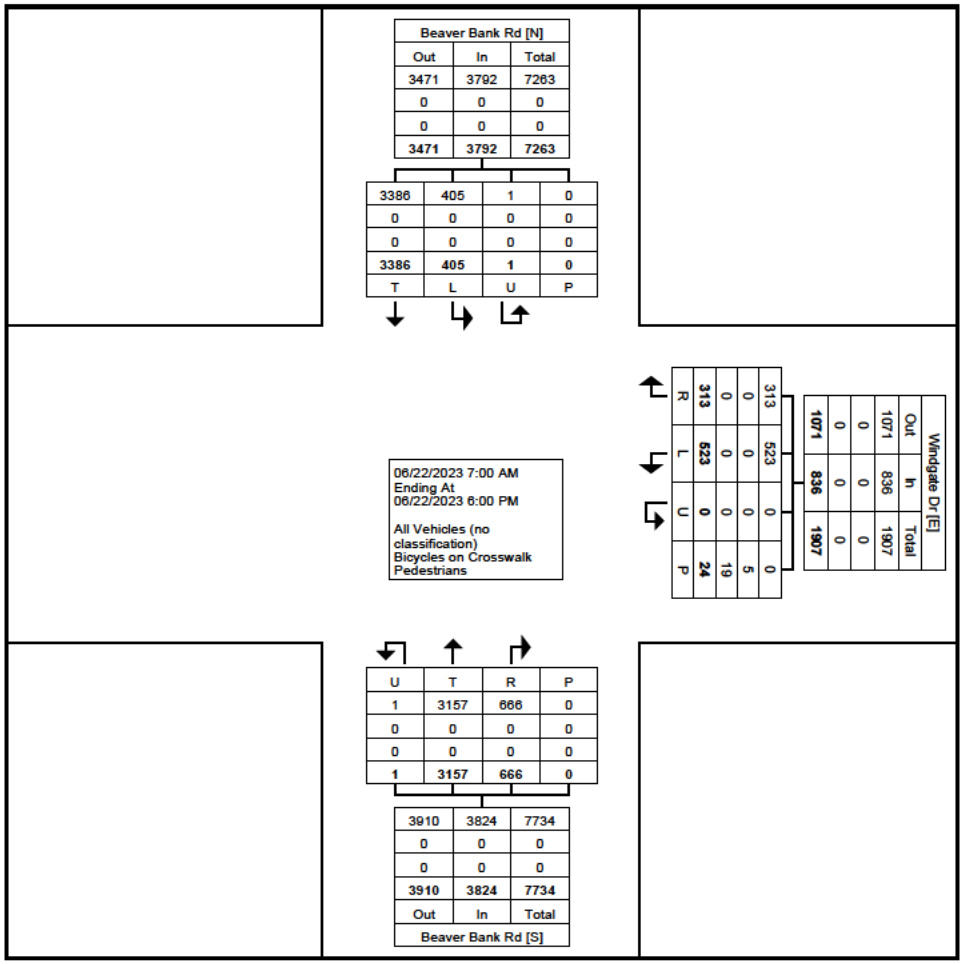
Count Name: 23RQ632
Site Code: Beaver Bank Rd at Windgate Dr
Start Date: 06/22/2023



Turning Movement Data Plot

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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

Count Name: 23RQ632
Site Code: Beaver Bank Rd at Windgate Dr
Start Date: 06/22/2023

Turning Movement Peak Hour Data (7:15 AM)

Start Time	Beaver Bank Rd Southbound					Windgate Dr Westbound					Beaver Bank Rd Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
7:15 AM	191	21	1	0	213	9	16	0	0	25	28	94	0	0	122	360
7:30 AM	223	24	0	0	247	12	25	0	0	37	22	96	0	0	118	402
7:45 AM	208	40	0	0	248	10	12	0	2	22	19	89	0	0	108	378
8:00 AM	167	23	0	0	190	4	16	0	0	20	21	75	0	0	96	306
Total	789	108	1	0	898	35	69	0	2	104	90	354	0	0	444	1446
Approach %	87.9	12.0	0.1	-	-	33.7	66.3	0.0	-	-	20.3	79.7	0.0	-	-	-
Total %	54.6	7.5	0.1	-	62.1	2.4	4.8	0.0	-	7.2	6.2	24.5	0.0	-	30.7	-
PHF	0.885	0.675	0.250	-	0.905	0.729	0.690	0.000	-	0.703	0.804	0.922	0.000	-	0.910	0.899
All Vehicles (no classification)	789	108	1	-	898	35	69	0	-	104	90	354	0	-	444	1446
% 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
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	50.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	50.0	-	-	-	-	-	-	-

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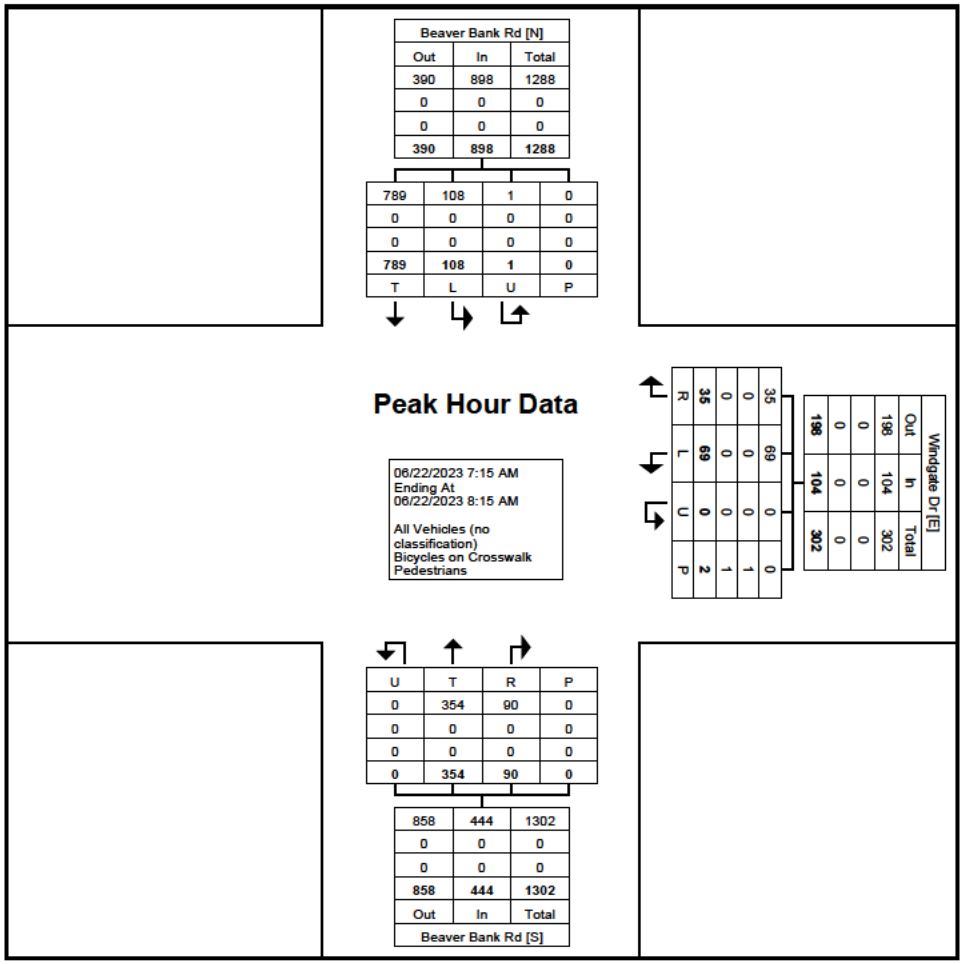

Turning Movement Peak Hour Data Plot (7:15 AM)

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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

Count Name: 23RQ632
Site Code: Beaver Bank Rd at Windgate Dr
Start Date: 06/22/2023

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Beaver Bank Rd Southbound					Windgate Dr Westbound					Beaver Bank Rd Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
11:00 AM	88	11	0	0	99	6	30	0	1	36	20	93	0	0	113	248
11:15 AM	116	13	0	0	129	16	22	0	0	38	19	77	0	0	96	263
11:30 AM	110	18	0	0	128	17	15	0	2	32	28	109	0	0	137	297
11:45 AM	115	16	0	0	131	11	22	0	0	33	24	120	0	0	144	308
Total	429	58	0	0	487	50	89	0	3	139	91	399	0	0	490	1116
Approach %	88.1	11.9	0.0	-	-	36.0	64.0	0.0	-	-	18.6	81.4	0.0	-	-	-
Total %	38.4	5.2	0.0	-	43.6	4.5	8.0	0.0	-	12.5	8.2	35.8	0.0	-	43.9	-
PHF	0.925	0.806	0.000	-	0.929	0.735	0.742	0.000	-	0.914	0.813	0.831	0.000	-	0.851	0.906
All Vehicles (no classification)	429	58	0	-	487	50	89	0	-	139	91	399	0	-	490	1116
% All Vehicles (no classification)	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0	100.0	-	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	33.3	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	66.7	-	-	-	-	-	-	-

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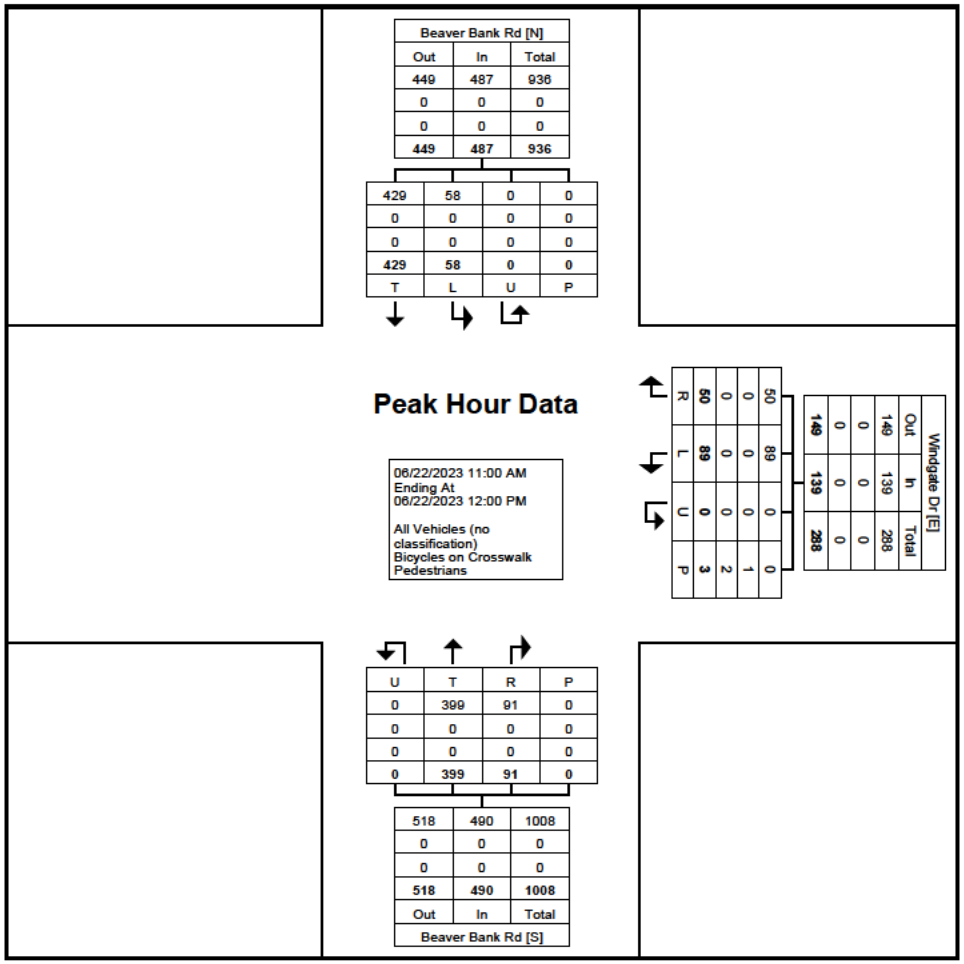

Turning Movement Peak Hour Data Plot (11:00 AM)

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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(902) 490-4866

Count Name: 23RQ632
Site Code: Beaver Bank Rd at Windgate Dr
Start Date: 06/22/2023

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Beaver Bank Rd Southbound					Windgate Dr Westbound					Beaver Bank Rd Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
12:00 PM	115	15	0	0	130	10	29	0	2	39	28	120	0	0	148	317
12:15 PM	93	13	0	0	106	9	16	0	1	25	20	137	0	0	157	288
12:30 PM	115	13	0	0	128	11	23	0	0	34	32	110	0	0	142	304
12:45 PM	102	14	0	0	116	13	16	0	0	29	20	97	0	0	117	262
Total	425	55	0	0	480	43	84	0	3	127	100	464	0	0	564	1171
Approach %	88.5	11.5	0.0	-	-	33.9	66.1	0.0	-	-	17.7	82.3	0.0	-	-	-
Total %	36.3	4.7	0.0	-	41.0	3.7	7.2	0.0	-	10.8	8.5	39.6	0.0	-	48.2	-
PHF	0.924	0.917	0.000	-	0.923	0.827	0.724	0.000	-	0.814	0.781	0.847	0.000	-	0.898	0.924
All Vehicles (no classification)	425	55	0	-	480	43	84	0	-	127	100	464	0	-	564	1171
% All Vehicles (no classification)	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	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Halifax Regional Municipality (Dartmouth, NS)
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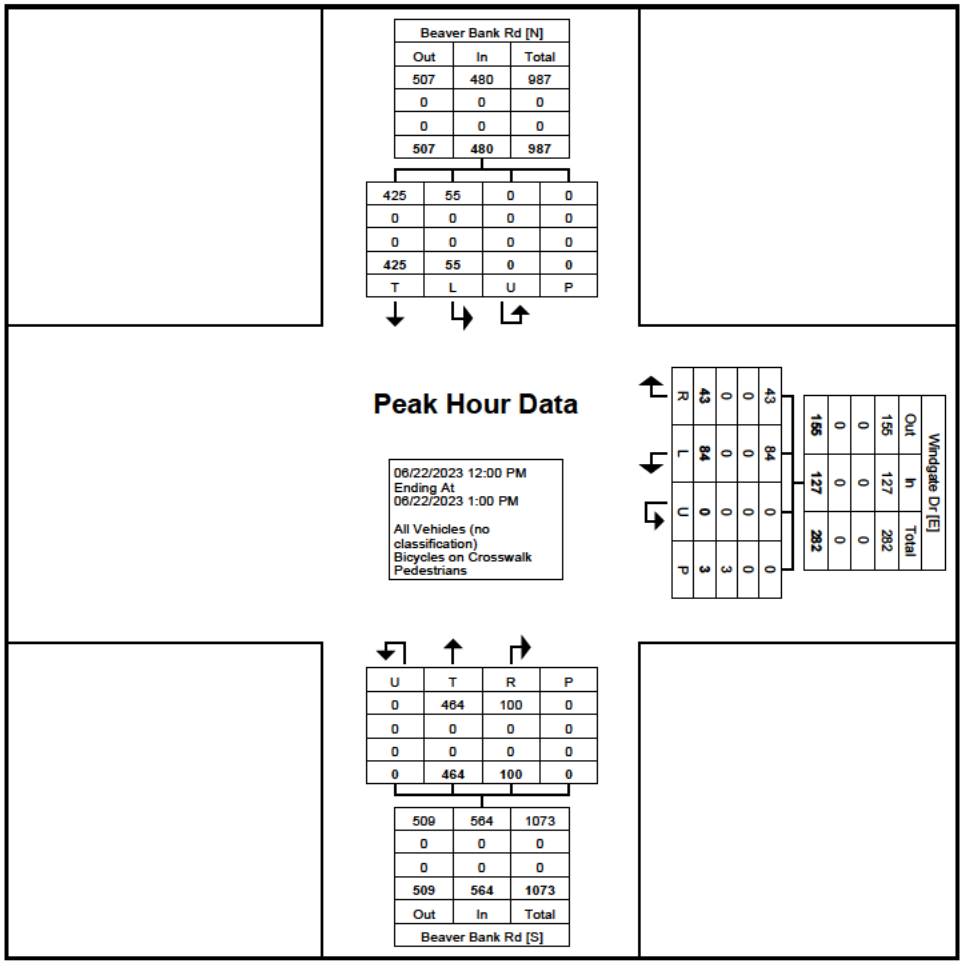

Turning Movement Peak Hour Data Plot (12:00 PM)

Halifax Regional Municipality (Dartmouth, NS)
PO Box 1749

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(902) 490-4866

Count Name: 23RQ632
Site Code: Beaver Bank Rd at Windgate Dr
Start Date: 06/22/2023

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Beaver Bank Rd Southbound					Windgate Dr Westbound					Beaver Bank Rd Northbound					
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	Int. Total
4:45 PM	126	13	0	0	139	12	24	0	2	36	35	225	0	0	260	435
5:00 PM	122	16	0	0	138	25	29	0	0	54	41	218	0	0	259	451
5:15 PM	128	8	0	0	136	24	32	0	0	56	48	219	1	0	268	460
5:30 PM	165	12	0	0	177	21	22	0	1	43	41	178	0	0	219	439
Total	541	49	0	0	590	82	107	0	3	189	165	840	1	0	1006	1785
Approach %	91.7	8.3	0.0	-	-	43.4	56.6	0.0	-	-	16.4	83.5	0.1	-	-	-
Total %	30.3	2.7	0.0	-	33.1	4.6	6.0	0.0	-	10.6	9.2	47.1	0.1	-	56.4	-
PHF	0.820	0.766	0.000	-	0.833	0.820	0.836	0.000	-	0.844	0.859	0.933	0.250	-	0.938	0.970
All Vehicles (no classification)	541	49	0	-	590	82	107	0	-	189	165	840	1	-	1006	1785
% 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
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

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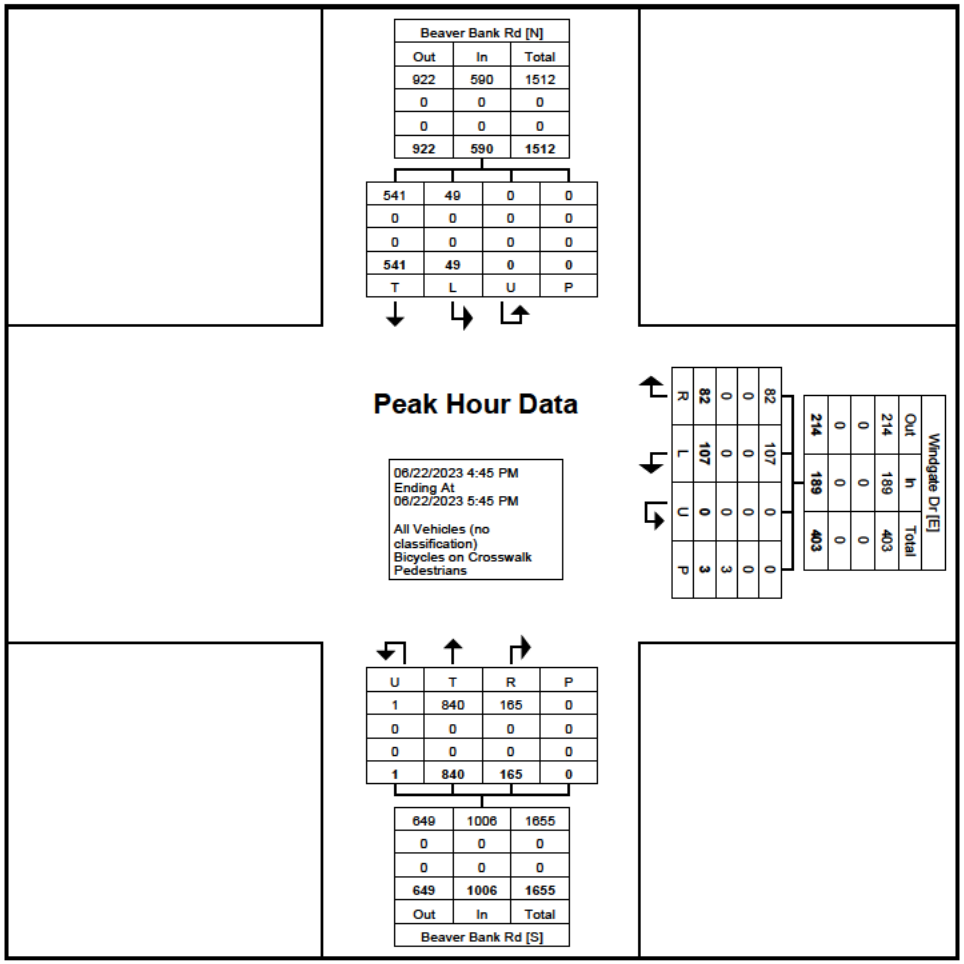


Turning Movement Peak Hour Data Plot (4:45 PM)

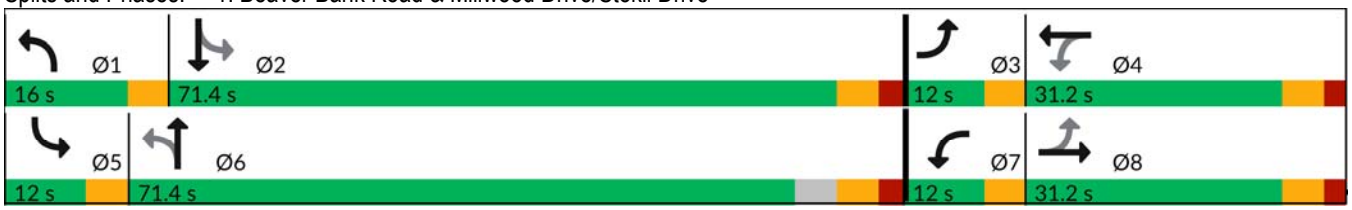
APPENDIX B: EXISTING SYNCHRO REPORTS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	43	155	146	35	27	43	285	108	38	666	64
Future Volume (vph)	64	43	155	146	35	27	43	285	108	38	666	64
Satd. Flow (prot)	1789	1625	0	1789	1697	0	1789	1705	0	1772	1829	0
Flt Permitted	0.705			0.257			0.103			0.426		
Satd. Flow (perm)	1324	1625	0	483	1697	0	194	1705	0	794	1829	0
Satd. Flow (RTOR)		113			34			21			7	
Lane Group Flow (vph)	80	241	0	168	80	0	52	433	0	56	862	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	12.0	31.2		12.0	31.2		16.0	71.4		12.0	71.4	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	24.3	14.0		26.3	18.0		63.9	56.1		63.9	56.1	
Actuated g/C Ratio	0.23	0.13		0.25	0.17		0.61	0.54		0.61	0.54	
v/c Ratio	0.23	0.76		0.74	0.25		0.22	0.47		0.10	0.87	
Control Delay (s/veh)	34.4	41.2		56.1	30.1		9.6	17.0		7.8	33.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	34.4	41.2		56.1	30.1		9.6	17.0		7.8	33.4	
LOS	C	D		E	C		A	B		A	C	
Approach Delay (s/veh)		39.5			47.7			16.2			31.8	
Approach LOS		D			D			B			C	
Queue Length 50th (m)	14.1	28.1		31.2	9.4		3.4	50.5		3.7	148.8	
Queue Length 95th (m)	23.5	42.0		#58.2	22.8		8.5	89.5		7.3	#253.0	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	352	495		227	454		317	1179		570	1204	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.23	0.49		0.74	0.18		0.16	0.37		0.10	0.72	

Intersection Summary	
Cycle Length: 130.6	
Actuated Cycle Length: 104.3	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay (s/veh): 31.2	Intersection LOS: C
Intersection Capacity Utilization 72.9%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive



Intersection	
Int Delay, s/veh	17.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	69	35	354	90	108	789
Future Vol, veh/h	69	35	354	90	108	789
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	40	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	73	92	80	68	89
Heavy Vehicles, %	2	2	6	2	2	3
Mvmt Flow	100	48	385	113	159	887

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1647	443	0	0	499	0
Stage 1	443	-	-	-	-	-
Stage 2	1204	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	109	615	-	-	1065	-
Stage 1	647	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 93	614	-	-	1063	-
Mov Cap-2 Maneuver	~ 93	-	-	-	-	-
Stage 1	646	-	-	-	-	-
Stage 2	242	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/veh	194.76	0	1.36
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	128	1063	-
HCM Lane V/C Ratio	-	-	1.157	0.149	-
HCM Control Delay (s/veh)	-	-	194.8	9	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	8.8	0.5	-

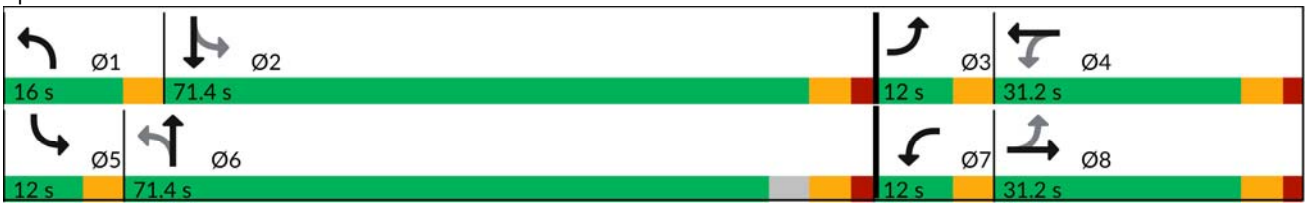
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	44	110	84	68	81	129	830	81	19	426	83
Future Volume (vph)	101	44	110	84	68	81	129	830	81	19	426	83
Satd. Flow (prot)	1738	1627	0	1706	1688	0	1755	1831	0	1789	1794	0
Flt Permitted	0.352			0.504			0.302			0.077		
Satd. Flow (perm)	643	1627	0	903	1688	0	558	1831	0	145	1794	0
Satd. Flow (RTOR)		89			52			7			12	
Lane Group Flow (vph)	160	188	0	88	192	0	177	983	0	28	562	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	12.0	31.2		12.0	31.2		16.0	71.4		12.0	71.4	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	25.1	16.6		23.7	13.8		73.7	65.6		68.0	58.5	
Actuated g/C Ratio	0.23	0.15		0.21	0.13		0.67	0.59		0.62	0.53	
v/c Ratio	0.71	0.59		0.35	0.75		0.38	0.90		0.14	0.59	
Control Delay (s/veh)	53.7	32.2		37.2	52.4		9.6	34.5		9.1	21.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	53.7	32.2		37.2	52.4		9.6	34.5		9.1	21.5	
LOS	D	C		D	D		A	C		A	C	
Approach Delay (s/veh)		42.1			47.6			30.7			20.9	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	29.9	21.1		15.8	30.8		12.6	194.4		1.8	77.3	
Queue Length 95th (m)	32.4	40.4		29.0	54.9		19.7	#324.2		4.2	132.7	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	226	440		255	425		506	1158		211	1070	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.71	0.43		0.35	0.45		0.35	0.85		0.13	0.53	

Intersection Summary	
Cycle Length: 130.6	
Actuated Cycle Length: 110.3	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay (s/veh): 31.9	Intersection LOS: C
Intersection Capacity Utilization 86.9%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive



Intersection	
Int Delay, s/veh	57.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	107	82	840	165	49	541
Future Vol, veh/h	107	82	840	165	49	541
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	40	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	82	93	86	77	82
Heavy Vehicles, %	2	2	3	2	2	3
Mvmt Flow	127	100	903	192	64	660

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1789	1002	0	0	1098	0
Stage 1	1002	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 89	294	-	-	636	-
Stage 1	355	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 80	293	-	-	634	-
Mov Cap-2 Maneuver	~ 80	-	-	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	403	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	$ 511.64	0	0.99
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	118	634	-
HCM Lane V/C Ratio	-	-	1.934	0.1	-
HCM Control Delay (s/veh)	-	-	$ 511.6	11.3	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	18.4	0.3	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C: FUTURE BACKGROUND SYNCHRO REPORTS

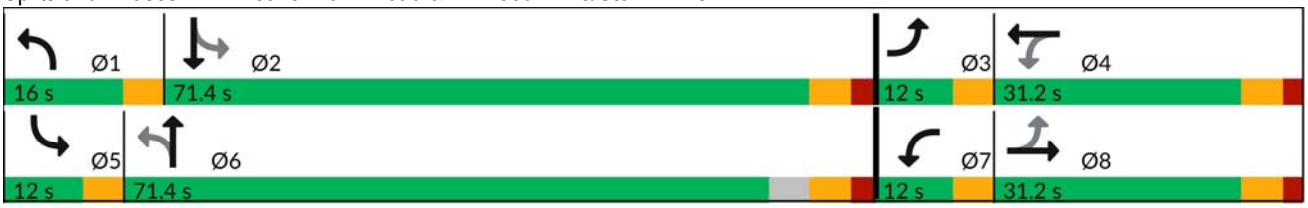
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	48	172	162	39	30	48	315	120	42	736	71
Future Volume (vph)	71	48	172	162	39	30	48	315	120	42	736	71
Satd. Flow (prot)	1789	1625	0	1789	1697	0	1789	1705	0	1772	1829	0
Flt Permitted	0.700			0.214			0.070			0.400		
Satd. Flow (perm)	1315	1625	0	402	1697	0	132	1705	0	745	1829	0
Satd. Flow (RTOR)		113			34			22			7	
Lane Group Flow (vph)	89	267	0	186	88	0	58	479	0	62	952	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	12.0	31.2		12.0	31.2		16.0	71.4		12.0	71.4	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	25.7	15.8		27.1	18.7		73.7	65.6		73.6	65.6	
Actuated g/C Ratio	0.22	0.14		0.24	0.16		0.64	0.57		0.64	0.57	
v/c Ratio	0.27	0.83		0.97	0.29		0.31	0.49		0.11	0.91	
Control Delay (s/veh)	35.4	49.6		97.4	31.1		12.1	17.8		8.3	38.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	35.4	49.6		97.4	31.1		12.1	17.8		8.3	38.0	
LOS	D	D		F	C		B	B		A	D	
Approach Delay (s/veh)		46.1			76.1			17.2			36.2	
Approach LOS		D			E			B			D	
Queue Length 50th (m)	15.9	35.1		~35.3	11.2		4.1	61.0		4.4	190.1	
Queue Length 95th (m)	25.8	49.4		#63.0	25.3		9.6	105.3		8.2	#308.3	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	331	444		192	399		262	1041		553	1046	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.60		0.97	0.22		0.22	0.46		0.11	0.91	

Intersection Summary	
Cycle Length: 130.6	
Actuated Cycle Length: 114.9	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay (s/veh): 38.1	Intersection LOS: D
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

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

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

Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive



Intersection	
Int Delay, s/veh	38.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	77	39	392	100	120	872
Future Vol, veh/h	77	39	392	100	120	872
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	40	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	73	92	80	68	89
Heavy Vehicles, %	2	2	6	2	2	3
Mvmt Flow	112	53	426	125	176	980

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1823	491	0	0	553	0
Stage 1	491	-	-	-	-	-
Stage 2	1333	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 85	578	-	-	1017	-
Stage 1	615	-	-	-	-	-
Stage 2	246	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 70	577	-	-	1015	-
Mov Cap-2 Maneuver	~ 70	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	203	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 423.91	0	1.42
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	98	1015	-
HCM Lane V/C Ratio	-	-	1.687	0.174	-
HCM Control Delay (s/veh)	-	-	$ 423.9	9.3	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	13.1	0.6	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

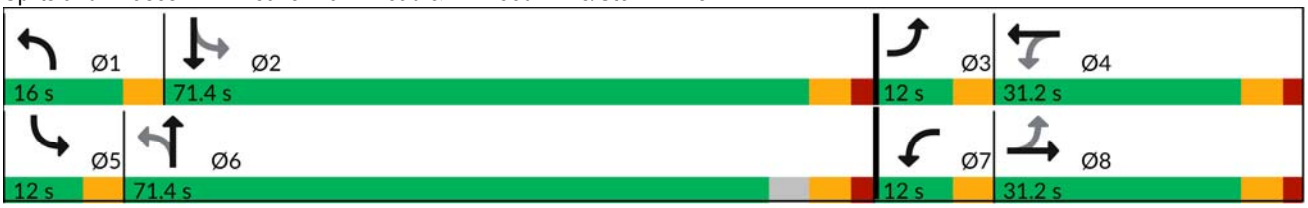
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	49	122	93	76	90	143	917	90	21	471	92
Future Volume (vph)	112	49	122	93	76	90	143	917	90	21	471	92
Satd. Flow (prot)	1738	1629	0	1706	1688	0	1755	1831	0	1789	1794	0
Flt Permitted	0.332			0.365			0.257			0.066		
Satd. Flow (perm)	606	1629	0	654	1688	0	475	1831	0	124	1794	0
Satd. Flow (RTOR)		89			52			7			12	
Lane Group Flow (vph)	178	209	0	97	213	0	196	1087	0	31	621	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	12.0	31.2		12.0	31.2		16.0	71.4		12.0	71.4	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	25.9	15.6		25.3	15.3		74.2	65.9		67.8	58.4	
Actuated g/C Ratio	0.23	0.14		0.23	0.14		0.66	0.59		0.60	0.52	
v/c Ratio	0.81	0.69		0.44	0.77		0.46	1.01		0.17	0.66	
Control Delay (s/veh)	63.6	38.6		39.6	54.5		11.5	55.1		10.2	24.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	63.6	38.6		39.6	54.5		11.5	55.1		10.2	24.7	
LOS	E	D		D	D		B	E		B	C	
Approach Delay (s/veh)		50.1			49.9			48.5			24.0	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	33.7	26.2		17.5	36.0		14.9	~271.9		2.1	94.4	
Queue Length 95th (m)	36.0	47.0		31.8	62.4		22.9	#390.9		4.7	159.2	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	221	435		225	420		453	1139		196	1054	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.81	0.48		0.43	0.51		0.43	0.95		0.16	0.59	

Intersection Summary	
Cycle Length: 130.6	
Actuated Cycle Length: 112.2	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay (s/veh): 42.8	Intersection LOS: D
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

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

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

Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive



Intersection	
Int Delay, s/veh	103.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	119	91	928	183	55	598
Future Vol, veh/h	119	91	928	183	55	598
Conflicting Peds, #/hr	0	0	0	3	3	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	40	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	82	93	86	77	82
Heavy Vehicles, %	2	2	3	2	2	3
Mvmt Flow	142	111	998	213	71	729

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1979	1107	0	0	1214	0
Stage 1	1107	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 68	256	-	-	575	-
Stage 1	316	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 59	255	-	-	573	-
Mov Cap-2 Maneuver	~ 59	-	-	-	-	-
Stage 1	315	-	-	-	-	-
Stage 2	358	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	$ 926.05	0	1.09
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	89	573	-
HCM Lane V/C Ratio	-	-	2.828	0.125	-
HCM Control Delay (s/veh)	-	-	$ 926	12.2	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	24.3	0.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX D: TRAFFIC SIGNAL WARRANT ANALYSIS

HRM - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**Beaverbank Road**
Side Street (name)	**Windgate Drive**
Quadrant / Int #	

for Warrant Calculation Results, please hit 'Page Down'

CHECK SHEET

Direction (EW or NS)	**NS**
Direction (EW or NS)	**EW**
Comments	**Existing Traffic Volumes**

Road Authority:	**HRM**
City:	**HRM**
Analysis Date:	**2024 Oct 04, Fri**
Count Date:	**2023 Jun 22, Thu**
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Beaverbank Road	NB					1			1,700	1			
Beaverbank Road	SB	1		1					590	1			
Windgate Drive	WB				1				1,700	1			
Windgate Drive	EB									0			

Are the Windgate Drive WB right turns significantly impeded by through movements? (y/n)	y
Are the Beaverbank Road NB right turns significantly impeded by through movements? (y/n)	y

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

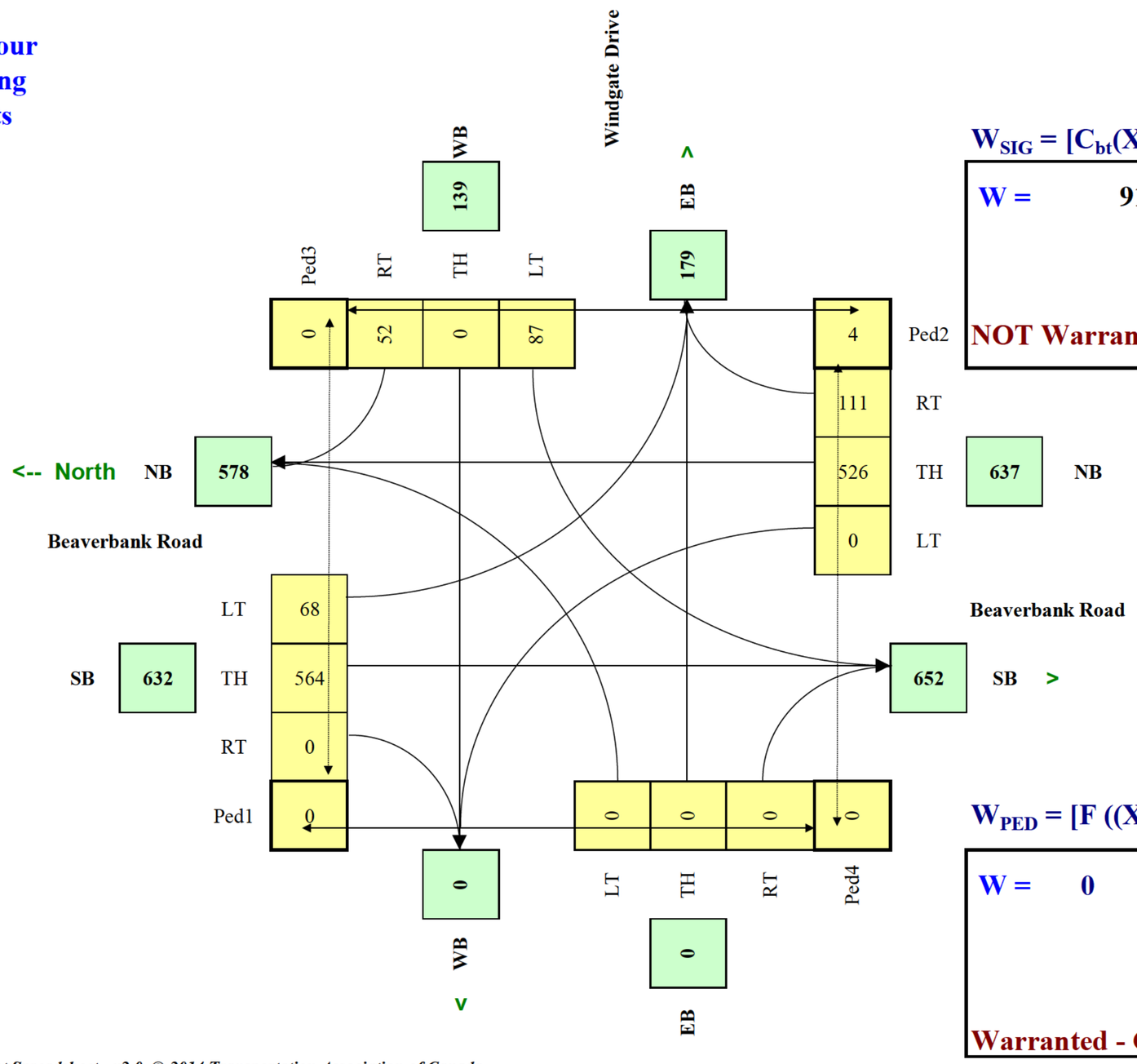
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	465,703
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Beaverbank Road	NS	50	4.0%	y	
Windgate Drive	EW	70	3.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
0: - 0:		329	86	106	818		65		40					5		
		311	88	84	660		73		21					3		
		399	91	58	429		89		50					3		
		464	100	55	425		84		43					3		
		843	139	47	500		102		79					5		
		811	162	55	554		110		80					5		
Total (6-hour peak)	**0**	**3,157**	**666**	**405**	**3,386**	**0**	**523**	**0**	**313**	**0**	**0**	**0**	**0**	**24**	**0**	**0**
Average (6-hour peak)	**0**	**526**	**111**	**68**	**564**	**0**	**87**	**0**	**52**	**0**	**0**	**0**	**0**	**4**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	**91**	**91**	**0**
		Veh	***Ped***

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

HRM - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**Beaverbank Road**
Side Street (name)	**Windgate Drive**
Quadrant / Int #	

CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Direction (EW or NS)	**NS**
Direction (EW or NS)	**EW**
Comments	**Future Background (2034) Traffic Volumes**

Road Authority:	**HRM**
City:	**HRM**
Analysis Date:	**2024 Oct 08, Tue**
Count Date:	**2023 Jun 22, Thu**
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Beaverbank Road	NB					1			1,700	1			
Beaverbank Road	SB	1		1					590	1			
Windgate Drive	WB				1				1,700	1			
Windgate Drive	EB									0			

Are the Windgate Drive WB right turns significantly impeded by through movements? (y/n)	y
Are the Beaverbank Road NB right turns significantly impeded by through movements? (y/n)	y

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

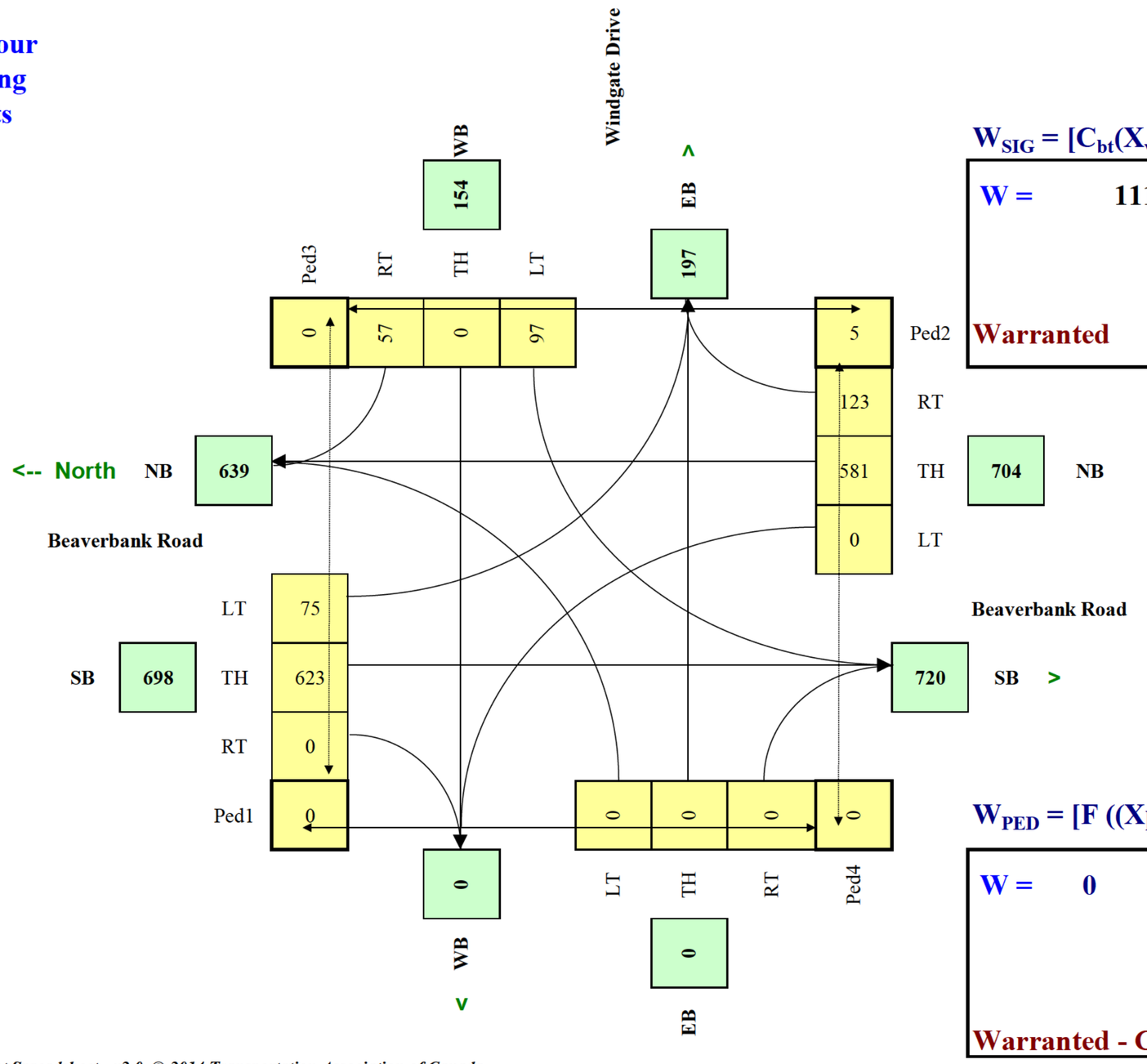
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	465,703
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Beaverbank Road	NS	50	4.0%	y	
Windgate Drive	EW	70	3.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
0: - 0:		363	95	117	904		72		44					6		
		344	97	93	729		81		23					3		
		441	101	64	474		98		55					3		
		513	110	61	469		93		47					3		
		931	154	52	552		113		87					6		
		896	179	61	612		122		88					6		
Total (6-hour peak)	**0**	**3,488**	**736**	**448**	**3,740**	**0**	**579**	**0**	**344**	**0**	**0**	**0**	**0**	**27**	**0**	**0**
Average (6-hour peak)	**0**	**581**	**123**	**75**	**623**	**0**	**97**	**0**	**57**	**0**	**0**	**0**	**0**	**5**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	**111**	**111**	**0**
		Veh	***Ped***

Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

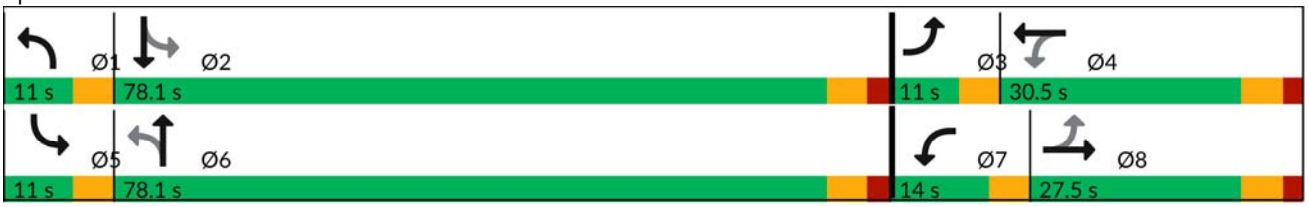
APPENDIX E: FUTURE BACKGROUND MITIGATION SYNCHRO REPORTS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	48	172	162	39	30	48	315	120	42	736	71
Future Volume (vph)	71	48	172	162	39	30	48	315	120	42	736	71
Satd. Flow (prot)	1789	1625	0	1789	1697	0	1789	1705	0	1772	1829	0
Flt Permitted	0.700			0.188			0.062			0.391		
Satd. Flow (perm)	1315	1625	0	354	1697	0	117	1705	0	729	1829	0
Satd. Flow (RTOR)		109			34			23			8	
Lane Group Flow (vph)	89	267	0	186	88	0	58	479	0	62	952	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	11.0	27.5		14.0	30.5		11.0	78.1		11.0	78.1	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	25.6	16.0		32.2	22.5		72.5	64.8		72.5	64.8	
Actuated g/C Ratio	0.22	0.14		0.28	0.19		0.62	0.56		0.62	0.56	
v/c Ratio	0.28	0.84		0.83	0.25		0.33	0.50		0.12	0.93	
Control Delay (s/veh)	38.2	53.5		66.9	32.0		13.2	18.1		8.4	41.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	38.2	53.5		66.9	32.0		13.2	18.1		8.4	41.8	
LOS	D	D		E	C		B	B		A	D	
Approach Delay (s/veh)		49.7			55.7			17.6			39.7	
Approach LOS		D			E			B			D	
Queue Length 50th (m)	17.2	39.6		38.2	11.8		4.6	66.0		4.9	206.2	
Queue Length 95th (m)	27.1	53.7		#65.6	26.2		9.1	99.4		7.7	#296.8	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	318	397		225	395		177	1100		517	1174	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.28	0.67		0.83	0.22		0.33	0.44		0.12	0.81	

Intersection Summary	
Cycle Length: 130.6	
Actuated Cycle Length: 116.7	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay (s/veh): 37.9	Intersection LOS: D
Intersection Capacity Utilization 79.2%	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.

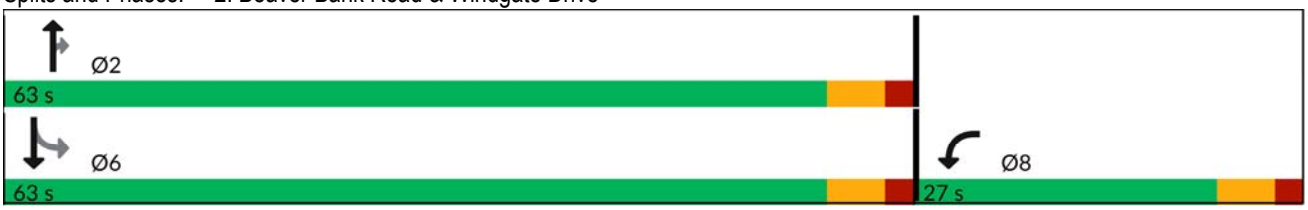
Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	77	39	392	100	120	872
Future Volume (vph)	77	39	392	100	120	872
Satd. Flow (prot)	1743	0	1812	1601	1789	1865
Flt Permitted	0.967				0.498	
Satd. Flow (perm)	1743	0	1812	1564	936	1865
Satd. Flow (RTOR)	25			125		
Lane Group Flow (vph)	165	0	426	125	176	980
Turn Type	Prot		NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases				2	6	
Total Split (s)	27.0		63.0	63.0	63.0	63.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Act Effct Green (s)	12.1		46.5	46.5	46.5	46.5
Actuated g/C Ratio	0.17		0.65	0.65	0.65	0.65
v/c Ratio	0.52		0.36	0.12	0.29	0.80
Control Delay (s/veh)	29.9		7.0	1.5	7.4	16.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.9		7.0	1.5	7.4	16.3
LOS	C		A	A	A	B
Approach Delay (s/veh)	29.9		5.8			14.9
Approach LOS	C		A			B
Queue Length 50th (m)	15.9		20.6	0.0	8.0	76.5
Queue Length 95th (m)	27.0		48.3	4.1	15.8	175.8
Internal Link Dist (m)	279.7		119.4			97.2
Turn Bay Length (m)				25.0	40.0	
Base Capacity (vph)	548		1498	1315	774	1542
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	0.30		0.28	0.10	0.23	0.64

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay (s/veh): 13.5	Intersection LOS: B
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Beaver Bank Road & Windgate Drive



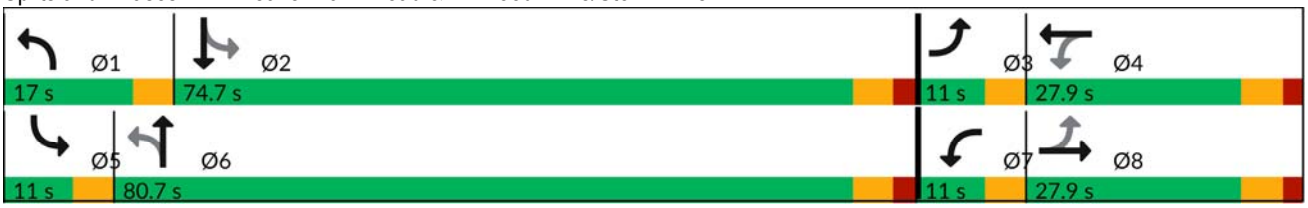
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	49	122	93	76	90	143	917	90	21	471	92
Future Volume (vph)	112	49	122	93	76	90	143	917	90	21	471	92
Satd. Flow (prot)	1738	1629	0	1706	1688	0	1755	1831	0	1789	1794	0
Flt Permitted	0.301			0.314			0.279			0.058		
Satd. Flow (perm)	550	1629	0	563	1688	0	515	1831	0	109	1794	0
Satd. Flow (RTOR)		86			51			7			13	
Lane Group Flow (vph)	178	209	0	97	213	0	196	1087	0	31	621	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	11.0	27.9		11.0	27.9		17.0	80.7		11.0	74.7	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	24.9	15.6		24.9	15.6		83.2	74.8		76.7	67.2	
Actuated g/C Ratio	0.21	0.13		0.21	0.13		0.69	0.62		0.64	0.56	
v/c Ratio	0.97	0.73		0.53	0.81		0.43	0.95		0.19	0.62	
Control Delay (s/veh)	104.1	45.0		49.2	62.3		9.9	41.4		9.7	21.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	104.1	45.0		49.2	62.3		9.9	41.4		9.7	21.9	
LOS	F	D		D	E		A	D		A	C	
Approach Delay (s/veh)		72.2			58.2			36.6			21.3	
Approach LOS		E			E			D			C	
Queue Length 50th (m)	37.6	29.4		19.5	39.5		14.9	~255.0		2.1	94.0	
Queue Length 95th (m)	39.2	50.8		34.4	66.6		20.8	#381.9		4.3	150.9	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	183	366		183	347		491	1140		167	1044	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.97	0.57		0.53	0.61		0.40	0.95		0.19	0.59	

Intersection Summary	
Cycle Length: 130.6	
Actuated Cycle Length: 120.4	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay (s/veh): 40.6	Intersection LOS: D
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

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

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

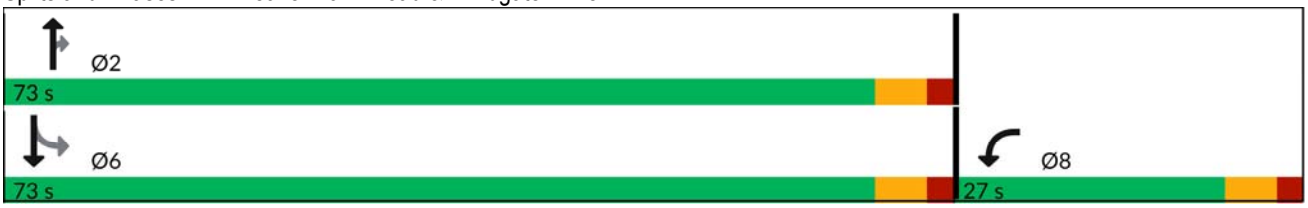
Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	91	928	183	55	598
Future Volume (vph)	119	91	928	183	55	598
Satd. Flow (prot)	1724	0	1865	1601	1789	1865
Flt Permitted	0.973				0.131	
Satd. Flow (perm)	1724	0	1865	1560	247	1865
Satd. Flow (RTOR)	36			100		
Lane Group Flow (vph)	253	0	998	213	71	729
Turn Type	Prot		NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases				2	6	
Total Split (s)	27.0		73.0	73.0	73.0	73.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Act Effct Green (s)	15.2		49.3	49.3	49.3	49.3
Actuated g/C Ratio	0.20		0.64	0.64	0.64	0.64
v/c Ratio	0.69		0.84	0.21	0.45	0.61
Control Delay (s/veh)	37.8		18.9	3.7	18.5	11.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.8		18.9	3.7	18.5	11.0
LOS	D		B	A	B	B
Approach Delay (s/veh)	37.8		16.2			11.7
Approach LOS	D		B			B
Queue Length 50th (m)	29.2		97.5	5.6	4.5	54.4
Queue Length 95th (m)	58.7		183.1	13.6	13.1	82.8
Internal Link Dist (m)	276.3		119.4			97.2
Turn Bay Length (m)				25.0	40.0	
Base Capacity (vph)	525		1578	1335	209	1578
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	0.48		0.63	0.16	0.34	0.46

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 77.3	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay (s/veh): 17.0	Intersection LOS: B
Intersection Capacity Utilization 71.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Beaver Bank Road & Windgate Drive



APPENDIX F: FUTURE TOTAL SYNCHRO REPORTS

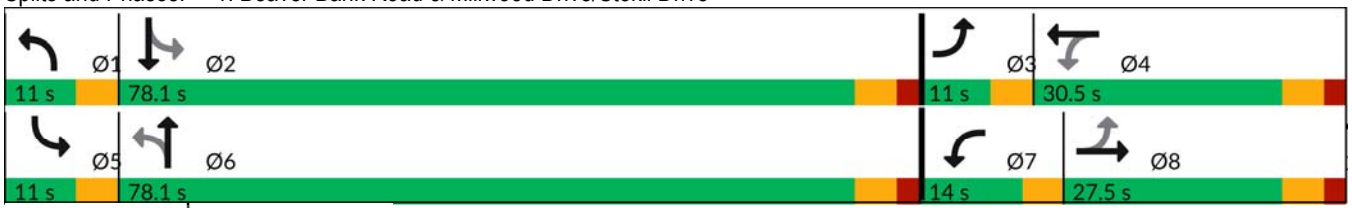
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	48	172	162	39	32	48	335	120	46	814	78
Future Volume (vph)	76	48	172	162	39	32	48	335	120	46	814	78
Satd. Flow (prot)	1789	1625	0	1789	1693	0	1789	1707	0	1772	1829	0
Flt Permitted	0.698			0.206			0.055			0.388		
Satd. Flow (perm)	1311	1625	0	387	1693	0	104	1707	0	723	1829	0
Satd. Flow (RTOR)		109			36			21			8	
Lane Group Flow (vph)	95	267	0	186	91	0	58	501	0	68	1052	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	11.0	27.5		14.0	30.5		11.0	78.1		11.0	78.1	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	25.5	16.3		31.5	19.3		79.9	72.1		79.9	72.1	
Actuated g/C Ratio	0.21	0.13		0.25	0.16		0.65	0.58		0.65	0.58	
v/c Ratio	0.32	0.87		0.88	0.31		0.36	0.50		0.13	0.98	
Control Delay (s/veh)	39.5	57.6		76.4	31.9		16.3	18.0		8.4	51.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	39.5	57.6		76.4	31.9		16.3	18.0		8.4	51.0	
LOS	D	E		E	C		B	B		A	D	
Approach Delay (s/veh)		52.9			61.8			17.8			48.4	
Approach LOS		D			E			B			D	
Queue Length 50th (m)	18.5	39.6		38.2	12.0		4.6	70.8		5.4	~277.9	
Queue Length 95th (m)	28.6	53.7		#62.0	26.5		9.8	106.1		8.4	#350.6	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	297	371		212	363		163	1004		527	1069	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.32	0.72		0.88	0.25		0.36	0.50		0.13	0.98	

Intersection Summary	
Cycle Length: 130.6	
Actuated Cycle Length: 123.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay (s/veh): 43.3	Intersection LOS: D
Intersection Capacity Utilization 83.7%	ICU Level of Service E
Analysis Period (min) 15	

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

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

Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive

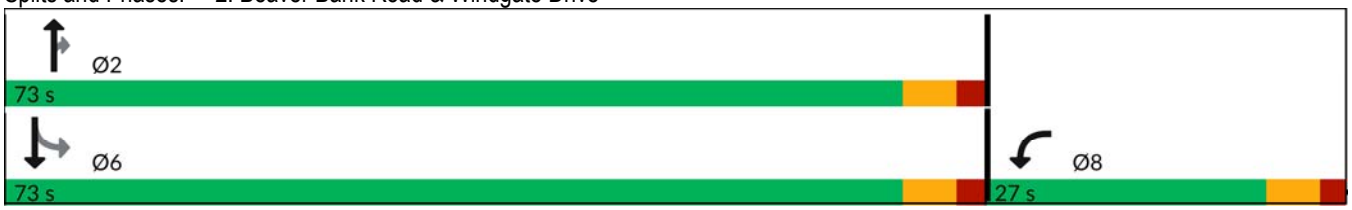


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	77	42	419	100	132	961
Future Volume (vph)	77	42	419	100	132	961
Satd. Flow (prot)	1739	0	1812	1601	1789	1865
Flt Permitted	0.968				0.479	
Satd. Flow (perm)	1739	0	1812	1563	901	1865
Satd. Flow (RTOR)	24			125		
Lane Group Flow (vph)	170	0	455	125	194	1080
Turn Type	Prot		NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases				2	6	
Total Split (s)	27.0		73.0	73.0	73.0	73.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Act Effct Green (s)	13.0		56.2	56.2	56.2	56.2
Actuated g/C Ratio	0.16		0.69	0.69	0.69	0.69
v/c Ratio	0.57		0.36	0.11	0.31	0.84
Control Delay (s/veh)	36.6		6.6	1.3	7.2	17.9
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.6		6.6	1.3	7.2	17.9
LOS	D		A	A	A	B
Approach Delay (s/veh)	36.6		5.5			16.3
Approach LOS	D		A			B
Queue Length 50th (m)	20.6		24.4	0.0	9.9	103.2
Queue Length 95th (m)	31.5		51.0	3.8	17.1	#216.6
Internal Link Dist (m)	279.7		119.4			97.2
Turn Bay Length (m)				25.0	40.0	
Base Capacity (vph)	479		1514	1326	752	1558
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	0.35		0.30	0.09	0.26	0.69

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 81.6			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay (s/veh): 14.9		Intersection LOS: B	
Intersection Capacity Utilization 67.4%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 2: Beaver Bank Road & Windgate Drive



Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	101	30	431	992	8
Future Vol, veh/h	25	101	30	431	992	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	25	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	110	33	468	1078	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1616	1083	1087	0	-	0
Stage 1	1083	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	114	264	642	-	-	-
Stage 1	325	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	108	264	642	-	-	-
Mov Cap-2 Maneuver	108	-	-	-	-	-
Stage 1	308	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	51.85	0.71	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	642	-	205	-	-
HCM Lane V/C Ratio	0.051	-	0.667	-	-
HCM Control Delay (s/veh)	10.9	-	51.8	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	4.1	-	-

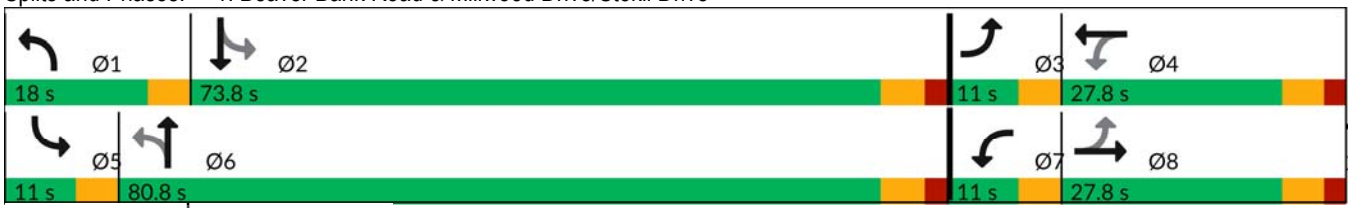
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	49	122	93	76	95	143	967	90	22	503	98
Future Volume (vph)	118	49	122	93	76	95	143	967	90	22	503	98
Satd. Flow (prot)	1738	1629	0	1706	1684	0	1755	1831	0	1789	1794	0
Flt Permitted	0.287			0.322			0.249			0.058		
Satd. Flow (perm)	524	1629	0	577	1684	0	460	1831	0	109	1794	0
Satd. Flow (RTOR)		86			53			7			13	
Lane Group Flow (vph)	187	209	0	97	220	0	196	1140	0	32	664	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4			6			2		
Total Split (s)	11.0	27.8		11.0	27.8		18.0	80.8		11.0	73.8	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.0	6.4		4.0	6.4	
Act Effct Green (s)	25.2	15.9		25.2	15.9		83.3	74.9		76.6	67.2	
Actuated g/C Ratio	0.21	0.13		0.21	0.13		0.69	0.62		0.63	0.56	
v/c Ratio	1.04	0.72		0.52	0.82		0.46	1.00		0.19	0.66	
Control Delay (s/veh)	121.0	44.2		48.7	63.0		10.7	52.2		10.0	23.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay (s/veh)	121.0	44.2		48.7	63.0		10.7	52.2		10.0	23.6	
LOS	F	D		D	E		B	D		A	C	
Approach Delay (s/veh)		80.4			58.6			46.1			23.0	
Approach LOS		F			E			D			C	
Queue Length 50th (m)	~42.6	29.4		19.5	41.0		15.1	~308.8		2.2	105.8	
Queue Length 95th (m)	#41.9	50.8		34.4	68.6		20.7	#410.8		4.4	168.9	
Internal Link Dist (m)		142.5			100.7			85.0			195.0	
Turn Bay Length (m)	90.0			50.0			90.0			60.0		
Base Capacity (vph)	180	363		186	346		469	1138		167	1034	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.04	0.58		0.52	0.64		0.42	1.00		0.19	0.64	

Intersection Summary		
Cycle Length: 130.6		
Actuated Cycle Length: 120.8		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 1.04		
Intersection Signal Delay (s/veh): 46.6	Intersection LOS: D	
Intersection Capacity Utilization 96.0%	ICU Level of Service F	
Analysis Period (min) 15		

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

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

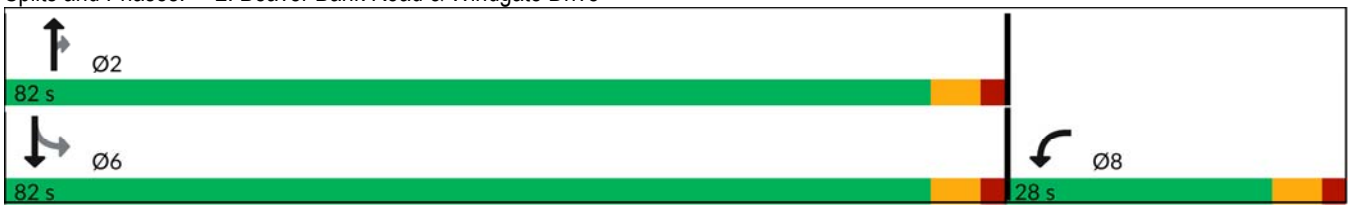
Splits and Phases: 1: Beaver Bank Road & Millwood Drive/Stokil Drive



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	97	989	183	59	637
Future Volume (vph)	119	97	989	183	59	637
Satd. Flow (prot)	1721	0	1865	1601	1789	1865
Flt Permitted	0.973				0.110	
Satd. Flow (perm)	1721	0	1865	1559	207	1865
Satd. Flow (RTOR)	34			91		
Lane Group Flow (vph)	260	0	1063	213	77	777
Turn Type	Prot		NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases				2	6	
Total Split (s)	28.0		82.0	82.0	82.0	82.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Act Effct Green (s)	16.6		57.5	57.5	57.5	57.5
Actuated g/C Ratio	0.19		0.66	0.66	0.66	0.66
v/c Ratio	0.73		0.86	0.20	0.56	0.63
Control Delay (s/veh)	44.4		20.5	3.8	27.4	11.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay (s/veh)	44.4		20.5	3.8	27.4	11.3
LOS	D		C	A	C	B
Approach Delay (s/veh)	44.4		17.7			12.7
Approach LOS	D		B			B
Queue Length 50th (m)	36.1		122.9	6.6	6.1	66.2
Queue Length 95th (m)	67.1		215.4	14.3	17.9	92.7
Internal Link Dist (m)	276.3		119.4			97.2
Turn Bay Length (m)				25.0	40.0	
Base Capacity (vph)	490		1581	1336	175	1581
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	0.53		0.67	0.16	0.44	0.49

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 87	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay (s/veh): 18.8	Intersection LOS: B
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Beaver Bank Road & Windgate Drive



Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	43	67	1019	653	28
Future Vol, veh/h	18	43	67	1019	653	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	25	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	47	73	1108	710	30

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1978	725	740	0	-	0
Stage 1	725	-	-	-	-	-
Stage 2	1253	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	68	425	866	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	269	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	62	425	866	-	-	-
Mov Cap-2 Maneuver	62	-	-	-	-	-
Stage 1	439	-	-	-	-	-
Stage 2	269	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	44.05	0.59	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	866	-	156	-	-
HCM Lane V/C Ratio	0.084	-	0.424	-	-
HCM Control Delay (s/veh)	9.5	-	44.1	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	0.3	-	1.9	-	-