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Transportation Impact Study

PROPOSED RESIDENTIAL PLAN OF SUBDIVISION

9229 5th Sideroad
TOWN OF CALEDON, ON

January 19, 2021
Project No: NT-20-179

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January 19, 2021

Carantania Investments (BT) Inc.
1 – 1681 Langstaff Road
Vaughan, ON L4K 5T3

Attention: Joseph Pavia

**Re: Transportation Impact Study
Proposed Residential Subdivision Development
9229 5th Sideroad, Caledon ON
Our Project No. NT-20-179**

NexTrans Consulting Engineers was retained by Carantania Investments (BT) Inc. (the 'Client') to undertake a Transportation Impact Study in support of a Plan of Subdivision and Zoning By-law Amendment applications for the above noted property.

The subject property is located south of Queensgate Boulevard between Landsbridge Street and Landsbridge Street / Sant Farm Drive, municipally known as 9229 5th Sideroad, in the Town of Caledon, Ontario. The subject site is currently vacant. The development proposal is to develop the existing lands to a residential subdivision development with a total floor area of 84 dwelling units. A minimum of four (4) parking spaces per unit are proposed on-site. Vehicular access to the site is proposed via an extension of Pembrook Street, as well as an extension of Southbury Manor Drive.

This study concludes that the development proposal can adequately be accommodated by the existing transportation network with minimal traffic impact to the adjacent public roadways. The proposed site accesses will operate at excellent levels of service.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Nextrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

Prepared by:

A handwritten signature in black ink that reads "Andy Bilawejian".

Andy Bilawejian, B.Eng, EIT
Transportation Analyst

Approved by:

A handwritten signature in black ink that reads "R.P.". Below the signature, there is some very small, illegible text.

Richard Pernicky, MITE
Principal

EXECUTIVE SUMMARY

NexTrans Consulting Engineers was retained by Carantania Investments (BT) Inc. (the 'Client') to undertake a Transportation Impact Study in support of a Plan of Subdivision and Zoning By-law Amendment applications for the above noted property. The subject property is located south of Queensgate Boulevard between Landsbridge Street and Landsbridge Street / Sant Farm Drive, municipally known as 9229 5th Sideroad, in the Town of Caledon, Ontario

Development Proposal

The subject site is currently vacant. The development proposal is to develop the existing lands to a residential subdivision development with a total floor area of 84 dwelling units. A minimum of four (4) parking spaces per unit are proposed on-site. Vehicular access to the site is proposed via an extension of Pembrook Street, as well as an extension of Southbury Manor Drive.

Traffic Analysis

The proposed development is anticipated to generate 64 two-way auto trips (16 inbound and 48 outbound) during the AM peak hours and 86 two-way auto trips (54 inbound and 32 outbound) during the PM peak hours.

The intersection capacity analysis results (based on the methodology and procedures outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board) indicate that the study area intersection and proposed vehicular access are expected to operate with excellent levels of service, with no critical movements identified.

Access Study and Parking Study

In accordance with Ontario Traffic Manual (OTM) Book 5, we recommend appropriate signage consisting of a STOP sign (Ra-1) and STOP bar be provided at the Southbury Manor Drive and Autumn Oak Court, Pembrook Street and Sheardown Trail and Southbury Manor Drive and Pembrook Street intersections.

Based on the information contained in the Town of Caledon Zoning By-law No. 2006-50, a total of 168 parking spaces are required for the proposed residential development. In comparing the 168 parking spaces required with the 168 parking spaces proposed, the subject site meets the parking requirements.

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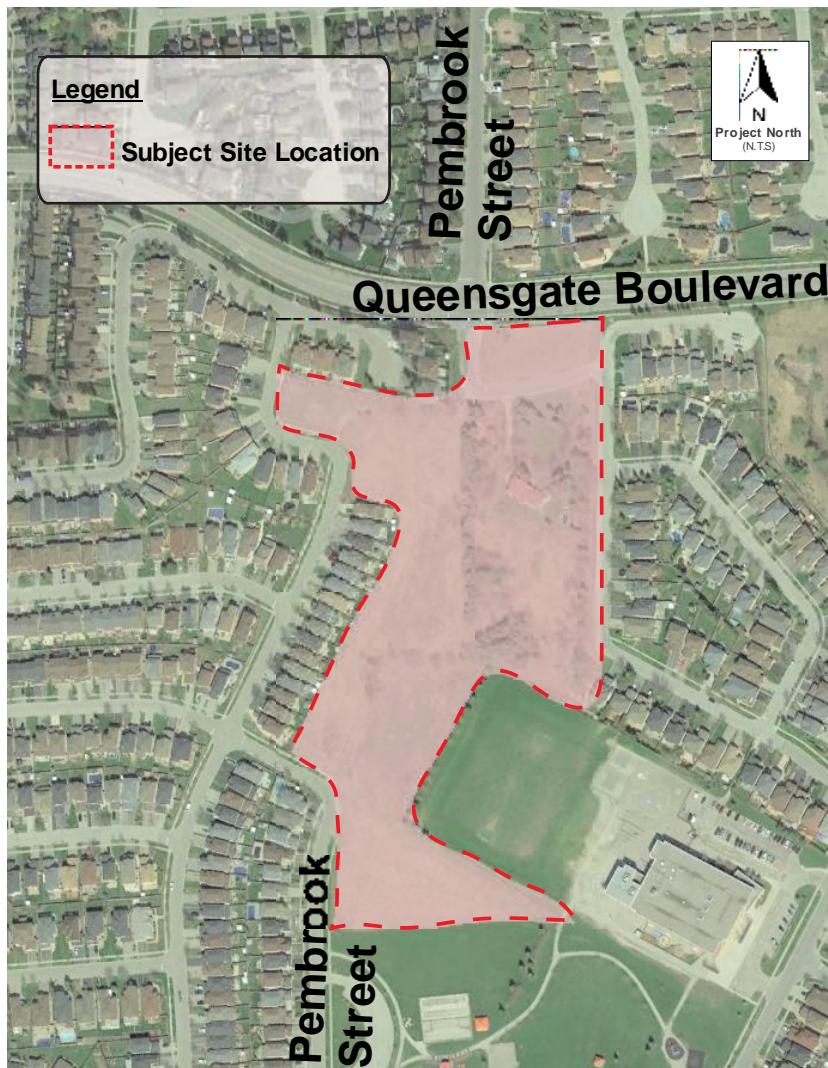
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1.0 INTRODUCTION

NexTrans Consulting Engineers was retained by Carantania Investments (BT) Inc. (the 'Client') to undertake a Transportation Impact Study in support of a Plan of Subdivision and Zoning By-law Amendment applications for the above noted property. The on-street parking analysis will be completed once preliminary grading has been completed and driveway locations have been identified. The subject property is located south of Queensgate Boulevard between Landsbridge Street and Landsbridge Street / Sant Farm Drive, municipally known as 9229 5th Sideroad, in the Town of Caledon, Ontario

Figure 1-1 – Site Location

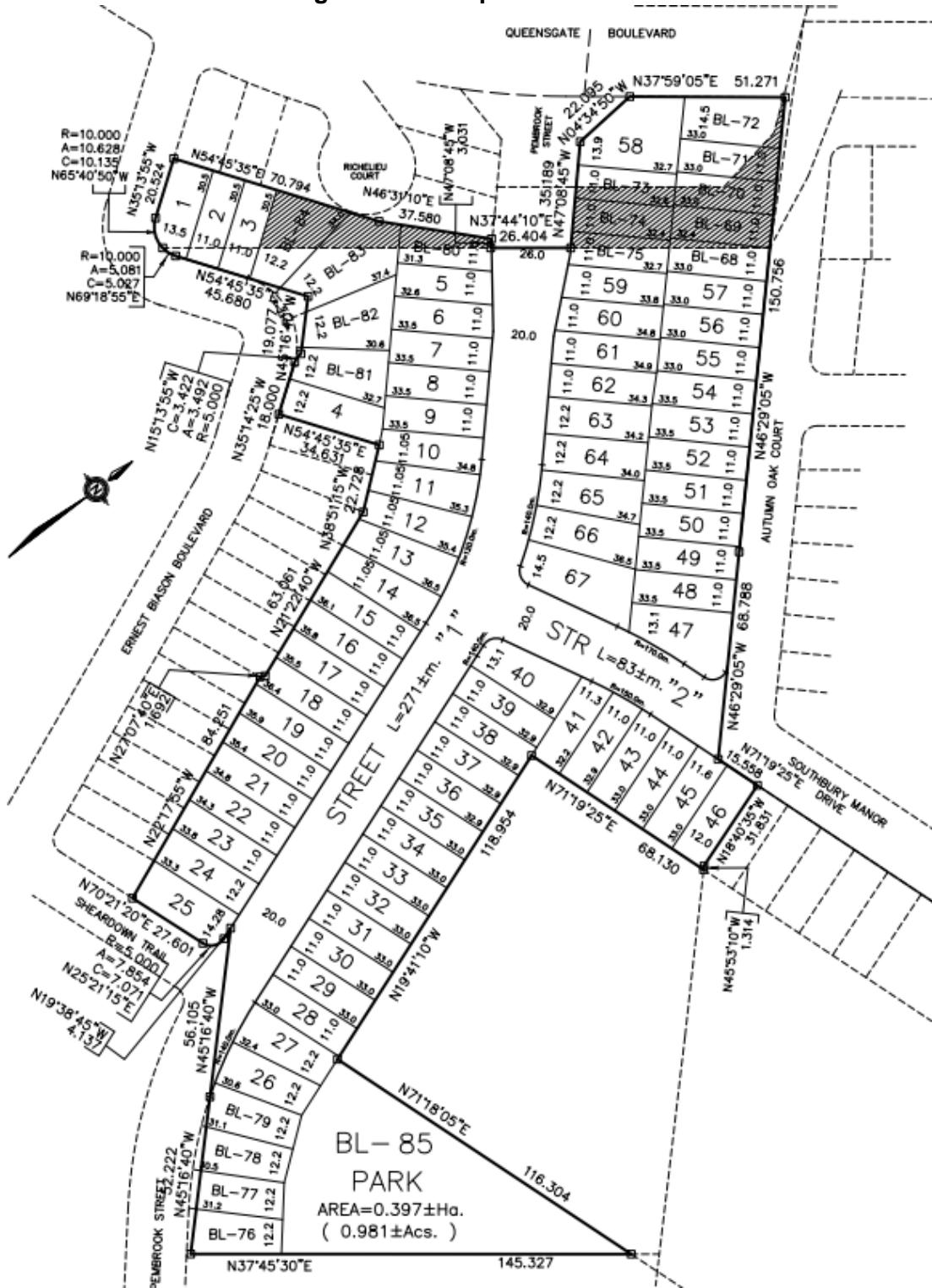


The subject site is currently vacant. Based on the Draft Plan of Subdivision prepared by KLM Planning Partners Inc., dated December 8, 2020, the development proposal is to develop the existing lands to a residential subdivision development with a total floor area of 84 dwelling units. A minimum of four (4) parking spaces per unit are proposed on-site. Vehicular access to the site is proposed via an extension of Pembroke Street, as well as an extension of Southbury Manor Drive.

The preliminary site plan is provided in **Figure 1-2; Appendix A** also provides a larger scale version of the proposed site plan.

Given the residential based nature of the development proposal, the analysis will include the weekday morning and afternoon peak periods for assessment purposes.

Figure 1-2 – Proposed Site Plan



2.0 EXISTING TRAFFIC CONDITIONS

2.1. Existing Road Network

The existing subject site is generally located south of Queensgate Boulevard between Landsbridge Street and Landsbridge Street / Sant Farm Drive, in the Town of Caledon. The road network is described as follows:

Highway 50: is classified as a High Capacity Arterial Regional road in accordance to the Town of Caledon Official Plan, Schedule J. It has a four (4)-lane cross section (two (2) lanes per direction) with sidewalks on both sides of the roadway and maintains a posted speed limit of 60 km/h south of the Wilton Drive / Allan Drive intersection, and 50 km/h north of the Wilton Drive / Allan Drive intersection.

Albion Vaughan Road: is classified as a Medium Capacity Arterial road in accordance to the Town of Caledon Official Plan, Schedule J. It has a two (2)-lane cross section (one (1) lane per direction) and maintains a posted speed limit of 80 km/h south of the Queensgate Boulevard intersection, and 60 km/h north of the Queensgate Boulevard intersection.

Queensgate Boulevard: is classified as a Collector road under the jurisdiction of the Town of Caledon. It has a four (4)-lane cross section with sidewalks on both sides of the roadway, and maintains a posted speed limit of 50 km/h in the vicinity of the subject site.

Pembroke Street: is classified as a Local road under the jurisdiction of the Town of Caledon. It has a two (2)-lane cross section (one (1) lane per direction) and maintains a posted speed limit of 40 km/h in the vicinity of the subject site.

2.2. Existing Active Transportation Network

Sidewalks

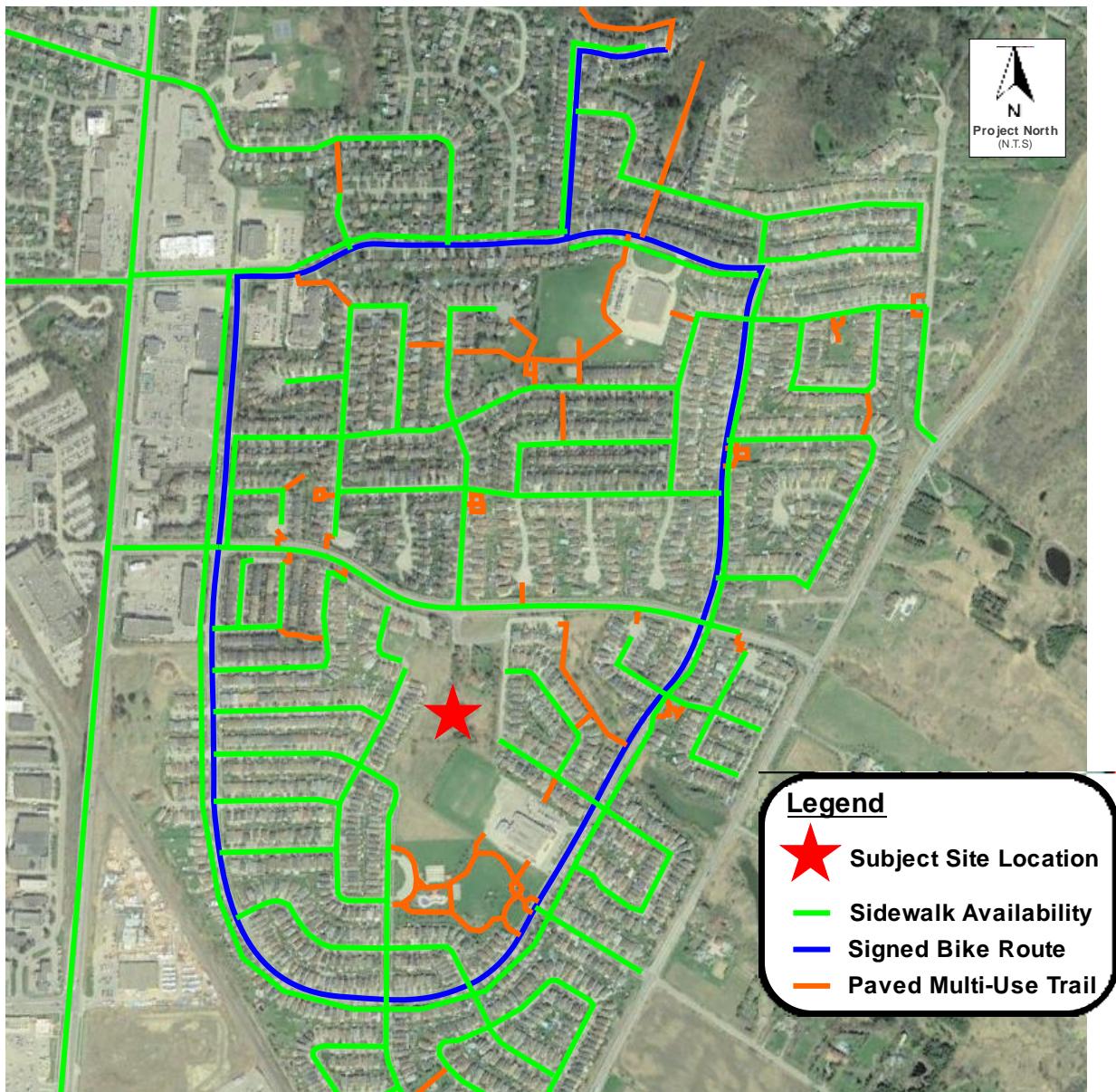
There are currently sidewalks available on Queensgate Boulevard, Queen Street South (Highway 50), Allan Drive, Pembroke Street as well as throughout the residential streets within the vicinity of the subject site.

Bicycle Lanes

There are dedicated signed bike routes on Landsbridge Street, Sant Farm Drive, Strawberry Hill Court and Alan Drive. There are also paved multi-use trails throughout the residential streets within the vicinity of the subject site.

Figure 2-1 depicts the sidewalk and cycling lane availability within the vicinity of the subject site.

Figure 2-1 – Sidewalk and Cycling Lane Availability



2.3. Active Transportation Mode and Assessment

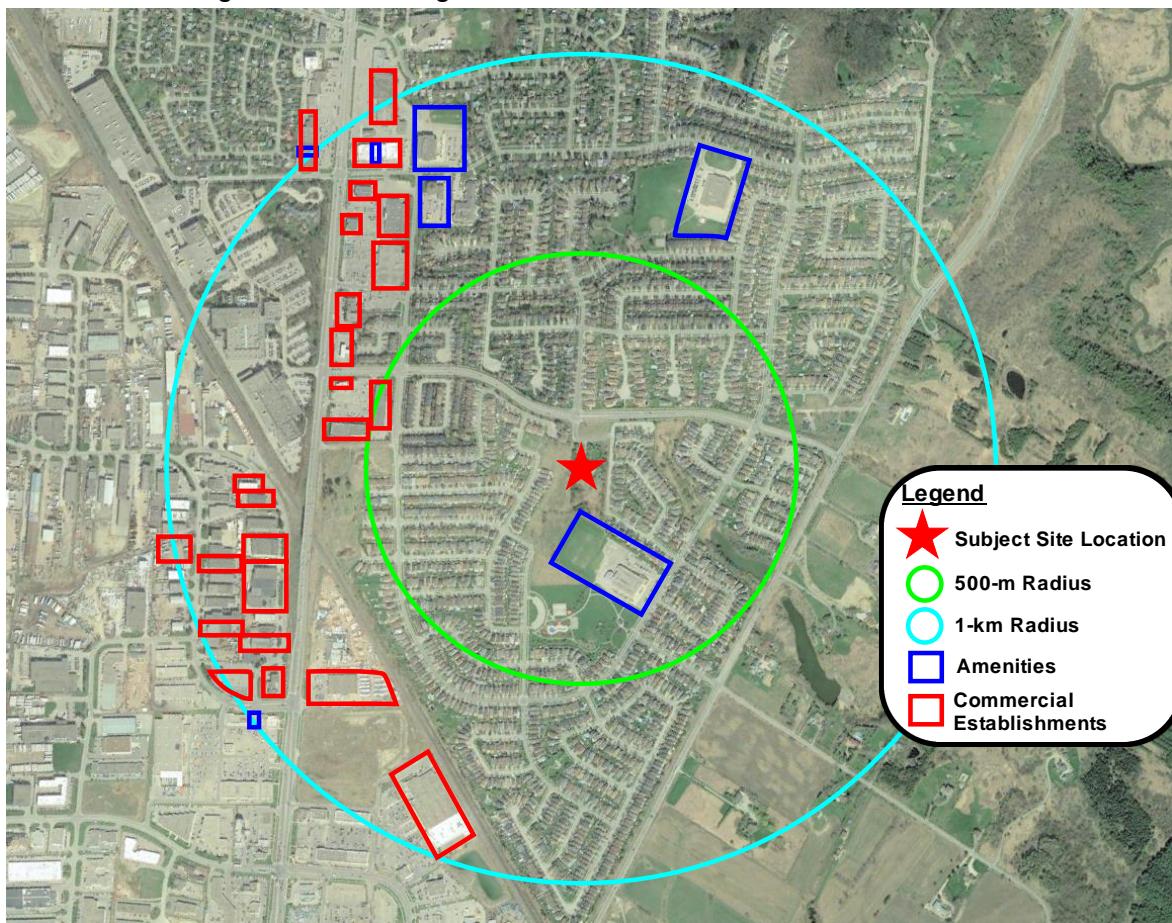
Existing Amenities

The review of the area surrounding the proposed development indicates recreational facilities, medical centres, places of worship and schools, many of which can be easily reached by pedestrian traffic and non-auto options. **Figure 2-2** illustrates the location of the existing amenities which Effective Kickboxing Bolton, Central Bolton Walk In Clinic, Dayspring Medical Centre and Dayspring Pharmacy, Holy Family Church, St. John the Baptist Elementary, Allan Drive Middle School, and Holy Family Elementary School, of which St. John Baptist Elementary is within 400-m of the subject site (about a five (5)-minute walk or one (1)-minute bike ride), while the rest are within 1-km of the subject site (about a 12-minute walk or three (3)-minute bike ride).

Existing Commercial Establishments

The review of the area surrounding the proposed development indicates numerous retail, food, and service establishments, many of which can be easily reached by pedestrian traffic and non-auto options. **Figure 2-2** illustrates the location of existing retail, food and service establishments from the proposed development. Commercial establishments include a Walmart Superstore, Wendy's, Mercato Fine Foods Bakery and Deli, Classic Optical, Shoppers Drug Mark, Pizza Pizza, Eternal Ladies Boutique, Wah Wi, Alterna Savings, RE/MAX West Realty Inc., Brokerage, Petro Canada & Car Wash, Garden Foods, Zehrs, Loblaws Pharmacy, BMO Bank of Montreal, Rexall, Canada Post, Staples, Winners, Giant Tiger, Dairy Queen, Scotiabank, Dollar Tree, The Toby Jug, Life Pharmacy, Sammy's Grill, Coffee Time, Medi Select Foods, Dollarama, Music 21, St. Louis Bar & Grill, United Lumber Home Hardware Building Centre – Bolton, Active Green+Ross Tire & Automotive Centre, Bolton Electrical Supply, North Hub Bike Shop, Bolton Tire Sales Inc., Green Valley Woodworking Ltd., Lothoweb, Hour Glass & Mirror, System 2 Inc., Orion Armored Cars, Albion Auto Service Auto Repair Shop In Bolton and Sign Solutions, which are all within 1 km of the subject site (approximately a 15-minute walk or a 3-minute bike ride).

Figure 2-2 – Existing Amenities and Commercial Establishments



2.4. Existing Traffic Volumes

Based on the Terms of Reference established with the Town of Caledon, provided in **Appendix B**, historic traffic volumes at the study area intersections were obtained from Spectrum Traffic on behalf of NexTrans Consulting Engineers at the following intersections during the morning (7:00 a.m. to 10:00 a.m.) and afternoon (4:00 p.m. to 7:00 p.m.) peak periods:

- Queensgate Boulevard & Sant Farm Drive / Landsbridge Street on Wednesday, August 23, 2017
- Queensgate Boulevard and Albion Vaughan Road on Wednesday August 23, 2017
- Queensgate Boulevard & Landsbridge Street on Wednesday, May 9, 2016
- Queensgate Boulevard and Highway 50 on Tuesday, March 20, 2018

Due to current COVID-19 restrictions, existing traffic volumes would not be deemed acceptable. As such, historic traffic data has been obtained, and a conservative 2% growth factor has been applied to the through volumes to represent 2020 conditions. In addition to the intersections above, since turning movement counts could not be obtained for the Queensgate Boulevard and Pembroke Street intersection, through volumes have been projected to this intersection. Detailed existing traffic data are provided in **Appendix C**.

2.5. Existing Traffic Assessment

The existing volumes are illustrated in **Figure 2-3**, and were analyzed using Synchro 9 software. The methodology of the software follows the procedures described and outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board. The detailed results are provided in **Appendix D** and summarized in **Table 2.1**.

Figure 2-3 – Existing Traffic Volumes

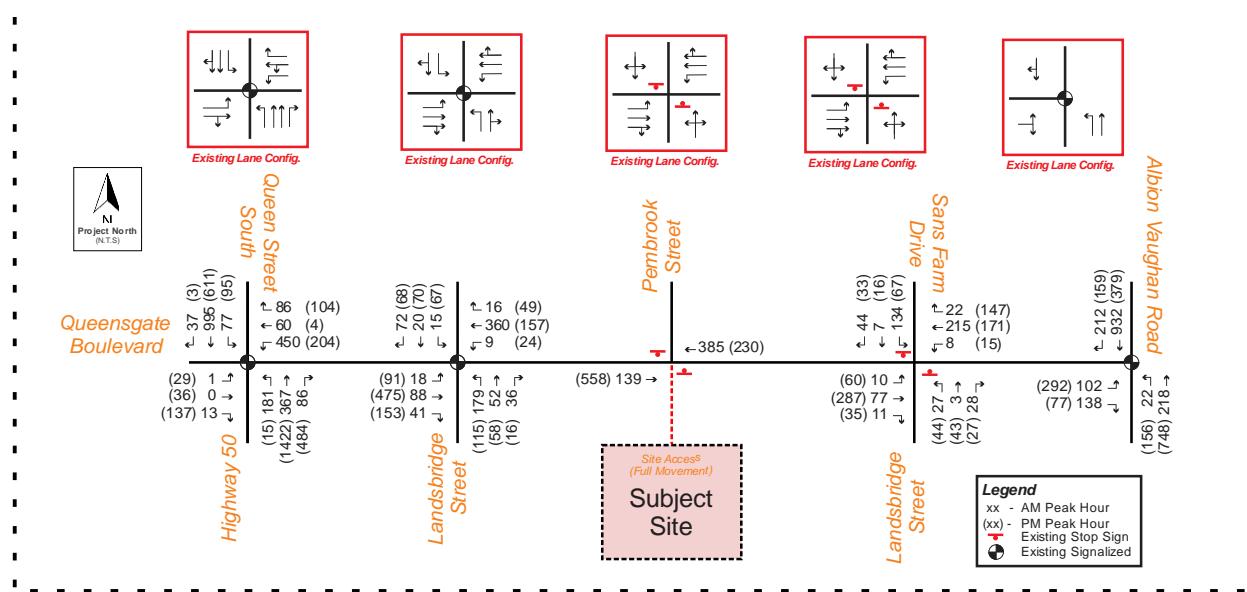


Table 2.1 – Level of Service – Existing Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95 th Queue (m)	LOS (v/c)	Delay (s)	95 th Queue (m)
Highway 50 / Queen Street South and Queensgate Boulevard (signalized)	OVERALL	D (1.08)	38.8	-	C (0.79)	29.6	-
	EBL	D (0.04)	44.9	0.8	C (0.13)	34.8	10.1
	EBTR	D (0.02)	45.8	0.0	D (0.73)	53.5	26.3
	WBL	C (0.67)	34.4	72.3	C (0.51)	32.3	32.9
	WBLT	D (0.68)	35.6	60.1	C (0.51)	33.9	18.1
	WBR	C (0.06)	29.8	8.6	D (0.08)	35.3	12.7
	NTL	F (1.16)	129.1	34.5	B (0.06)	14.1	4.8
	NBT	B (0.23)	14.6	33.1	C (0.88)	33.0	248.8
	NBR	B (0.06)	13.2	7.5	B (0.35)	19.6	17.4
	SBL	B (0.19)	13.8	12.6	C (0.69)	33.3	28.9
	SBTR	C (0.77)	27.4	126.7	B (0.39)	17.2	76.3
Landsbridge Street and Queensgate Boulevard (signalized)	OVERALL	B (0.40)	13.9	-	B (0.39)	15.0	-
	EBL	B (0.15)	16.8	5.0	B (0.33)	16.8	17.5
	EBTR	B (0.18)	16.6	7.8	B (0.59)	18.7	41.6
	WBL	B (0.08)	16.2	2.7	B (0.23)	16.4	6.0
	WBTR	B (0.56)	19.1	28.1	B (0.20)	15.7	13.0
	NTL	A (0.33)	9.0	24.3	B (0.27)	10.4	19.3
	NBTR	A (0.16)	7.3	6.6	A (0.10)	8.7	11.6
	SBL	A (0.04)	6.7	3.1	A (0.12)	9.0	12.6
	SBTR	A (0.09)	6.9	5.2	A (0.19)	9.4	12.9
Landsbridge Street / Sant Farm Drive and Queensgate Boulevard (unsignalized)	EBL	A (0.01)	8.1	0.2	A (0.07)	8.4	1.7
	WBL	A (0.01)	7.4	0.2	A (0.02)	8.2	0.4
	NBLTR	B (0.12)	11.0	3.0	E (0.65)	41.3	31.6
	SBLTR	C (0.37)	15.3	13.1	E (0.65)	43.1	31.3
Albion Vaughan Road and Queensgate Boulevard (signalized)	OVERALL	F (1.02)	86.4	-	C (0.82)	24.7	-
	EBL	C (0.49)	26.4	24.8	D (0.77)	35.4	68.0
	EBR	C (0.10)	23.7	11.5	C (0.06)	22.6	7.4
	NTL	B (0.16)	14.6	2.7	B (0.59)	14.4	21.9
	NBT	A (0.25)	5.2	21.2	B (0.79)	18.8	177.4
	SBTR	F (1.21)	119.0	309.2	C (0.82)	30.5	156.9

Under existing conditions, the study intersections are currently operating at acceptable levels of service during both peak periods with the exception of the northbound left turn lane at the Highway 50 / Queen Street South and Queensgate Boulevard, and the southbound through-right lane at the Albion Vaughan Road and Queensgate Boulevard experiencing a failing level of service during the morning peak hour.

2.6. Evaluation of Existing Capacity Analysis at Signalized Intersection

As summarized in **Table 2.1** under existing conditions, the signalized study area intersections Highway 50 / Queen Street South and Queensgate Boulevard, and Albion Vaughan Road and Queensgate Boulevard are experiencing failing levels of service during the morning peak period. It is theoretically not possible to have a v/c ratio above 1.00 under existing conditions since the traffic volumes were collected on-site and the existing signal timing plan and cycle length were incorporated into the analysis.

It is our opinion that the Synchro parameters used in the analysis for signalized intersections are conservatively high (i.e. Left Turn Factor (perm), Ideal Satd. Flow (vphpl), critical gap values, etc.). However, rather than adjusting the analysis parameters, the signal timing was optimized while maintaining the existing cycle length, for the AM peak hour, to ensure all movements are operating below v/c ratio of 1.00.

On this basis, the recommended signal timings at Highway 50 / Queen Street South and Queensgate Boulevard, and Albion Vaughan Road and Queensgate Boulevard intersections during the morning peak hour period is detailed in **Tables 2.2 and 2.3**.

Table 2.2 – Optimized Signal Timing Plan (Highway 50 / Queen Street South and Queensgate Boulevard)

Movement	Signal Timing Plan AM (s)	Optimized Signal Timing Plan AM (s)
NBL	Total Split = 14 Amber = 3 All Red = 0	Total Split = 24 Amber = 3 All Red = 0
SBTR	Total Split = 49 Amber = 4 All Red = 2.5	Total Split = 56.8 Amber = 4 All Red = 2.5
EBL	Total Split = 25 Amber = 4 All Red = 2.7	Total Split = 9.6 Amber = 3.5 All Red = 1
EBTR	Total Split = 42 Amber = 4 All Red = 2.7	Total Split = 34.8 Amber = 4 All Red = 2.7
WBL	Total Split = 25 Amber = 4 All Red = 2.7	Total Split = 14.4 Amber = 3.5 All Red = 1
WBTR	Total Split = 42 Amber = 4 All Red = 2.7	Total Split = 39.6 Amber = 4.0 All Red = 2.7
SBL	Total Split = 10 Amber = 3 All Red = 0	Total Split = 9.8 Amber = 3 All Red = 0
NBTR	Total Split = 53 Amber = 4 All Red = 2.5	Total Split = 71 Amber = 4 All Red = 2.5

Table 2.3 – Optimized Signal Timing Plan (Albion Vaughan Road and Queensgate Boulevard)

Movement	Signal Timing Plan AM (s)	Optimized Signal Timing Plan AM (s)
EBLR	Total Split = 41.1 Amber = 4 All Red = 2.1	Total Split = 17.2 Amber = 4 All Red = 2.1
NBL	Total Split = 13 Amber = 3 All Red = 0	Total Split = 8 Amber = 3 All Red = 0
NBT	Total Split = 41.1 Amber = 4 All Red = 2.1	Total Split = 78 Amber = 4 All Red = 2.1
SBTR	Total Split = 41.1 Amber = 4 All Red = 2.1	Total Split = 70 Amber = 4 All Red = 2.1

The optimized signal timing will be carried forward to future background and future total analysis during the morning and afternoon peak hour periods.

3.0 FUTURE BACKGROUND CONDITIONS

A 5-year (2025) horizon period was selected and assumed in this analysis, which generally coincides with the full build out of the proposed development. For a conservative analysis, a standard 2% growth rate per annum is assumed for the through traffic on Queensgate Boulevard, Albion Vaughan Road and Highway 50 / Queen Street South. In accordance to the *Regional Guidelines for Using Synchro Version 7.73 Rev 8*, dated December 2010, Peak Hour Factor shall be 1.00 for all movements on all approaches. As such, peak hour factors have been set to 1.00 for future background and future total scenarios.

The future (2025) background traffic volumes are provided in **Figure 3-1**. **Table 3.1** summarizes the level of service at the given intersections under future background traffic conditions. Detailed output analysis can be found in **Appendix E**.

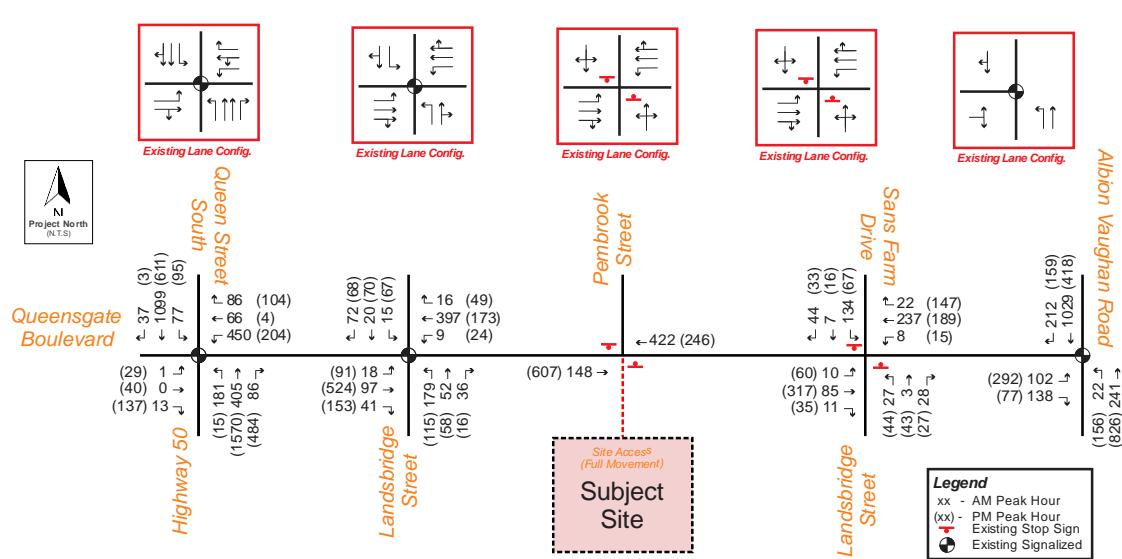
Figure 3-1 – Future (2025) Background Traffic Volumes

Table 3.1: Future (2025) Background Traffic Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95 th Queue (m)	LOS (v/c)	Delay (s)	95 th Queue (m)
Highway 50 / Queen Street South and Queensgate Boulevard (signalized)	OVERALL	C (0.67)	25.9	-	C (0.70)	22.6	-
	EBL	D (0.01)	50.9	1.5	D (0.13)	38.6	10.9
	EBTR	D (0.01)	51.7	0.0	D (0.41)	44.9	34.2
	WBL	D (0.66)	41.1	78.9	C (0.40)	32.7	30.6
	WBLT	D (0.66)	42.2	89.7	C (0.41)	33.9	31.5
	WBR	D (0.05)	35.9	6.3	D (0.07)	36.9	14.1
	NTL	B (0.57)	17.1	30.5	B (0.03)	10.9	3.8
	NBT	B (0.22)	14.3	40.6	C (0.82)	24.7	192.3
	NBR	B (0.06)	12.9	2.2	B (0.31)	14.9	17.0
	SBL	B (0.15)	13.9	14.7	B (0.50)	19.3	19.9
	SBTR	C (0.65)	25.0	161.1	B (0.33)	12.1	59.1
	OVERALL	B (0.34)	13.9	-	B (0.35)	15.3	-
Landsbridge Street and Queensgate Boulevard (signalized)	EBL	B (0.09)	16.7	5.3	B (0.26)	16.2	16.5
	EBTR	B (0.15)	16.8	9.3	B (0.60)	18.8	43.0
	WBL	B (0.04)	16.4	3.4	B (0.14)	15.6	6.5
	WBTR	B (0.52)	18.9	28.5	B (0.18)	15.5	13.5
	NTL	A (0.26)	7.8	21.0	A (0.19)	9.7	18.7
	NBTR	A (0.08)	6.3	8.4	A (0.07)	8.6	11.0
	SBL	A (0.02)	6.1	3.1	A (0.10)	8.9	11.7
	SBTR	A (0.07)	6.3	6.7	A (0.12)	9.0	14.3
Landsbridge Street / Sant Farm Drive and Queensgate Boulevard (unsignalized)	EBL	A (0.01)	8.1	0.2	A (0.05)	8.1	1.2
	WBL	A (0.01)	7.4	0.1	A (0.01)	8.0	0.3
	NBLTR	B (0.08)	10.4	2.0	C (0.31)	19.4	10.0
	SBLTR	B (0.31)	13.6	9.8	C (0.31)	18.8	9.8
Albion Vaughan Road and Queensgate Boulevard (signalized)	OVERALL	C (0.87)	23.7	-	B (0.75)	19.1	-
	EBL	D (0.58)	47.0	33.8	C (0.71)	32.7	64.0
	EBR	D (0.08)	40.6	16.3	C (0.05)	23.2	9.3
	NTL	C (0.20)	20.6	1.9	A (0.35)	8.8	17.8
	NBT	A (0.20)	3.3	17.0	B (0.72)	14.0	145.2
	SBTR	C (0.93)	23.9	315.5	C (0.71)	21.9	131.2

As summarized in **Table 3.1**, with the implementation of the optimized signal timing plan, it is shown that during future background traffic conditions the subject study area intersections continue to operate at acceptable level of services with no critical movements identified.

4.0 EXISTING TTS DATA BY WARD

According to the TTS data, approximately 15% of people in the vicinity utilize alternative modes of transportation, such as transit, walking, and cycling, as summarized in **Table 4.1**. TTS Data sheet is provided in **Appendix F**.

Table 4.1 – TTS Data for Ward 5 (Town of Caledon)

Time Period	Modes of Travel					
	Auto Mode of Travel		Non-Auto Mode of Travel			
	Driver	Passenger	Transit	GO Train	Walking & Cycling	Other
6-9AM	72%	11%	1%	1%	7%	9%
24 Hours	74%	14%	1%	1%	6%	5%
Average	73%	12%	1%	1%	6%	7%
Total	85%		15%			

4.1. Site Traffic

The development proposal is to develop the existing lands to a residential subdivision development with a total floor area of 84 dwelling units. Trip rates and site generated trips were derived from the information contained in the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) for “Single-Family Detached Housing” (LUC 210). As a conservative approach, no transit reductions were applied to the site generated traffic. The trip generation summary is shown in **Table 4.2**.

Table 4.2 – Site Traffic Trip Generation (Based on ITE)

ITE Land Use	Parameter	Morning Peak Hour			Afternoon Peak Hour		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing (84 Units) (LUC 210)	New Trips	16	48	64	54	32	86
	Trip Rate	0.19	0.57	0.76	0.64	0.38	1.02
Total		16	48	64	54	32	86

As shown in **Table 4.2**, the proposed development is anticipated to generate 64 two-way auto trips (16 inbound and 48 outbound) during the AM peak hours and 86 two-way auto trips (54 inbound and 32 outbound) during the PM peak hours.

The assumptions for the trip distribution rates are based on the existing traffic patterns and routes that drivers would likely take to access the subject site and engineering judgement based on ease of site access. As a result, site trip distribution is summarized for the inbound and outbound site traffic movements during the morning and afternoon peak hours in **Tables 4.3, 4.4, 4.5, 4.6 and 4.7**, with the trip assignment illustrated in **Figure 4-1**.

Table 4.3 – Site Traffic Trip Distribution (Queensgate Boulevard and Pembrook Street)

Direction	Via	AM Peak Period		PM Peak Period	
		Inbound	Outbound	Inbound	Outbound
East	Queensgate Boulevard	27%	27%	71%	71%
West	Queensgate Boulevard	73%	73%	29%	29%
Total		100%	100%	100%	100%

Table 4.4 – Site Traffic Trip Distribution (Queensgate Boulevard and Landsbridge Street)

Direction	Via	AM Peak Period		PM Peak Period	
		Inbound	Outbound	Inbound	Outbound
West	Queensgate Boulevard	63%	94%	85%	69%
North	Landsbridge Street	11%	4%	12%	21%
South	Landsbridge Street	26%	2%	3%	10%
Total		100%	100%	100%	100%

Table 4.5 – Site Traffic Trip Distribution (Queensgate Boulevard and Highway 50)

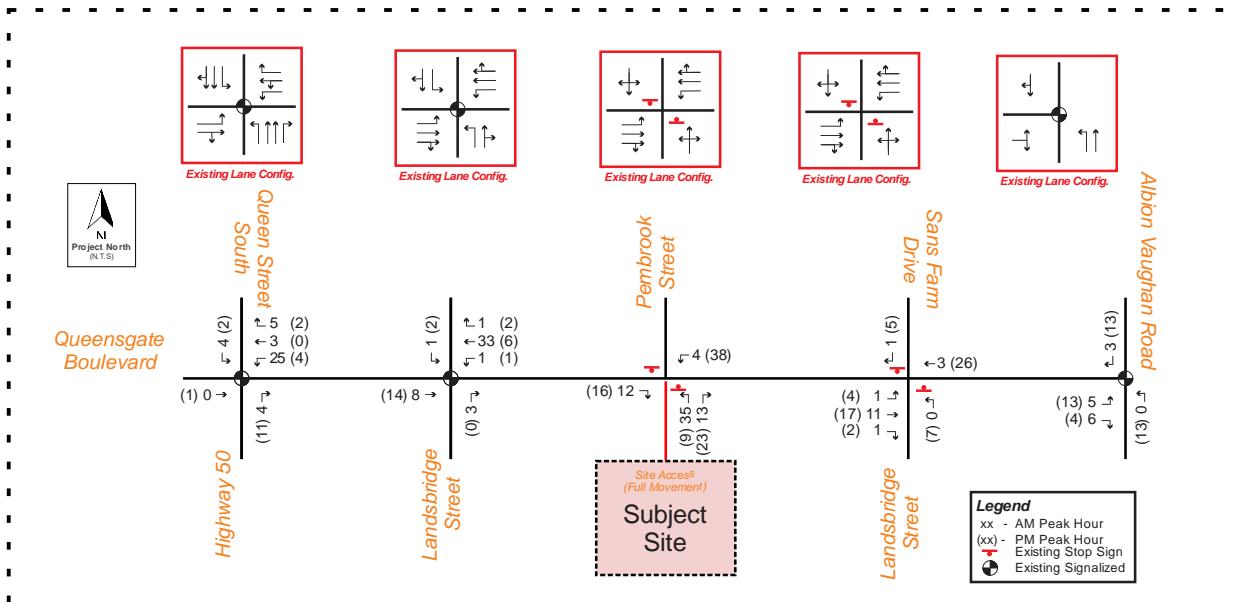
Direction	Via	AM Peak Period		PM Peak Period	
		Inbound	Outbound	Inbound	Outbound
West	Queensgate Boulevard	0%	10%	6%	1%
North	Queen Street South	47%	145	15%	33%
South	Highway 50	53%	76%	79%	66%
Total		100%	100%	100%	100%

Table 4.6 – Site Traffic Trip Distribution (Queensgate Boulevard and Landsbridge Street / Sant Farm Drive)

Direction	Via	AM Peak Period		PM Peak Period	
		Inbound	Outbound	Inbound	Outbound
East	Queensgate Boulevard	75%	79%	69%	75%
North	Sant Farm Drive	15%	10%	13%	16%
South	Landsbridge Street	10%	11%	18%	9%
Total		100%	100%	100%	100%

Table 4.7 – Site Traffic Trip Distribution (Queensgate Boulevard and Albion Vaughan Road)

Direction	Via	AM Peak Period		PM Peak Period	
		Inbound	Outbound	Inbound	Outbound
North	Landsbridge Street	91%	43%	51%	79%
South	Landsbridge Street	9%	57%	49%	21%
Total		100%	100%	100%	100%

Figure 4-1 – Site Generated Traffic Assignments

5.0 FUTURE TOTAL TRAFFIC CONDITIONS

The forecasted 2025 future total traffic volumes (future background volumes plus site generated traffic volumes) are illustrated in **Figure 5-1**, and were analyzed using Synchro 10 software with stopped controlled at the proposed site access. The detailed calculations are provided in **Appendix G** and summarized in **Table 5.1**.

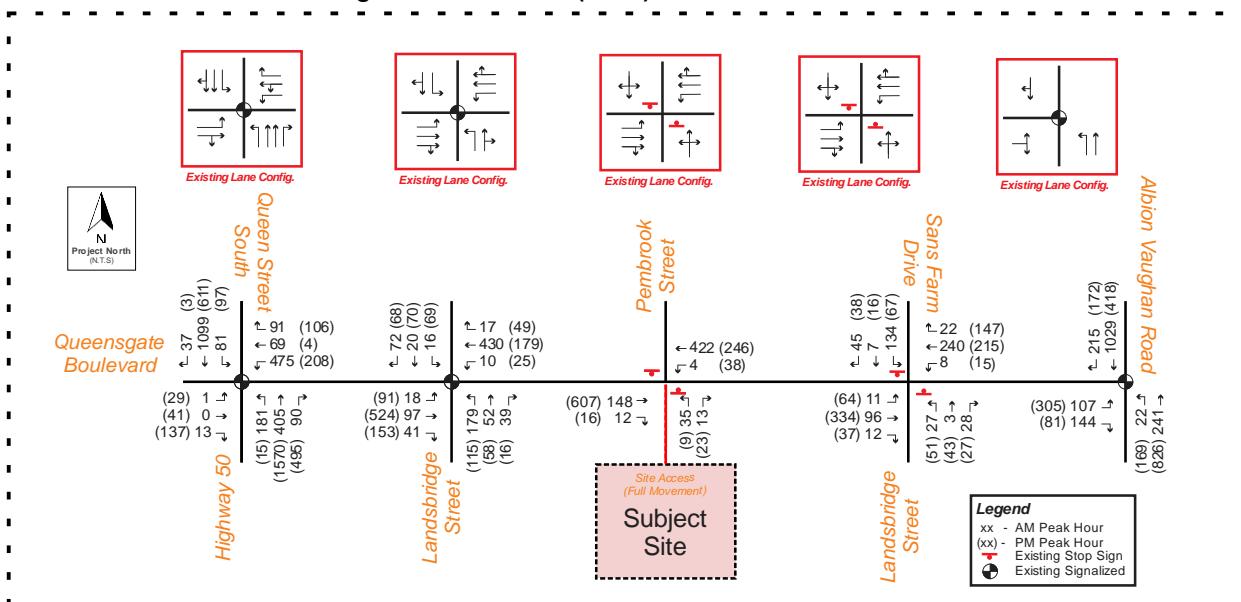
Figure 5-1 – Future (2025) Total Traffic Volumes

Table 5.1 – Level of Service – Future Total Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95 th Queue (m)	LOS (v/c)	Delay (s)	95 th Queue (m)
Highway 50 / Queen Street South and Queensgate Boulevard (signalized)	OVERALL	C (0.68)	26.5	-	C (0.71)	22.9	-
	EBL	D (0.01)	51.2	1.5	D (0.13)	38.6	10.7
	EBTR	D (0.01)	52.1	0.0	D (0.42)	45.1	34.9
	WBL	D (0.68)	41.8	84.1	C (0.41)	32.7	30.9
	WBLT	D (0.67)	42.8	98.4	C (0.41)	33.9	32.0
	WBR	D (0.06)	35.6	7.9	D (0.07)	36.8	14.1
	NTL	B (0.57)	17.7	30.8	B (0.03)	11.0	3.8
	NBT	B (0.22)	14.7	40.6	C (0.82)	25.1	194.0
	NBR	B (0.06)	13.3	2.9	B (0.32)	15.1	17.3
	SBL	B (0.16)	14.3	15.3	B (0.51)	19.6	20.8
	SBTR	C (0.66)	25.5	161.1	B (0.33)	12.3	59.5
Landsbridge Street and Queensgate Boulevard (signalized)	OVERALL	B (0.35)	14.2	-	B (0.35)	15.4	-
	EBL	B (0.09)	16.6	5.4	B (0.26)	16.1	16.5
	EBTR	B (0.15)	16.7	9.7	B (0.61)	18.7	44.1
	WBL	B (0.04)	16.2	3.6	B (0.15)	15.6	6.7
	WBTR	B (0.55)	19.1	30.8	B (0.18)	15.4	13.8
	NTL	A (0.26)	8.0	21.5	A (0.19)	9.9	18.9
	NBTR	A (0.08)	6.5	8.7	A (0.08)	8.8	11.0
	SBL	A (0.03)	6.3	3.3	A (0.11)	9.1	12.2
	SBTR	A (0.07)	6.5	6.8	A (0.12)	9.2	14.6
	Queensgate Boulevard and Pembroke Street (unsignalized)	WBL NBLTR SBLTR	A (<0.01) B (0.08) A (<0.01)	7.5 11.2 0.0	0.1 1.9 0.0	A (0.04) B (0.07) A (<0.01)	8.9 13.2 0.0
Landsbridge Street / Sant Farm Drive and Queensgate Boulevard (unsignalized)	EBL	A (0.01)	8.1	0.2	A (0.05)	8.1	1.3
	WBL	A (0.01)	7.4	0.1	A (0.01)	8.0	0.3
	NBLTR	B (0.08)	10.6	2.0	C (0.36)	21.7	12.2
	SBLTR	B (0.31)	13.8	10.1	C (0.34)	20.2	11.1
Albion Vaughan Road and Queensgate Boulevard (signalized)	OVERALL	C (0.88)	24.3	-	B (0.75)	19.9	-
	EBL	D (0.60)	47.7	35.3	C (0.72)	33.1	66.8
	EBR	D (0.09)	40.5	16.6	C (0.05)	23.1	9.4
	NTL	C (0.21)	21.2	1.9	A (0.39)	9.5	19.7
	NBT	A (0.20)	3.3	17.0	B (0.72)	14.4	148.8
	SBTR	C (0.93)	24.6	317.0	C (0.74)	23.4	138.2

Under future total traffic conditions, with the implementation of the optimized signal timing plan, the study area intersections are expected to continue operating at acceptable level of service during both peak periods with no critical movements identified. **As such, it is our opinion the site traffic will have negligible impacts to the abutting road network.**

6.0 PARKING ASSESSMENT

The Town-wide Zoning By-law No. 2006-50, Section 5 – Parking, Loading and Delivery, has been adopted by the Town of Caledon, and it was revised on March 14, 2016. Based on the information contained in the Town of Caledon Zoning By law, the technical parking requirement for the proposed development is detailed in **Table 6.1**.

Table 6.1 – Vehicle Parking Requirements

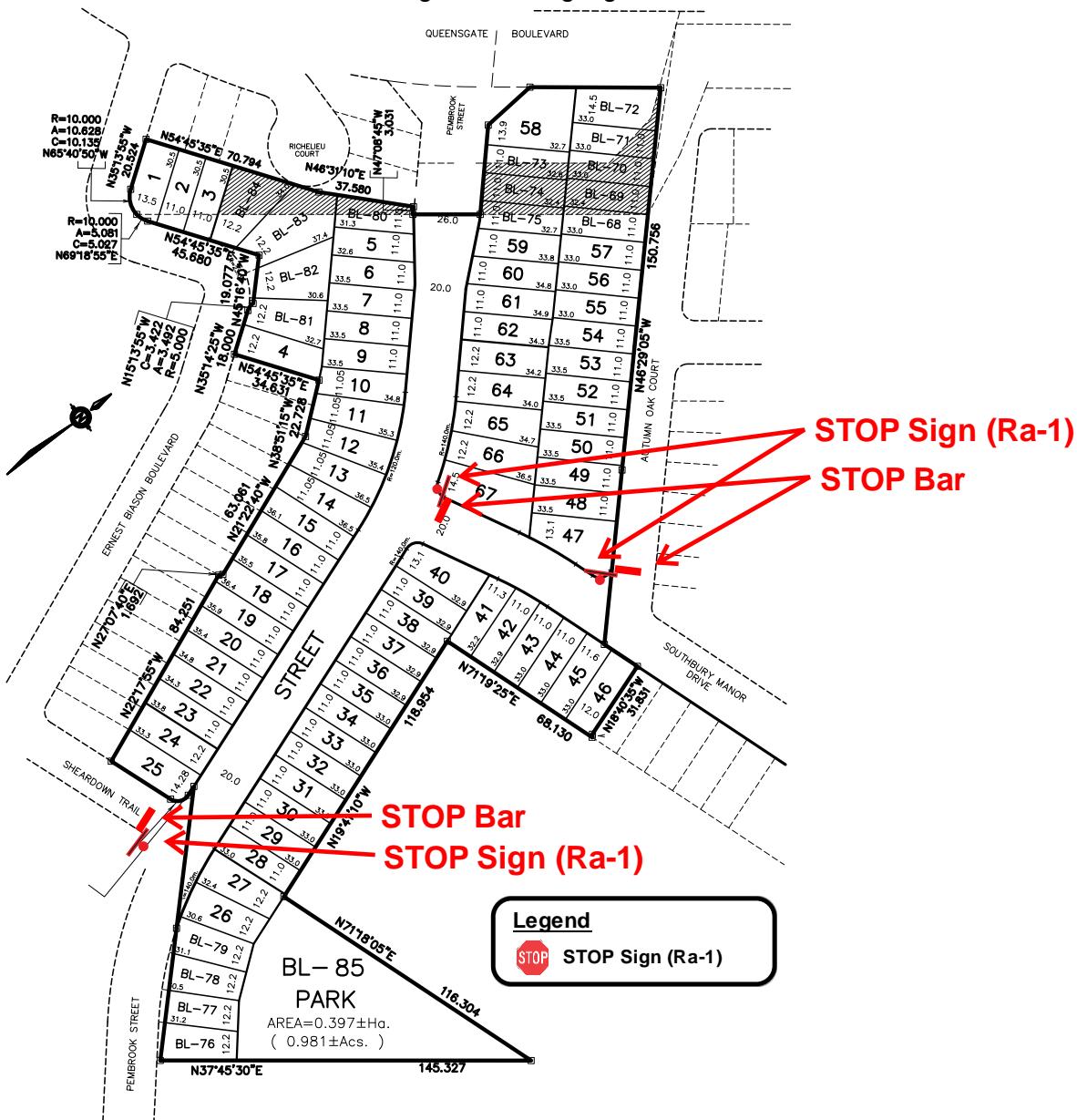
Use	Units	Rate	Parking Requirement	Parking Provided	Difference
Dwelling, Detached	84 units	2 parking spaces per unit	168	336	+168
Total			168	336	+168

Based on **Table 6.1**, a total of 168 parking spaces are required for the proposed residential development. In comparing the 168 parking spaces required with the 336 parking spaces proposed, the subject site has a surplus of 168 parking spaces.

7.0 SITE PLAN REVIEW

In accordance with Ontario Traffic Manual (OTM) Book 5, we recommend appropriate signage consisting of a STOP sign (Ra-1) and STOP bar be provided at the Southbury Manor Drive and Autumn Oak Court, Pembrook Street and Sheardown Trail and Southbury Manor Drive and Pembrook Street intersections, as depicted in **Figure 7-1**.

Figure 7-1 – Signage Plan



8.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management (TDM) refers to a variety of strategies to reduce congestion, minimize the number of single-occupant vehicles, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system. Typically, TDM strategies are for residential and office developments where large quantities of people congregate in one origin or destination.

8.1. Parking Management

Based on our experience, excessive parking supply imposes environmental costs, contradicts community development objectives for more livable and walkable communities, and tends to increase driving and discourage the use of alternative mode of travel. It is anticipated that the combination of reduced parking supply and an efficient public transit system will encourage the use of alternative modes of travel.

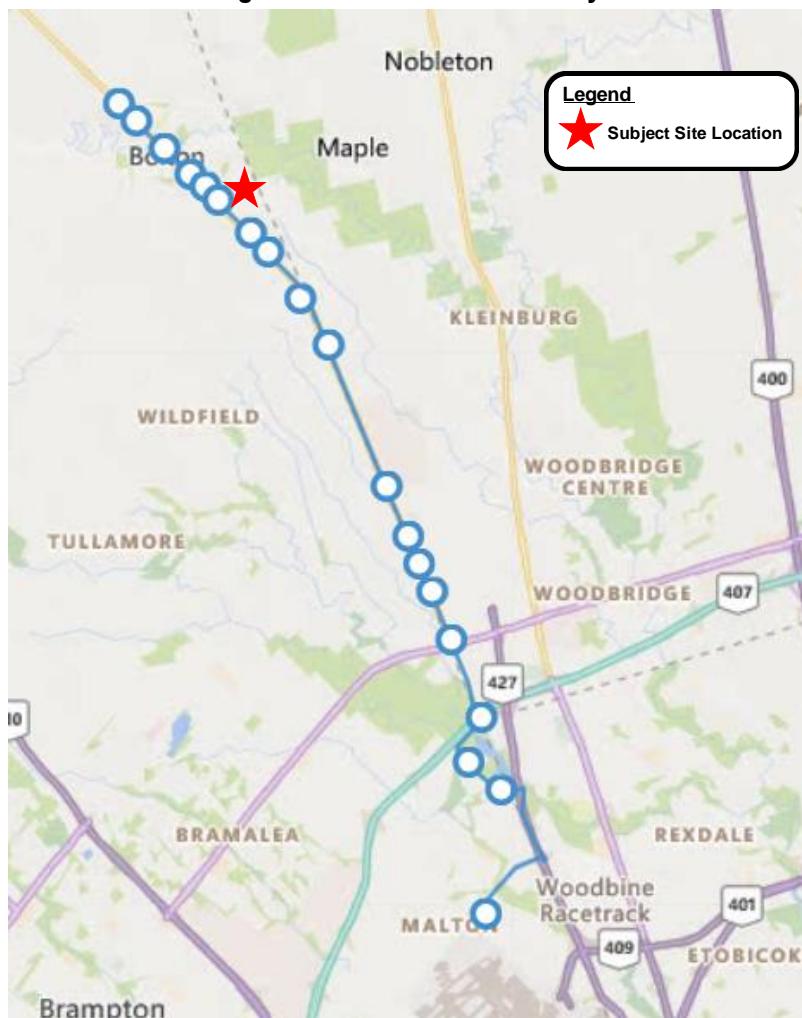
8.2. Transit and Active Transportation Mode Assessment

The proposed development is situated in a transit supportive neighbourhood with a bus stop located approximately eight (8)-minutes to the subject site within comfortable walking distance. The route services in the immediate area is described below and illustrated in **Figure 8-1**.

- **38 – Bolton / Malton:** Route 38 Bolton / Malton bus route operates between Highway 50 / Columbia Way and Malton GO Bus, generally in a north-south direction. Weekday service operates approximately every hour during the morning and every 2 hours during the afternoon hours (i.e. 5:00 AM to 6:45 AM in the morning and 4:15 PM to 7:00 PM in the afternoon). Accessible service is provided on the route.

Based on the study prepared by the Ministry of Transportation Ontario entitled: ‘Transit Supportive Guidelines’, dated January 2012, transit users are generally willing to walk 400 meters to a local stop or 800 meters to a rapid transit station. The 38 Bolton / Malton bus stop is located approximately 600 meters from the subject site (about an eight (8)-minute walk or two (2) minute bike ride).

Figure 8-1 – Transit Availability



8.3. TDM Implementation

TDM measures actively encourage its tenants to explore and take advantage of the alternative modes of travelling available within their neighbourhood. The *GO Transit* and *Caledon Cycling Map* webpages can provide a comprehensive list of items including materials, e-resources, links and PDF brochures on the following categories: Public Transit, Smart Commute, Cycling Information, and Active Transportation.

9.0 CONCLUSION

The findings and conclusions of our analysis are as follows:

- The development proposal is to develop the existing lands to a residential subdivision development with a total floor area of 84 dwelling units. A minimum of four (4) parking spaces per unit are proposed on-site. Vehicular access to the site is proposed via an extension of Pembrook Street, as well as an extension of Southbury Manor Drive.
- The proposed development is anticipated to generate 64 two-way auto trips (16 inbound and 48 outbound) during the AM peak hours and 86 two-way auto trips (54 inbound and 32 outbound) during the PM peak hours.
- The intersection capacity analysis results (based on the methodology and procedures outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board) indicate that the study intersections and existing accesses are expected to operate with excellent levels of service.
- Based on the information contained in the Town of Caledon Zoning By-law No. 2006-50, a total of 168 parking spaces are required for the proposed residential development. In comparing the 168 parking spaces required with the 336 parking spaces proposed, the subject site has a surplus of 168 parking spaces.
- In accordance with Ontario Traffic Manual (OTM) Book 5, we recommend appropriate signage consisting of a STOP sign (Ra-1) and STOP bar be provided at the Southbury Manor Drive and Autumn Oak Court, Pembrook Street and Sheardown Trail and Southbury Manor Drive and Pembrook Street intersections.

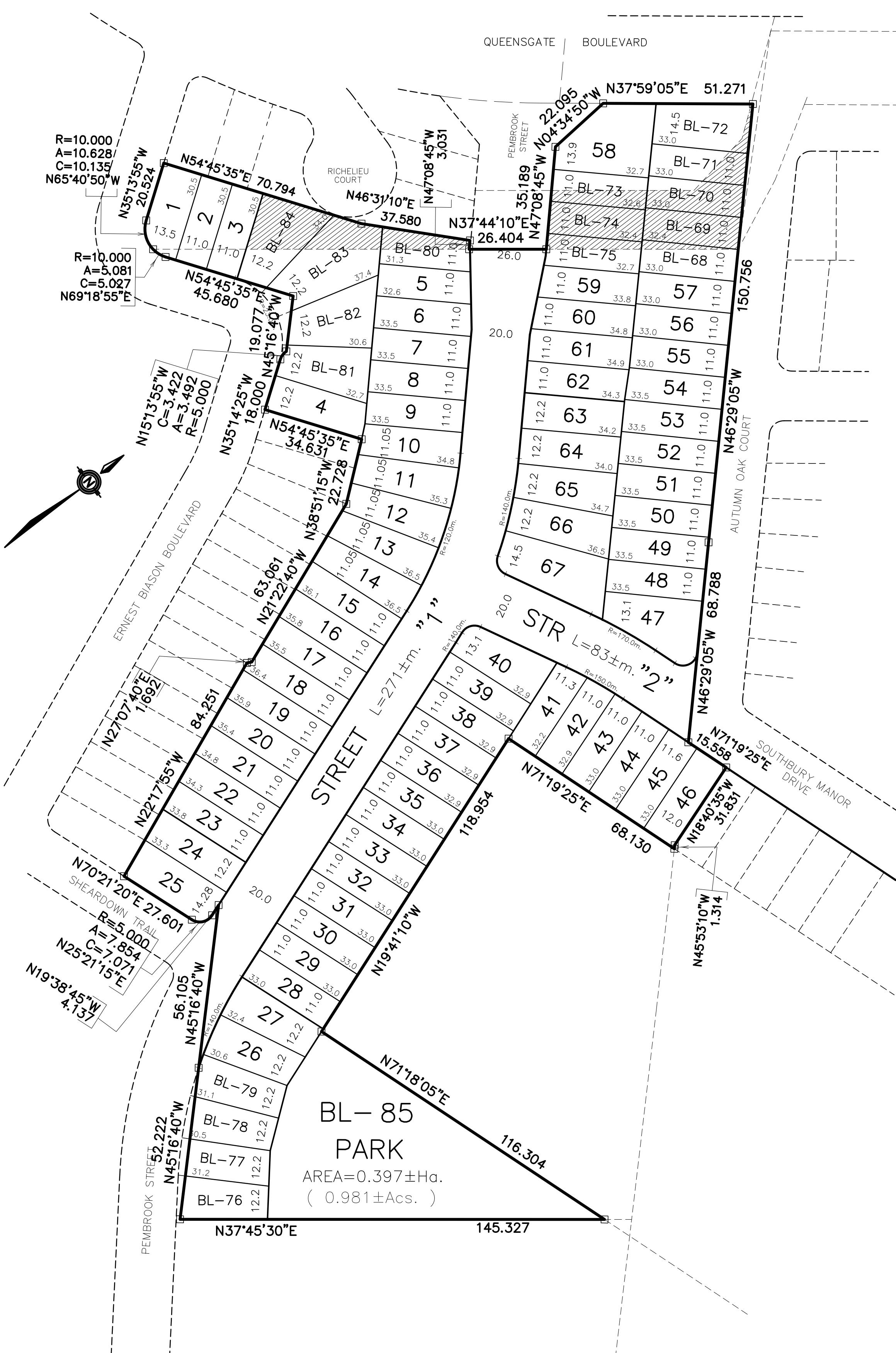
Appendix A - Proposed Site Plan

DRAFT PLAN OF SUBDIVISION

ALL OF BLOCK 123 REGISTERED PLAN 43M-1028 AND ALL OF BLOCKS 63, 64 AND 70 REGISTERED PLAN 43M-1210 AND ALL OF BLOCKS 188, 189, 190, 191, 192, 193, 201, 202, 203, 204 AND 205 AND PART OF BLOCK 187 REGISTERED PLAN 43M-1306 AND BLOCKS 14, 15 AND 16 REGISTERED PLAN 43M-1365 AND PART OF LOT 5, CONCESSION 7 AND PART OF LOT 6, CONCESSION 7 (TRAVELED ROAD) (KNOWN AS 5 SIDEROAD) AND PART OF THE ROAD ALLOWANCE BETWEEN LOTS 5 AND 6, CONCESSION 7 (KNOWN AS 5 SIDEROAD) AND PART OF THE ROAD ALLOWANCE BETWEEN LOTS 5 AND 6, CONCESSION 7
(CLOSED BY BY-LAW No. 99-61, INST. LT1974409)
(GEOGRAPHIC TOWNSHIP OF ALBION)

TOWN OF CALEDON REGIONAL MUNICIPALITY OF PEEL

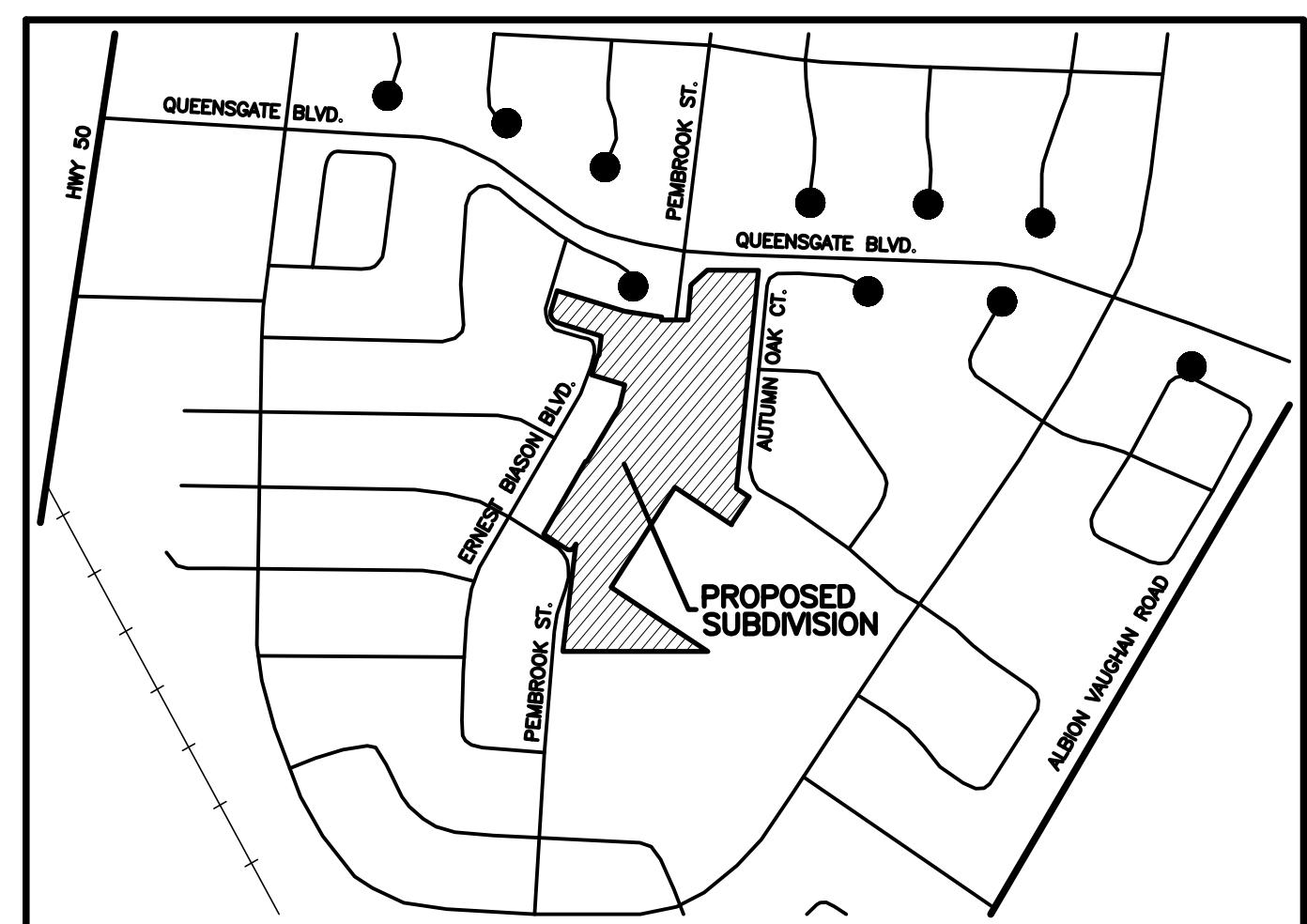
SCALE 1:1000



LAND CURRENTLY OWNED BY
THE TOWN OF CALEDON

NOTE — ELEVATIONS RELATED TO
CANADIAN GEODETIC DATUM

DRAFT PLAN T-



KEY PLAN

SECTION 51, PLANNING ACT, ADDITIONAL INFORMATION

- A. AS SHOWN ON DRAFT PLAN
- B. AS SHOWN ON DRAFT PLAN
- C. AS SHOWN ON DRAFT PLAN
- D. SEE SCHEDULE OF LAND USE
- E. AS SHOWN ON DRAFT PLAN
- F. AS SHOWN ON DRAFT PLAN
- G. AS SHOWN ON DRAFT PLAN
- H. MUNICIPAL PIPED WATER AVAILABLE AT TIME OF DEVELOPMENT
- I. CLAY-LOAM
- J. AS SHOWN ON DRAFT PLAN
- K. SANITARY AND STORM SEWERS, GARBAGE COLLECTION, FIRE PROTECTION
- L. AS SHOWN ON DRAFT PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE
SUBDIVIDED AS SHOWN ON THIS PLAN, AND THEIR RELATIONSHIP TO
THE ADJACENT LAND ARE ACCURATELY AND CORRECTLY SHOWN.

DATE -----, 2020

GARY B. VANDERVEEN
ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

I AUTHORIZE KLM PLANNING PARTNERS INC. TO PREPARE AND SUBMIT
THIS DRAFT PLAN OF SUBDIVISION TO THE REGIONAL MUNICIPALITY OF
PEEL FOR APPROVAL.

OWNER

CARANTANIA INVESTMENTS (BT) INC.

C/O

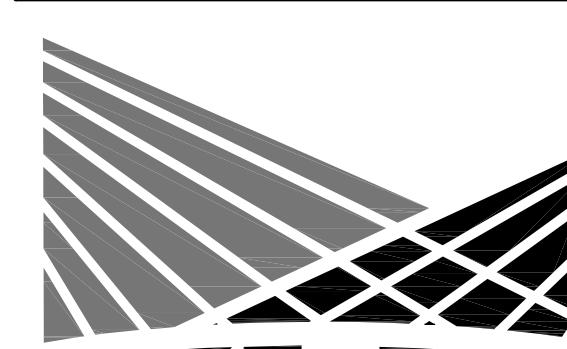
TREASURE HILL
1681 LANGSTAFF ROAD
UNIT 1, VAUGHAN ONTARIO
L4K 5T3

NICHOLAS FIDEI
PRESIDENT

TOTAL AREA OF LAND TO BE SUBDIVIDED = 4.487±Ha. (11.088±Acs.)

SCHEDULE OF LAND USE

DETACHED DWELLINGS	BLOCKS	LOTS	UNITS	±Ha.	±Acs.
LOTS 4, 24-27 and 63-67		10	10	0.454	1.121
MIN. LOT FRONTAGE=12.2m. MIN. LOT AREA=398.9sq.m. plus BLOCKS 76-79 and 81-84	8	4	0.375	0.927	
LOTS 1-3, 5-23 and 28-62		57	57	2.197	5.429
MIN. LOT FRONTAGE=11.0m. MIN. LOT AREA=335.5sq.m. plus BLOCKS 68-75 and 80	9	4.5	0.339	0.838	
SUBTOTAL		17	67	75.5	3.365
BLOCK 85 — PARK		1		0.397	0.981
STREETS				0.725	1.792
26.0m. WIDE TOTAL LENGTH= 25±m. AREA= 0.065±Ha. 20.0m. WIDE TOTAL LENGTH= 32.9±m. AREA= 0.680±Ha. TOTAL LENGTH= 354±m. AREA= 0.725±Ha.					
TOTAL		18	67	75.5	4.487
					11.088



PROJECT No. P-2657

SCALE 1:1000

DEC 8, 2020

(2657-DES9) X-REF:(2657MAS2 & 2657TOPO)

KLM DWG. No. - 20:2
PLANNING PARTNERS INC.
64 JARDIN DRIVE - UNIT 1B, CONCORD ONTARIO L4K 3P3
TEL: (905) 669-4055 FAX: (905) 669-0097 design@klmplanning.com

Planning • Design • Development

Appendix B – Terms of Reference

520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

Phone: 905-503-2563
www.nextrans.ca



NextEng Consulting Group Inc.

Terms of Reference

To: Arash Olia, Manager, Transportation Engineering, Engineering Service Department, Town of Caledon

From: Andy Bilawejian, Transportation Analyst, Nextrans Consulting Engineers

Date: November 18, 2020

Re: 9299 5 Sideroad, Residential Development – TOR for Traffic Impact Study

These terms of reference have been prepared to outline (for the Town's review and approval) the intended scope of work for a Traffic Impact Study for a proposed residential development consisting of 82 dwelling units. The subject site is located south of Queensgate Boulevard and west of Albion Vaughan Road in the Town of Caledon.

Introduction

The report introduction will include:

1. Description of site location
2. Description of nature of application
3. Description of proposed development and land use
4. Proposed study area

Existing Traffic Assessment

The existing conditions within the study area will be summarized and documented. This will include, but not limited to:

- A description of key roads and intersections (lanes, speed limits)
- Identifying forms of traffic control, lane configurations, turning restrictions
- Identifying pedestrian and cycling facilities
- Noting the location of adjacent driveways and access points
- Identifying other traffic generators in the vicinity of the site

Turning movement counts will be requested from the City / Region during the weekday AM (7am-10am) and weekday PM (4pm-7pm) peak periods at the following study area intersections:

- Queensgate Boulevard and Sant Farm Drive / Landsbridge Street
- Queensgate Boulevard and Albion Vaughan Road
- Queensgate Boulevard and Pembroke Street
- Queensgate Boulevard and Landsbridge Street
- Queensgate Boulevard and Queen Street South

- Local roads impacted by the proposed subdivision

Once traffic volumes have been collected, we will prepare a baseline model of existing traffic operations at the study area intersections using Synchro v.10 analysis for the identified critical time periods (weekday AM and PM peak hours). The existing analysis will include levels of service, volume to capacity ratios, and queuing at the key study intersections.

We understand that existing traffic volumes cannot be obtained due to the COVID-19 Pandemic, as counts do not represent typical conditions. However, pre-COVID turning movement counts at all intersections with the exception of the Pembrook Street and Queensgate Boulevard intersections are available as we have worked on other developments in the area. With respect to the Pembrook Street and Queensgate Boulevard intersection, please advise if one of the following options are acceptable:

- Obtain current turning movement counts and apply a 2% growth factor to represent pre-COVID counts
- Project pre-COVID through volumes from the nearest westerly or easterly intersection

Alternatively, if there's another more acceptable approach to obtaining counts at the Pembrook Street and Queensgate Boulevard intersection, please advise.

Future Background Traffic Assessment

Future Background consists of background growth and other background development traffic. We will obtain historic AADT records and estimate a background growth rate for the assumed full build-out year for the proposed development along with a 5-year time horizon period thereafter.

We do understand that there is and may be further redevelopment applications, as such traffic generation associated with those developments will be included in our analysis to reflect our horizon year assessment.

Operational deficiencies as a result of future forecasted traffic volumes will be identified and mitigative measures will be proposed and documented in the final report.

Site Traffic Assessment

The weekday AM and PM peak hour traffic to be generated by the proposed development will be estimated based on information published in the *Trip Generation, 10th Edition*, by the Institute of Transportation Engineers (ITE).

The directional trip distribution and assignment for traffic approaching and departing the site will be determined based upon existing traffic patterns and Transportation Tomorrow Survey (TTS) 2016 data.

Future Total Traffic Assessment

Future total traffic consists of future background plus site traffic. Operational deficiencies as a result of site traffic will be identified and mitigative measures will be proposed and documented in the final report. We will develop and recommend appropriate intersection controls and geometric improvements for all key intersections as well as determine the appropriateness of the proposed site access location(s) and the lane requirements at these new locations.

Parking / On Site Circulation and Site Access Review

- Review the available parking to determine whether the proposed parking supply is sufficient to accommodate the parking demand of the proposed site and meets current by-law requirements.
- We will review and provide comment on the most recent site plan with respect to the functionality of the internal vehicular circulation to facilitate vehicle maneuvering, loading, servicing, parking and pick-up / drop-off activities.
- Using Auto TURN, we will confirm the turning radius requirements and site circulation for passenger and heavy vehicles.
- Determine the appropriateness of access location and ensure adequate connections to main corridors are provided.
- Assign appropriate internal signage to site plan.

Transit and Transportation Demand Management Plan

A review of the existing and future transit availability in the area and recommendations shall be made to ensure acceptable walking distances are proposed to the subject lands. Transit routes, service frequencies, and stations will be identified in the study area.

Appendix C – Existing Traffic Data

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date		December 14, 2020			Prepared Date	December 15, 2020			
Database Rev		iNET			Completed By	JP			
Timing Card / Field rev		-			Checked By	MA			
Location	Highway 50 at Queensgate Boulevard/Husky Entrance								
Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)	Amber (s)	All Red (s)	TIME PERIOD (s) (Green+Amber+All Red)			
			WALK	FDWALK		AM MAX	OFF MAX	PM MAX	
1	Highway 50 - NB PP LT	5	0	0	3	0	14	8	8
2	Highway 50 - SB	8	8	22	4	2.5	49	47	62
3	Queensgate Boulevard - EB LT & THRU	8	8	20	4	2.7	25	23	33
4	Husky Entrance - WB LT & THRU	8	8	20	4	2.7	42	42	42
5	Highway 50 - SB PP LT	5	0	0	3	0	10	10	10
6	Highway 50 - NB	8	8	22	4	2.5	53	45	60
7	Not in use	-	-	20	3	2	-	-	-
8	Duplicate Phase	8	8	20	4	2.7	67	65	75
System Control		TIME (M-F)		PEAK	CYCLE LENGTH (s)		OFFSET (s)		
		06:00 - 09:00		AM	130		16		
		09:00 - 12:00 13:00 - 15:00		OFF	120		100		
		15:00 - 20:00		PM	145		22		
Semi-Actuated Mode									

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date		March 21, 2019			Prepared Date	December 15, 2020																	
Database Rev		3			Completed By	JP																	
Timing Card / Field rev		-			Checked By	MA																	
Location	Queensgate Boulevard at Albion Vaughan Road																						
Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)	Amber (s)	All Red (s)	TIME PERIOD (s) (Green+Amber+All Red)																	
			WALK			FDWALK	AM/OFF/PM																
1	Albion Vaughan Road - NB PP LT	5	0	0	3	0	8 (min), 13 (max)																
2	Albion Vaughan Road - NB/SB	8	8	22	4	2.1	14.1 (min), 41.1 (max)																
3	Not in use	-	-	-	-	-	-																
4	Queensgate Boulevard - EB/WB	8	8	10	4	2.1	41.1 (max)																
5	Not in use	-	-	-	-	-	-																
6	Not in use	-	-	-	-	-	-																
7	Not in use	-	-	-	-	-	-																
8	Not in use	-	-	-	-	-	-																
System Control		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TIME (M-F)</th><th>PEAK</th><th>CYCLE LENGTH (s)</th><th>OFFSET (s)</th></tr> </thead> <tbody> <tr> <td>FREE</td><td>AM</td><td>N/A</td><td>N/A</td></tr> <tr> <td>FREE</td><td>OFF</td><td>N/A</td><td>N/A</td></tr> <tr> <td>FREE</td><td>PM</td><td>N/A</td><td>N/A</td></tr> </tbody> </table>						TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)	FREE	AM	N/A	N/A	FREE	OFF	N/A	N/A	FREE	PM	N/A	N/A
TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)																				
FREE	AM	N/A	N/A																				
FREE	OFF	N/A	N/A																				
FREE	PM	N/A	N/A																				
Semi-Actuated Mode																							
Yes																							

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date		September 1, 2004			Prepared Date	December 15, 2020																	
Database Rev		3			Completed By	JP																	
Timing Card / Field rev		-			Checked By	MA																	
Location	Queensgate Boulevard at Landsbridge Street																						
Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)	Amber (s)	All Red (s)	TIME PERIOD (s) (Green+Amber+All Red)																	
			WALK			FDWALK	AM/OFF/PM																
1	Not in use	-	-	-	-	-																	
2	Queensgate Blvd. - EB/WB	8	8	16	4	2	37.0 (max)																
3	Not in use	-	-	-	-	-	-																
4	Landsbridge Street - NB/SB	8	8	20	4	3.4	15.4 (min), 27.4 (max)																
5	Not in use	-	-	-	-	-	-																
6	Not in use	-	-	-	-	-	-																
7	Not in use	-	-	-	-	-	-																
8	Not in use	-	-	-	-	-	-																
System Control		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>TIME (M-F)</th><th>PEAK</th><th>CYCLE LENGTH (s)</th><th>OFFSET (s)</th></tr> </thead> <tbody> <tr> <td>FREE</td><td>AM</td><td>N/A</td><td>N/A</td></tr> <tr> <td>FREE</td><td>OFF</td><td>N/A</td><td>N/A</td></tr> <tr> <td>FREE</td><td>PM</td><td>N/A</td><td>N/A</td></tr> </tbody> </table>						TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)	FREE	AM	N/A	N/A	FREE	OFF	N/A	N/A	FREE	PM	N/A	N/A
TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)																				
FREE	AM	N/A	N/A																				
FREE	OFF	N/A	N/A																				
FREE	PM	N/A	N/A																				
Semi-Actuated Mode																							
Yes																							



Turning Movement Count (1 . ALBION VAUGHAN RD & QUEENSGATE BLVD) CustID: 99900001 MiID: 440453

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach QUEENSGATE BLVD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	U-Turn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	42	219	0	0	261	49	2	0	0	51	32	29	0	0	61	373	
07:15:00	32	216	0	0	248	51	7	0	0	58	26	31	0	0	57	363	
07:30:00	51	242	0	0	293	45	5	0	0	50	32	18	0	0	50	393	
07:45:00	57	236	0	0	293	61	6	0	0	67	41	26	0	0	67	427	1556
08:00:00	63	201	0	0	264	48	7	0	0	55	27	24	0	0	51	370	1553
08:15:00	41	199	0	0	240	51	4	0	0	55	38	34	0	0	72	367	1557
08:30:00	35	167	0	0	202	56	7	0	0	63	33	29	0	0	62	327	1491
08:45:00	50	152	0	0	202	51	5	0	0	56	19	31	0	0	50	308	1372
09:00:00	41	143	0	0	184	56	11	0	0	67	20	22	0	0	42	293	1295
09:15:00	44	119	0	0	163	50	8	0	0	58	20	22	0	0	42	263	1191
09:30:00	29	102	0	0	131	47	5	0	0	52	19	21	0	0	40	223	1087
09:45:00	28	102	0	0	130	52	5	0	0	57	29	19	0	0	48	235	1014
BREAK																	
16:00:00	36	77	0	0	113	174	35	0	0	209	8	65	0	0	73	395	
16:15:00	47	96	0	0	143	141	23	0	0	164	19	61	0	0	80	387	
16:30:00	42	79	0	0	121	188	30	0	0	218	16	77	0	0	93	432	
16:45:00	36	84	0	0	120	101	19	0	0	120	18	68	0	0	86	326	1540
17:00:00	38	80	0	0	118	198	55	0	0	253	13	85	0	0	98	469	1614
17:15:00	32	75	0	1	107	136	14	0	0	150	23	94	0	0	117	374	1601
17:30:00	42	100	0	0	142	206	30	0	0	236	24	57	0	0	81	459	1628
17:45:00	47	102	0	0	149	165	57	0	0	222	17	56	1	0	74	445	1747
18:00:00	41	83	0	0	124	164	39	0	0	203	9	43	0	0	52	379	1657
18:15:00	27	94	0	0	121	145	38	0	0	183	18	48	0	0	66	370	1653
18:30:00	38	71	0	0	109	143	33	0	0	176	19	46	0	0	65	350	1544
18:45:00	36	82	0	0	118	124	31	0	0	155	22	57	0	0	79	352	1451
Grand Total	975	3121	0	1	4096	2502	476	0	0	2978	542	1063	1	0	1606	8680	-
Approach%	23.8%	76.2%	0%	-	84%	16%	0%	-	-	33.7%	66.2%	0.1%	-	-	-	-	-
Totals %	11.2%	36%	0%	47.2%	28.8%	5.5%	0%	34.3%	6.2%	12.2%	0%	18.5%	-	-	-	-	-
Heavy	8	236	0	-	192	7	0	-	8	11	0	-	-	-	-	-	-
Heavy %	0.8%	7.6%	0%	-	7.7%	1.5%	0%	-	1.5%	1%	0%	-	-	-	-	-	-
Bicycles	0	4	0	-	0	0	0	-	1	1	0	-	-	-	-	-	-
Bicycle %	0%	0.1%	0%	-	0%	0%	0%	-	0.2%	0.1%	0%	-	-	-	-	-	-



Peak Hour: 07:30 AM - 08:30 AM Weather: Clear (12.7 °C)

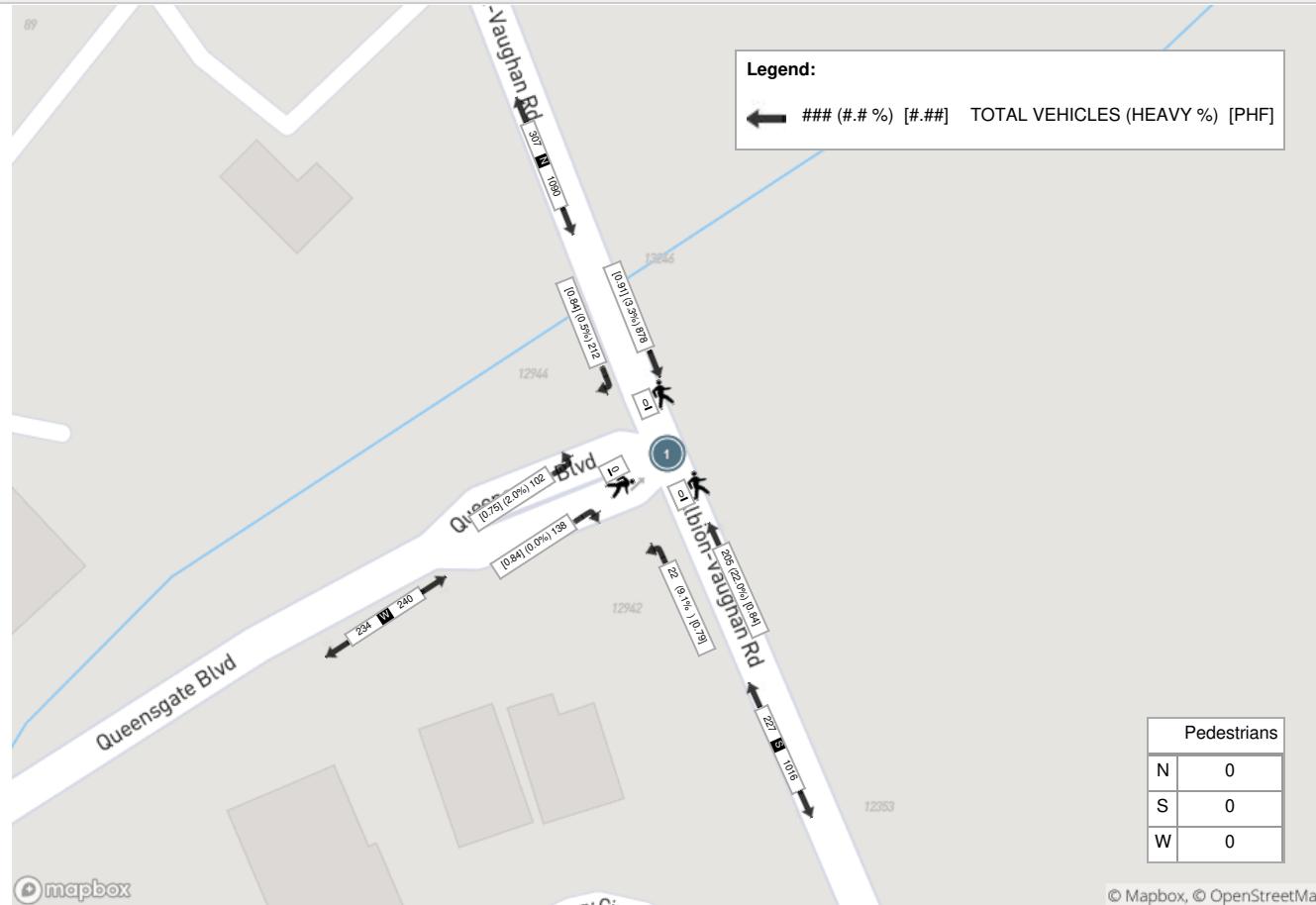
Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach QUEENSGATE BLVD					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
07:30:00	51	242	0	0	293	45	5	0	0	50	32	18	0	0	50	393
07:45:00	57	236	0	0	293	61	6	0	0	67	41	26	0	0	67	427
08:00:00	63	201	0	0	264	48	7	0	0	55	27	24	0	0	51	370
08:15:00	41	199	0	0	240	51	4	0	0	55	38	34	0	0	72	367
Grand Total	212	878	0	0	1090	205	22	0	0	227	138	102	0	0	240	1557
Approach%	19.4%	80.6%	0%	-	90.3%	9.7%	0%	-	57.5%	42.5%	0%	-	-	-	-	-
Totals %	13.6%	56.4%	0%	70%	13.2%	1.4%	0%	14.6%	8.9%	6.6%	0%	15.4%	-	-	-	-
PHF	0.84	0.91	0	0.93	0.84	0.79	0	0.85	0.84	0.75	0	0.83	-	-	-	-
Heavy	1	29	0	30	45	2	0	47	0	2	0	2	-	-	-	-
Heavy %	0.5%	3.3%	0%	2.8%	22%	9.1%	0%	20.7%	0%	2%	0%	0.8%	-	-	-	-
Lights	211	849	0	1060	160	20	0	180	138	100	0	238	-	-	-	-
Lights %	99.5%	96.7%	0%	97.2%	78%	90.9%	0%	79.3%	100%	98%	0%	99.2%	-	-	-	-
Single-Unit Trucks	1	23	0	24	26	1	0	27	0	2	0	2	-	-	-	-
Single-Unit Trucks %	0.5%	2.6%	0%	2.2%	12.7%	4.5%	0%	11.9%	0%	2%	0%	0.8%	-	-	-	-
Buses	0	0	0	0	7	0	0	7	0	0	0	0	-	-	-	-
Buses %	0%	0%	0%	0%	3.4%	0%	0%	3.1%	0%	0%	0%	0%	-	-	-	-
Articulated Trucks	0	6	0	6	12	1	0	13	0	0	0	0	-	-	-	-
Articulated Trucks %	0%	0.7%	0%	0.6%	5.9%	4.5%	0%	5.7%	0%	0%	0%	0%	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	0	-	-	-	0	-	-	-	-
Pedestrians%	-	-	-	0%	-	-	-	0%	-	-	-	0%	-	-	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	-	0	1	0	-	-	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	0%	-	-	-	0%	-	-	-	-



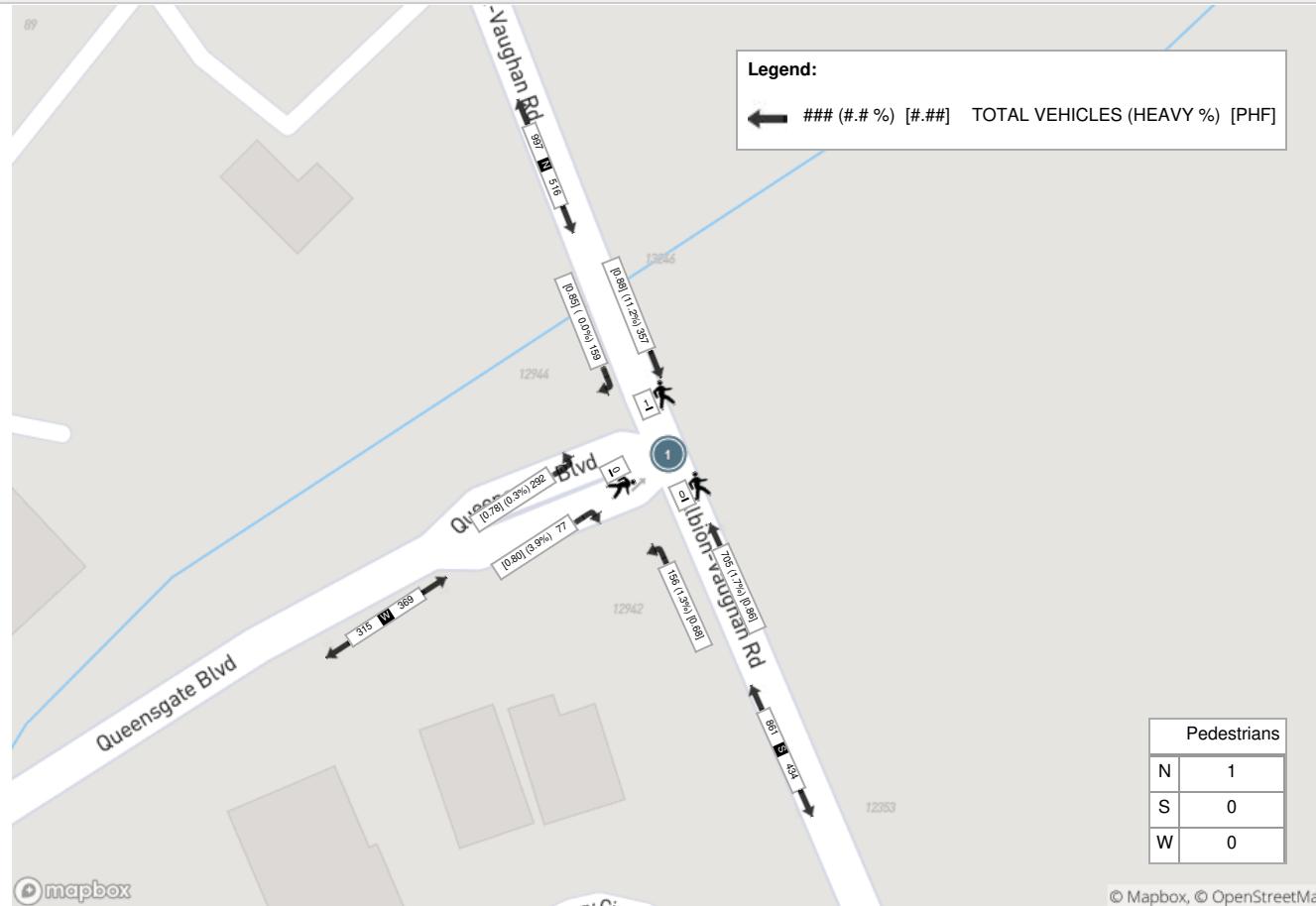
Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (22.3 °C)

Start Time	N Approach ALBION VAUGHAN RD					S Approach ALBION VAUGHAN RD					W Approach QUEENSGATE BLVD					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
17:00:00	38	80	0	0	118	198	55	0	0	253	13	85	0	0	98	469
17:15:00	32	75	0	1	107	136	14	0	0	150	23	94	0	0	117	374
17:30:00	42	100	0	0	142	206	30	0	0	236	24	57	0	0	81	459
17:45:00	47	102	0	0	149	165	57	0	0	222	17	56	1	0	74	445
Grand Total	159	357	0	1	516	705	156	0	0	861	77	292	1	0	370	1747
Approach%	30.8%	69.2%	0%	-	81.9%	18.1%	0%	-	20.8%	78.9%	0.3%	-	-	-	-	-
Totals %	9.1%	20.4%	0%	29.5%	40.4%	8.9%	0%	49.3%	4.4%	16.7%	0.1%	21.2%	-	-	-	-
PHF	0.85	0.88	0	0.87	0.86	0.68	0	0.85	0.8	0.78	0.25	0.79	-	-	-	-
Heavy	0	40	0	40	12	2	0	-	14	3	1	0	-	4	-	-
Heavy %	0%	11.2%	0%	7.8%	1.7%	1.3%	0%	1.6%	3.9%	0.3%	0%	1.1%	-	-	-	-
Lights	159	317	0	476	693	154	0	-	847	74	291	1	366	-	-	-
Lights %	100%	88.8%	0%	92.2%	98.3%	98.7%	0%	98.4%	96.1%	99.7%	100%	98.9%	-	-	-	-
Single-Unit Trucks	0	22	0	22	10	2	0	-	12	3	1	0	4	-	-	-
Single-Unit Trucks %	0%	6.2%	0%	4.3%	1.4%	1.3%	0%	1.4%	3.9%	0.3%	0%	1.1%	-	-	-	-
Buses	0	0	0	0	1	0	0	-	1	0	0	0	0	-	-	-
Buses %	0%	0%	0%	0%	0.1%	0%	0%	0.1%	0%	0%	0%	0%	-	-	-	-
Articulated Trucks	0	18	0	18	1	0	0	-	1	0	0	0	0	-	-	-
Articulated Trucks %	0%	5%	0%	3.5%	0.1%	0%	0%	0.1%	0%	0%	0%	0%	0%	-	-	-
Pedestrians	-	-	-	1	-	-	-	0	-	-	-	0	-	-	-	-
Pedestrians%	-	-	-	100%	-	-	-	0%	-	-	-	0%	-	-	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	-	0	0	0	-	-	-	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	0%	-	-	-	0%	-	-	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear (12.7 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (22.3 °C)





Turning Movement Count (48 . HWY 50 & QUEENSGATE BLVD) CustID: 05014978 MiID: 506038

Start Time	N Approach HWY 50						E Approach QUEENSGATE BLVD						S Approach HWY 50						W Approach QUEENSGATE BLVD						Int. Total (15 min)	Int. Total (1 hr)
	Left N:E	Thru N:S	Right N:W	U-Turn N:N	Peds N:	Approach Total	Left E:S	Thru E:W	Right E:N	U-Turn E:E	Peds E:	Approach Total	Left S:W	Thru S:N	Right S:E	U-Turn S:S	Peds S:	Approach Total	Left W:N	Thru W:E	Right W:S	U-Turn W:W	Peds W:	Approach Total		
07:00:00	14	223	5	1	1	243	134	6	8	0	0	148	15	56	12	0	0	83	0	0	0	0	0	0	474	
07:15:00	14	227	5	0	0	246	144	11	9	0	0	164	31	56	17	0	0	104	0	0	2	0	0	2	516	
07:30:00	7	253	5	0	0	265	119	8	18	0	0	145	33	67	15	0	0	115	0	0	3	0	0	3	528	
07:45:00	16	243	15	1	1	275	122	19	19	0	0	160	86	80	19	0	0	185	1	0	3	0	0	4	624	2142
08:00:00	16	196	16	0	0	228	119	19	19	0	0	157	50	89	19	1	2	159	0	0	7	0	0	7	551	2219
08:15:00	24	246	2	0	0	272	95	13	25	0	0	133	24	93	25	0	0	142	0	0	2	0	0	2	549	2252
08:30:00	21	271	4	0	0	296	114	7	23	0	0	144	21	91	23	0	0	135	0	0	1	0	1	1	576	2300
08:45:00	20	235	2	0	0	257	118	6	29	0	0	153	8	108	32	0	0	148	0	0	1	0	1	1	559	2235
BREAK																										
11:00:00	19	178	0	0	1	197	46	1	16	0	0	63	4	142	41	0	0	187	0	1	3	0	0	4	451	
11:15:00	23	161	0	0	0	184	58	1	16	0	1	75	5	156	26	0	1	187	0	2	3	0	0	5	451	
11:30:00	30	171	2	0	1	203	50	1	15	0	0	66	2	160	52	0	0	214	2	2	6	0	1	10	493	
11:45:00	35	182	0	0	0	217	72	0	12	0	0	84	5	204	46	0	5	255	4	3	11	0	2	18	574	1969
12:00:00	25	182	1	0	1	208	53	3	18	0	1	74	6	180	53	0	1	239	3	4	29	0	1	36	557	2075
12:15:00	33	200	2	0	0	235	57	1	23	0	0	81	10	205	62	1	1	278	3	3	13	0	1	19	613	2237
12:30:00	29	185	7	0	0	221	66	1	14	0	1	81	12	223	54	2	2	291	0	2	9	0	2	11	604	2348
12:45:00	22	161	3	0	2	186	64	6	23	0	0	93	14	192	51	0	2	257	3	1	11	0	1	15	551	2325
13:00:00	25	195	7	0	0	227	77	3	20	0	0	100	19	239	42	0	4	300	0	6	6	0	0	12	639	2407
13:15:00	21	175	3	0	0	199	54	3	29	0	1	86	8	220	49	0	0	277	1	1	7	0	0	9	571	2365
13:30:00	21	151	6	0	0	178	59	3	22	0	0	84	9	193	46	0	0	248	0	2	6	0	1	8	518	2279
13:45:00	12	164	6	0	1	182	57	5	14	0	0	76	11	214	61	0	1	286	2	1	1	0	1	4	548	2276
BREAK																										
15:00:00	29	161	5	0	0	195	61	7	24	0	0	92	9	262	86	0	0	357	4	5	11	0	0	20	664	
15:15:00	25	176	1	0	1	202	67	1	24	0	0	92	10	246	61	1	0	318	3	3	7	0	0	13	625	
15:30:00	24	158	1	1	0	184	53	0	26	0	0	79	7	290	93	1	1	391	2	6	25	0	0	33	687	
15:45:00	26	128	3	0	1	157	83	3	34	0	0	120	7	268	85	1	0	361	3	6	18	0	0	27	665	2641
16:00:00	18	170	0	0	0	188	48	2	22	0	3	72	6	317	128	0	2	451	5	6	26	0	0	37	748	2725
16:15:00	26	154	0	0	0	180	58	1	30	0	0	89	3	334	122	0	2	459	6	6	24	0	1	36	764	2864
16:30:00	20	135	2	0	2	157	47	1	28	0	1	76	2	369	138	0	1	509	7	17	59	0	2	83	825	3002
16:45:00	31	128	1	0	2	160	51	0	24	0	0	75	4	347	96	0	0	447	11	6	28	0	2	45	727	3064
17:00:00	20	135	1	0	0	156	55	0	37	0	0	92	3	311	129	0	0	443	3	9	40	0	0	52	743	3059
17:15:00	29	150	2	0	0	181	48	0	31	0	1	79	1	353	102	0	0	456	8	2	31	0	0	41	757	3052
17:30:00	36	159	0	0	1	195	59	0	37	0	0	96	2	324	118	1	0	445	1	5	15	0	0	21	757	2984
17:45:00	27	138	0	0	0	165	63	0	36	0	0	99	1	309	108	0	0	418	3	4	23	0	0	30	712	2969
Grand Total	738	5791	107	3	15	6639	2371	132	725	0	9	3228	428	6698	2011	8	25	9145	75	103	431	0	17	609	19621	-
Approach%	11.1%	87.2%	1.6%	0%	-	73.5%	4.1%	22.5%	0%	-	4.7%	73.2%	22%	0.1%	-	12.3%	16.9%	70.8%	0%	-	-	-	-	-	-	
Totals %	3.8%	29.5%	0.5%	0%	33.8%	12.1%	0.7%	3.7%	0%	16.5%	2.2%	34.1%	10.2%	0%	46.6%	0.4%	0.5%	2.2%	0%	3.1%	-	-	-	-	-	
Heavy	22	162	0	0	-	26	0	24	0	-	0	160	34	0	-	0	0	0	0	-	-	-	-	-	-	
Heavy %	3%	2.8%	0%	0%	-	1.1%	0%	3.3%	0%	-	0%	2.4%	1.7%	0%	-	0%	0%	0%	0%	-	-	-	-	-	-	
Bicycles	0	1	0	0	-	0	1	0	0	-	0	0	0	0	-	0	0	0	-	-	-	-	-	-		
Bicycle %	0%	0%	0%	0%	-	0%	0.8%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	-	-	-	-	



Peak Hour: 07:45 AM - 08:45 AM Weather: Clear (-6.4 °C)

Start Time	N Approach HWY 50						E Approach QUEENSGATE BLVD						S Approach HWY 50						W Approach QUEENSGATE BLVD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:45:00	16	243	15	1	1	275	122	19	19	0	0	160	86	80	19	0	0	185	1	0	3	0	0	4	624
08:00:00	16	196	16	0	0	228	119	19	19	0	0	157	50	89	19	1	2	159	0	0	7	0	0	7	551
08:15:00	24	246	2	0	0	272	95	13	25	0	0	133	24	93	25	0	0	142	0	0	2	0	0	2	549
08:30:00	21	271	4	0	0	296	114	7	23	0	0	144	21	91	23	0	0	135	0	0	1	0	1	1	576
Grand Total	77	956	37	1	1	1071	450	58	86	0	0	594	181	353	86	1	2	621	1	0	13	0	1	14	2300
Approach%	7.2%	89.3%	3.5%	0.1%	-	75.8%	9.8%	14.5%	0%	-	29.1%	56.8%	13.8%	0.2%	-	-	7.1%	0%	92.9%	0%	-	-	-	-	
Totals %	3.3%	41.6%	1.6%	0%	46.6%	19.6%	2.5%	3.7%	0%	25.8%	7.9%	15.3%	3.7%	0%	27%	0%	0%	0.6%	0%	0.6%	-	-	-	-	
PHF	0.8	0.88	0.58	0.25	0.9	0.92	0.76	0.86	0	0.93	0.53	0.95	0.86	0.25	0.84	0.25	0	0.46	0	0.5	-	-	-	-	
Heavy	6	18	0	0	24	2	0	2	0	4	0	26	4	0	30	0	0	0	0	0	0	0	0	0	
Heavy %	7.8%	1.9%	0%	0%	2.2%	0.4%	0%	2.3%	0%	0.7%	0%	7.4%	4.7%	0%	4.8%	0%	0%	0%	0%	0%	-	-	-	-	
Lights	71	938	37	1	1047	448	58	84	0	590	181	327	82	1	591	1	0	13	0	0	14	-	-	-	
Lights %	92.2%	98.1%	100%	100%	97.8%	99.6%	100%	97.7%	0%	99.3%	100%	92.6%	95.3%	100%	95.2%	100%	0%	100%	0%	100%	-	-	-	-	
Single-Unit Trucks	1	8	0	0	9	1	0	2	0	3	0	13	2	0	15	0	0	0	0	0	0	0	0	-	
Single-Unit Trucks %	1.3%	0.8%	0%	0%	0.8%	0.2%	0%	2.3%	0%	0.5%	0%	3.7%	2.3%	0%	2.4%	0%	0%	0%	0%	0%	-	-	-	-	
Buses	5	5	0	0	10	1	0	0	0	1	0	10	2	0	12	0	0	0	0	0	0	0	0	-	
Buses %	6.5%	0.5%	0%	0%	0.9%	0.2%	0%	0%	0%	0.2%	0%	2.8%	2.3%	0%	1.9%	0%	0%	0%	0%	0%	-	-	-	-	
Articulated Trucks	0	5	0	0	5	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	-	
Articulated Trucks %	0%	0.5%	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0.8%	0%	0%	0.5%	0%	0%	0%	0%	0%	-	-	-	-	
Pedestrians	-	-	-	-	1	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	1	-	-	-	
Pedestrians%	-	-	-	-	25%	-	-	-	-	0%	-	-	-	-	25%	-	-	-	-	-	25%	-	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	0	-	-	-	
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	25%	-	-	-	-	-	0%	-	-	-	
Bicycles on Road	0	0	0	0	0	0	1	0	0	0	-	0	0	0	-	0	0	0	0	0	0	0	-		
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	



Peak Hour: 12:15 PM - 01:15 PM Weather: Partly Cloudy (-2 °C)

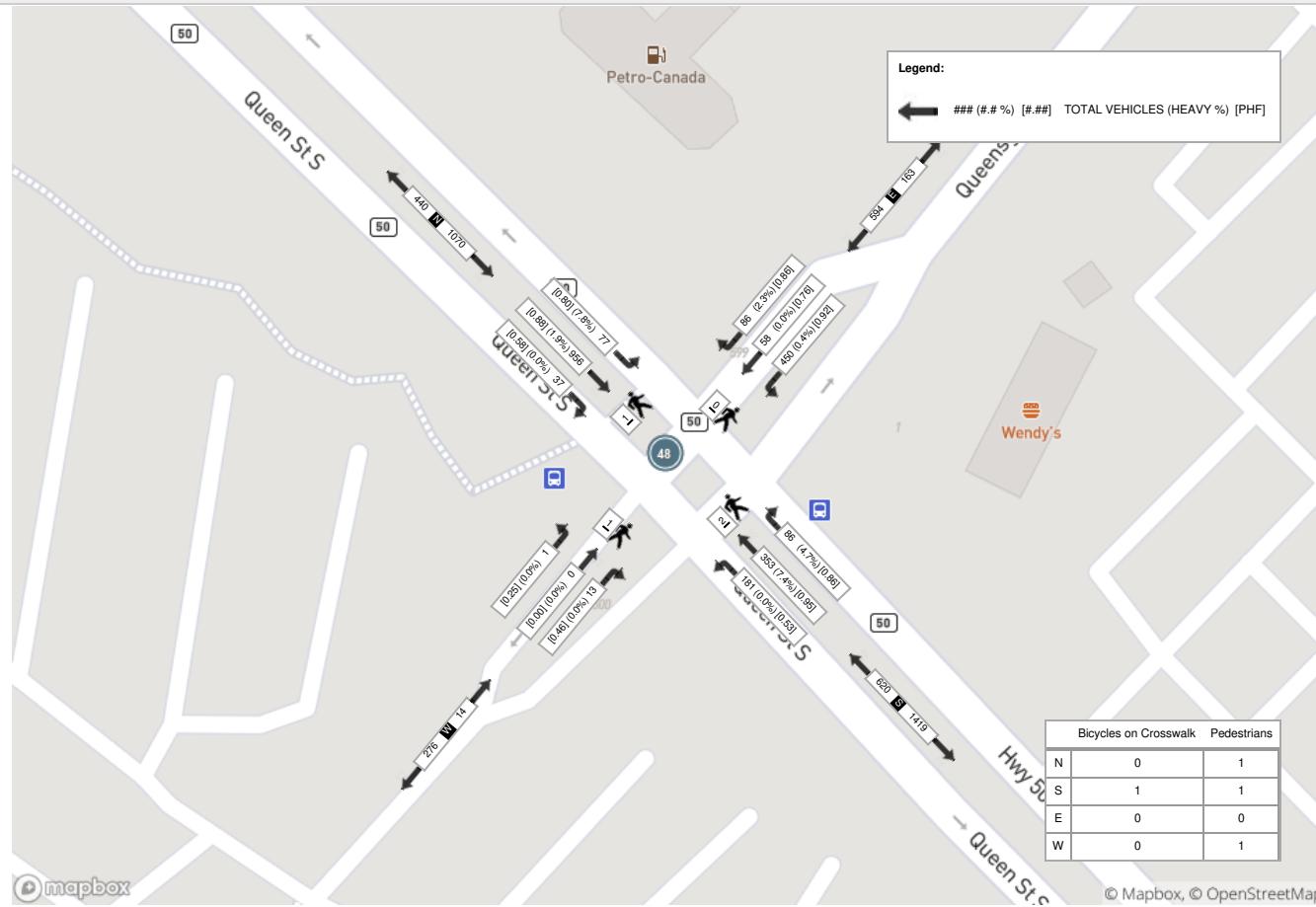
Start Time	N Approach HWY 50						E Approach QUEENSGATE BLVD						S Approach HWY 50						W Approach QUEENSGATE BLVD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
12:15:00	33	200	2	0	0	235	57	1	23	0	0	81	10	205	62	1	1	278	3	3	13	0	1	19	613
12:30:00	29	185	7	0	0	221	66	1	14	0	1	81	12	223	54	2	2	291	0	2	9	0	2	11	604
12:45:00	22	161	3	0	2	186	64	6	23	0	0	93	14	192	51	0	2	257	3	1	11	0	1	15	551
13:00:00	25	195	7	0	0	227	77	3	20	0	0	100	19	239	42	0	4	300	0	6	6	0	0	12	639
Grand Total	109	741	19	0	2	869	264	11	80	0	1	355	55	859	209	3	9	1126	6	12	39	0	4	57	2407
Approach%	12.5%	85.3%	2.2%	0%	-	74.4%	3.1%	22.5%	0%	-	4.9%	76.3%	18.6%	0.3%	-	10.5%	21.1%	68.4%	0%	-	-	-	-	-	-
Totals %	4.5%	30.8%	0.8%	0%	36.1%	11%	0.5%	3.3%	0%	14.7%	2.3%	35.7%	8.7%	0.1%	46.8%	0.2%	0.5%	1.6%	0%	2.4%	-	-	-	-	-
PHF	0.83	0.93	0.68	0	0.92	0.86	0.46	0.87	0	0.89	0.72	0.9	0.84	0.38	0.94	0.5	0.5	0.75	0	0.75	-	-	-	-	-
Heavy	3	22	0	0	25	2	0	3	0	5	0	29	3	0	32	0	0	0	0	0	0	0	0	0	-
Heavy %	2.8%	3%	0%	0%	2.9%	0.8%	0%	3.8%	0%	1.4%	0%	3.4%	1.4%	0%	2.8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Lights	106	719	19	0	844	262	11	77	0	350	55	830	206	3	1094	6	12	39	0	57	-	-	-	-	-
Lights %	97.2%	97%	100%	0%	97.1%	99.2%	100%	96.3%	0%	98.6%	100%	96.6%	98.6%	100%	97.2%	100%	100%	100%	0%	100%	-	-	-	-	-
Single-Unit Trucks	3	18	0	0	21	2	0	3	0	5	0	17	1	0	18	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	2.8%	2.4%	0%	0%	2.4%	0.8%	0%	3.8%	0%	1.4%	0%	2%	0.5%	0%	1.6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	1	0	0	1	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	0	0	0	0	-
Buses %	0%	0.1%	0%	0%	0.1%	0%	0%	0%	0%	0%	0%	0.3%	0.5%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Articulated Trucks	0	3	0	0	3	0	0	0	0	0	0	9	1	0	10	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0.4%	0%	0%	0.3%	0%	0%	0%	0%	0%	0%	1%	0.5%	0%	0.9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Pedestrians	-	-	-	-	2	-	-	-	-	1	-	-	-	-	9	-	-	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	12.5%	-	-	-	-	6.3%	-	-	-	-	56.3%	-	-	-	-	-	-	-	25%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	-	0	0	0	-	0	0	0	0	0	0	0	0	-	
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	-	0%	-	-



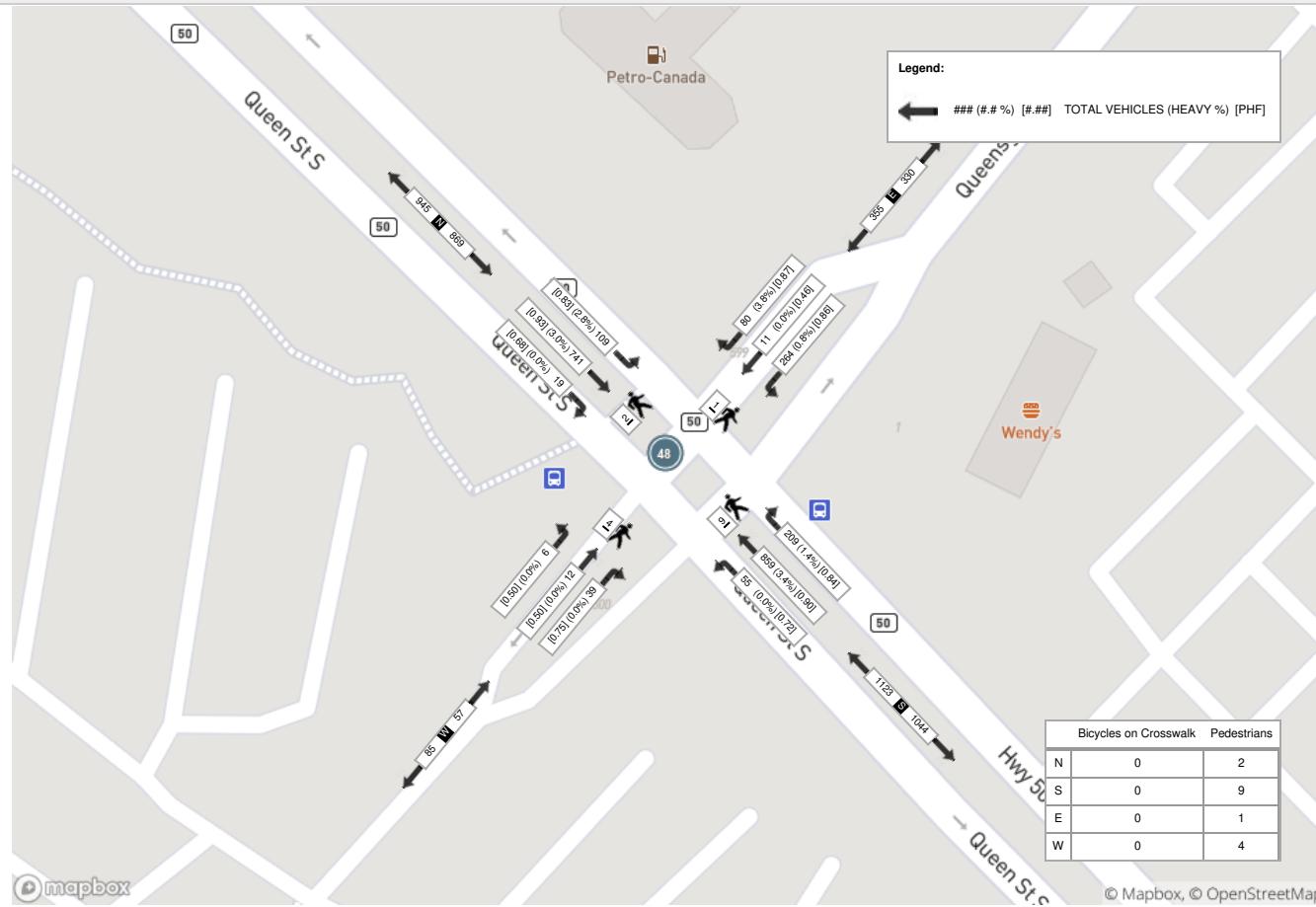
Peak Hour: 04:00 PM - 05:00 PM Weather: Clear (1.4 °C)

Start Time	N Approach HWY 50						E Approach QUEENSGATE BLVD						S Approach HWY 50						W Approach QUEENSGATE BLVD						Int. Total (15 min)	
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
16:00:00	18	170	0	0	0	188	48	2	22	0	3	72	6	317	128	0	2	451	5	6	26	0	0	37	748	
16:15:00	26	154	0	0	0	180	58	1	30	0	0	89	3	334	122	0	2	459	6	6	24	0	1	36	764	
16:30:00	20	135	2	0	2	157	47	1	28	0	1	76	2	369	138	0	1	509	7	17	59	0	2	83	825	
16:45:00	31	128	1	0	2	160	51	0	24	0	0	75	4	347	96	0	0	447	11	6	28	0	2	45	727	
Grand Total	95	587	3	0	4	685	204	4	104	0	4	312	15	1367	484	0	5	1866	29	35	137	0	5	201	3064	
Approach%	13.9%	85.7%	0.4%	0%	-	65.4%	1.3%	33.3%	0%	-	0.8%	73.3%	25.9%	0%	-	14.4%	17.4%	68.2%	0%	-	-	-	-	-	-	
Totals %	3.1%	19.2%	0.1%	0%	22.4%	6.7%	0.1%	3.4%	0%	10.2%	0.5%	44.6%	15.8%	0%	60.9%	0.9%	1.1%	4.5%	0%	6.6%	-	-	-	-	-	-
PHF	0.77	0.86	0.38	0	0.91	0.88	0.5	0.87	0	0.88	0.63	0.93	0.88	0	0.92	0.66	0.51	0.58	0	0.61	-	-	-	-	-	-
Heavy	0	16	0	0	16	2	0	1	0	3	0	10	5	0	15	0	0	0	0	0	0	0	0	0	0	0
Heavy %	0%	2.7%	0%	0%	2.3%	1%	0%	1%	0%	1%	0%	0.7%	1%	0%	0.8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Lights	95	571	3	0	669	202	4	103	0	309	15	1357	479	0	1851	29	35	137	0	201	-	-	-	-	-	-
Lights %	100%	97.3%	100%	0%	97.7%	99%	100%	99%	0%	99%	100%	99.3%	99%	0%	99.2%	100%	100%	100%	0%	100%	-	-	-	-	-	-
Single-Unit Trucks	0	9	0	0	9	2	0	1	0	3	0	5	2	0	7	0	0	0	0	0	0	0	0	0	0	-
Single-Unit Trucks %	0%	1.5%	0%	0%	1.3%	1%	0%	1%	0%	1%	0%	0.4%	0.4%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
Buses	0	5	0	0	5	0	0	0	0	0	0	1	3	0	4	0	0	0	0	0	0	0	0	0	0	-
Buses %	0%	0.9%	0%	0%	0.7%	0%	0%	0%	0%	0%	0%	0.1%	0.6%	0%	0.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	
Articulated Trucks	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	-
Articulated Trucks %	0%	0.3%	0%	0%	0.3%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	
Pedestrians	-	-	-	-	3	-	-	-	-	4	-	-	-	-	5	-	-	-	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	16.7%	-	-	-	-	22.2%	-	-	-	-	27.8%	-	-	-	-	-	-	-	-	16.7%	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	5.6%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	-	-	11.1%	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	0	0	-	
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	-	-	0%	-	-

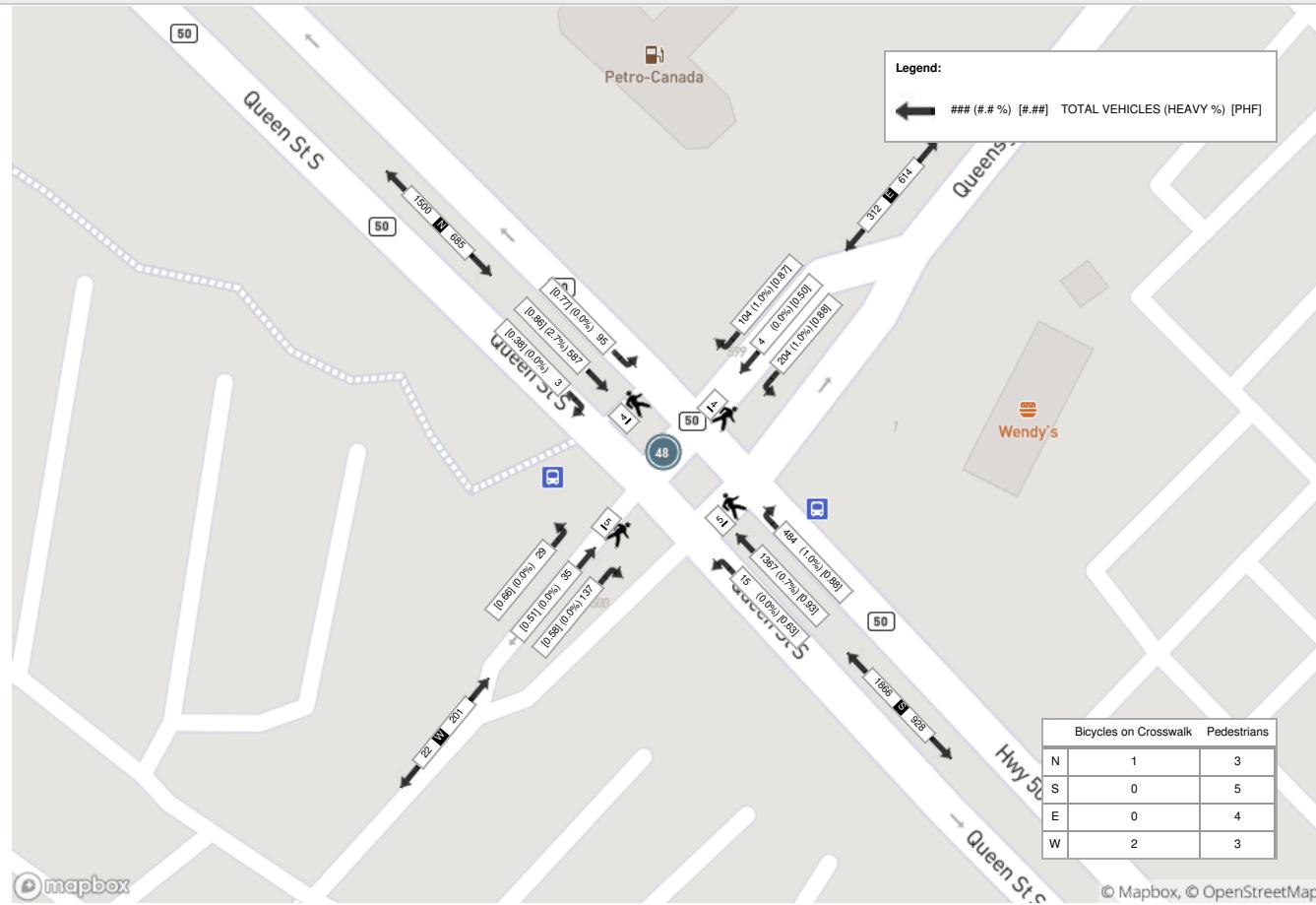
Peak Hour: 07:45 AM - 08:45 AM Weather: Clear (-6.4 °C)



Peak Hour: 12:15 PM - 01:15 PM Weather: Partly Cloudy (-2 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Clear (1.4 °C)





Turning Movement Count (3 . LANDSBIDGE STREET & QUEENSGATE BOULEVARD (SIGNALIZED))

Start Time	N Approach LANDSBIDGE STREET						E Approach QUEENSGATE BOULEVARD						S Approach LANDSBIDGE STREET						W Approach QUEENSGATE BOULEVARD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	25	1	3	0	1	29	3	83	0	0	1	86	0	1	44	0	0	45	8	5	2	0	0	15	175	
07:15:00	22	2	2	0	1	26	5	63	1	0	1	69	2	6	39	0	1	47	2	8	3	0	0	13	155	
07:30:00	17	5	4	0	1	26	5	90	1	0	2	96	4	4	55	0	0	63	15	14	6	0	1	35	220	
07:45:00	17	3	1	0	0	21	4	105	0	0	1	109	7	8	45	0	1	60	9	19	2	0	0	30	220	770
08:00:00	19	7	3	0	0	29	1	60	3	0	4	64	6	7	53	0	0	66	8	16	7	0	0	31	190	785
08:15:00	23	5	6	0	0	34	4	86	1	0	0	91	7	11	39	0	0	57	13	16	4	0	0	33	215	845
08:30:00	13	5	5	0	0	23	7	82	5	0	2	94	16	26	42	0	0	84	11	30	5	0	0	46	247	872
08:45:00	14	16	2	0	0	32	3	68	5	0	3	76	4	11	35	0	0	50	16	30	6	0	4	52	210	862
BREAK																										
16:00:00	16	20	12	0	1	48	13	38	3	0	0	54	5	5	20	0	0	30	26	82	22	0	5	130	262	
16:15:00	21	19	14	0	3	54	6	49	4	0	5	59	7	10	23	0	6	40	32	78	16	0	1	126	279	
16:30:00	16	14	18	0	0	48	11	33	4	0	4	48	2	18	22	0	3	42	40	106	19	0	0	165	303	
16:45:00	20	16	19	0	3	55	13	45	10	0	10	68	3	13	39	0	3	55	36	102	24	0	10	162	340	1184
17:00:00	15	12	13	0	3	40	14	30	5	0	4	49	2	16	24	0	1	42	42	115	28	0	2	185	316	1238
17:15:00	17	28	17	0	4	62	11	37	5	0	4	53	9	11	30	0	8	50	35	116	20	0	3	171	336	1295
17:30:00	10	14	10	0	2	34	13	34	1	0	1	48	3	6	31	0	2	40	40	78	24	0	6	142	264	1256
17:45:00	16	9	18	0	1	43	10	36	5	0	2	51	5	15	33	0	0	53	40	60	20	0	2	120	267	1183
Grand Total	281	176	147	0	20	604	123	939	53	0	44	1115	82	168	574	0	25	824	373	875	208	0	34	1456	3999	-
Approach%	46.5%	29.1%	24.3%	0%	-	11%	84.2%	4.8%	0%	-	10%	20.4%	69.7%	0%	-	25.6%	60.1%	14.3%	0%	-	-	-	-	-	-	
Totals %	7%	4.4%	3.7%	0%	15.1%	3.1%	23.5%	1.3%	0%	27.9%	2.1%	4.2%	14.4%	0%	20.6%	9.3%	21.9%	5.2%	0%	36.4%	-	-	-	-	-	
Heavy	4	5	2	0	-	2	11	1	0	-	3	2	8	0	-	8	9	3	0	-	-	-	-	-		
Heavy %	1.4%	2.8%	1.4%	0%	-	1.6%	1.2%	1.9%	0%	-	3.7%	1.2%	1.4%	0%	-	2.1%	1%	1.4%	0%	-	-	-	-	-		
Bicycles	0	1	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-	-	-	-		
Bicycle %	0%	0.6%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	-	-	-		



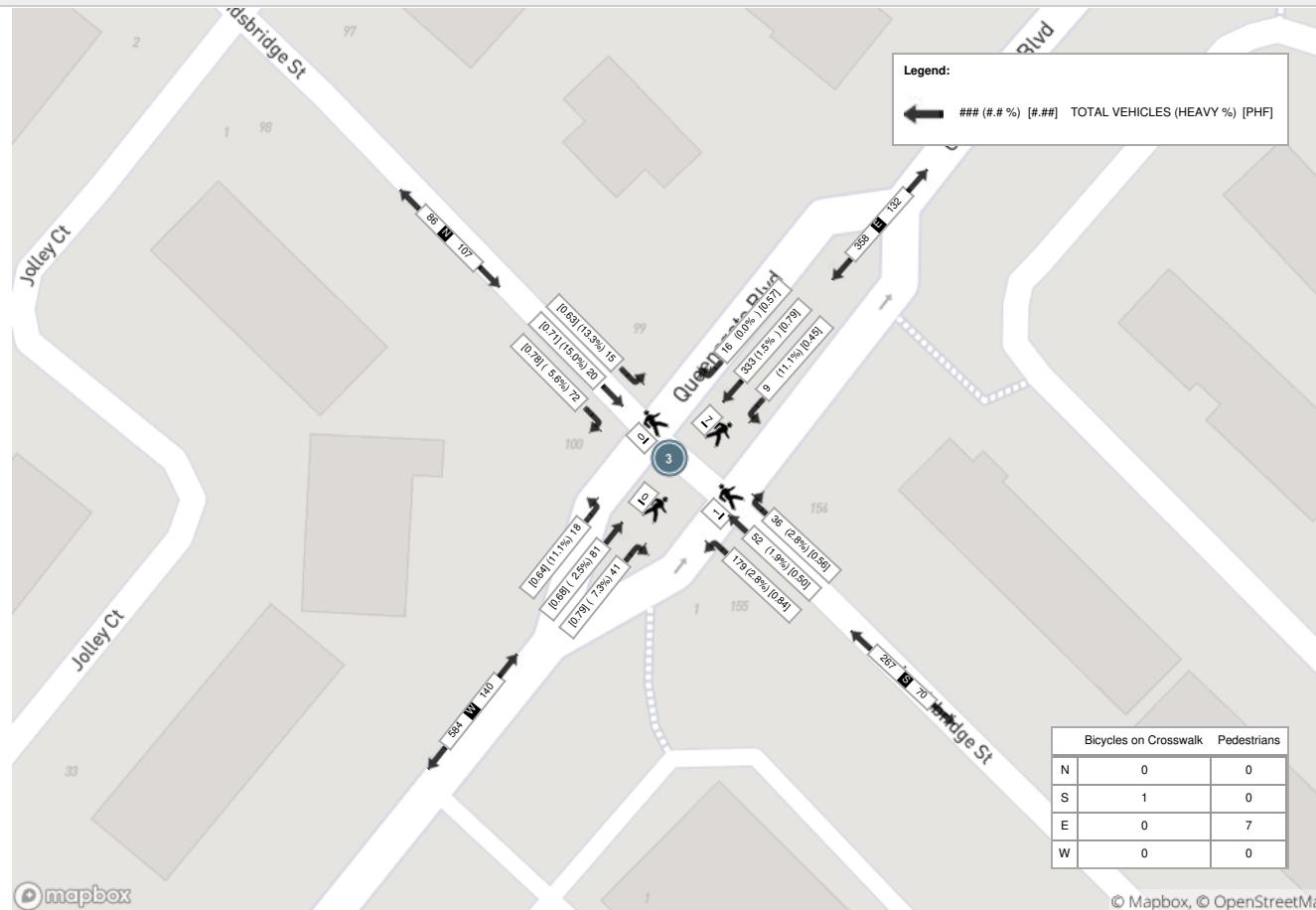
		Peak Hour: 07:45 AM - 08:45 AM Weather:																								
Start Time		N Approach LANDSBRIDGE STREET						E Approach QUEENSGATE BOULEVARD						S Approach LANDSBRIDGE STREET						W Approach QUEENSGATE BOULEVARD						Int. Total (15 min)
		Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00		17	3	1	0	0	21	4	105	0	0	1	109	7	8	45	0	1	60	9	19	2	0	0	30	220
08:00:00		19	7	3	0	0	29	1	60	3	0	4	64	6	7	53	0	0	66	8	16	7	0	0	31	190
08:15:00		23	5	6	0	0	34	4	86	1	0	0	91	7	11	39	0	0	57	13	16	4	0	0	33	215
08:30:00		13	5	5	0	0	23	7	82	5	0	2	94	16	26	42	0	0	84	11	30	5	0	0	46	247
Grand Total		72	20	15	0	0	107	16	333	9	0	7	358	36	52	179	0	1	267	41	81	18	0	0	140	872
Approach%		67.3%	18.7%	14%	0%	-	4.5%	93%	2.5%	0%	-	13.5%	19.5%	67%	0%	-	29.3%	57.9%	12.9%	0%	-	-	-	-	-	
Totals %		8.3%	2.3%	1.7%	0%	12.3%	1.8%	38.2%	1%	0%	41.1%	4.1%	6%	20.5%	0%	30.6%	4.7%	9.3%	2.1%	0%	16.1%	-	-	-	-	
PHF		0.78	0.71	0.63	0	0.79	0.57	0.79	0.45	0	0.82	0.56	0.5	0.84	0	0.79	0.79	0.68	0.64	0	0.76	-	-	-	-	
Heavy		4	3	2	0	9	0	5	1	0	6	1	1	5	0	7	3	2	2	0	7	-	-	-	-	
Heavy %		5.6%	15%	13.3%	0%	8.4%	0%	1.5%	11.1%	0%	1.7%	2.8%	1.9%	2.8%	0%	2.6%	7.3%	2.5%	11.1%	0%	5%	-	-	-	-	
Lights		68	17	13	0	98	16	328	8	0	352	35	51	174	0	260	38	79	16	0	133	-	-	-	-	
Lights %		94.4%	85%	86.7%	0%	91.6%	100%	98.5%	88.9%	0%	98.3%	97.2%	98.1%	97.2%	0%	97.4%	92.7%	97.5%	88.9%	0%	95%	-	-	-	-	
Single-Unit Trucks		1	0	0	0	1	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	
Single-Unit Trucks %		1.4%	0%	0%	0%	0.9%	0%	0%	11.1%	0%	0.3%	0%	0%	0.6%	0%	0.4%	0%	0%	0%	0%	0%	0%	0%	0%	-	
Buses		3	3	2	0	8	0	5	0	0	5	1	1	4	0	6	3	2	2	0	7	-	-	-	-	
Buses %		4.2%	15%	13.3%	0%	7.5%	0%	1.5%	0%	0%	1.4%	2.8%	1.9%	2.2%	0%	2.2%	7.3%	2.5%	11.1%	0%	5%	-	-	-	-	
Pedestrians		-	-	-	-	0	-	-	-	-	7	-	-	-	-	0	-	-	-	-	0	-	-	-	-	
Pedestrians%		-	-	-	-	0%	-	-	-	-	87.5%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	
Bicycles on Crosswalk		-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-	-	-	
Bicycles on Crosswalk%		-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	12.5%	-	-	-	-	0%	-	-	-	-	
Bicycles on Road		0	0	0	0	0	-	0	0	0	0	-	0	0	0	-	0	0	0	0	-	0	0	0	-	
Bicycles on Road%		-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	



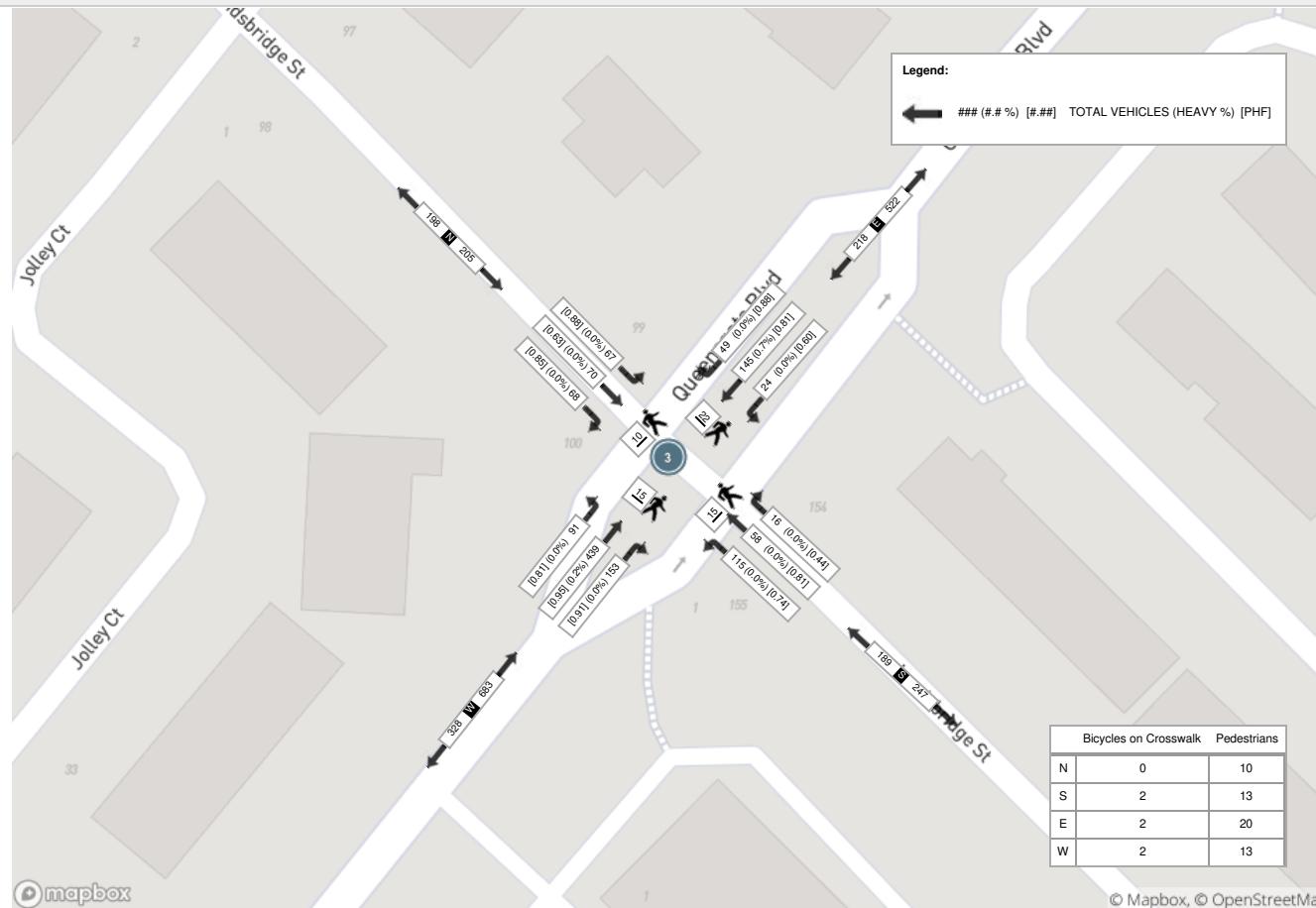
Peak Hour: 04:30 PM - 05:30 PM Weather:

Start Time	N Approach LANDSBIDGE STREET						E Approach QUEENSGATE BOULEVARD						S Approach LANDSBIDGE STREET						W Approach QUEENSGATE BOULEVARD						Int. Total (15 min)	
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total		
16:30:00	16	14	18	0	0	48	11	33	4	0	4	48	2	18	22	0	3	42	40	106	19	0	0	165	303	
16:45:00	20	16	19	0	3	55	13	45	10	0	10	68	3	13	39	0	3	55	36	102	24	0	10	162	340	
17:00:00	15	12	13	0	3	40	14	30	5	0	4	49	2	16	24	0	1	42	42	115	28	0	2	185	316	
17:15:00	17	28	17	0	4	62	11	37	5	0	4	53	9	11	30	0	8	50	35	116	20	0	3	171	336	
Grand Total	68	70	67	0	10	205	49	145	24	0	22	218	16	58	115	0	15	189	153	439	91	0	15	683	1295	
Approach%	33.2%	34.1%	32.7%	0%	-	22.5%	66.5%	11%	0%	-	8.5%	30.7%	60.8%	0%	-	22.4%	64.3%	13.3%	0%	-	-	-	-	-	-	
Totals %	5.3%	5.4%	5.2%	0%	15.8%	3.8%	11.2%	1.9%	0%	16.8%	1.2%	4.5%	8.9%	0%	14.6%	11.8%	33.9%	7%	0%	52.7%	-	-	-	-	-	
PHF	0.85	0.63	0.88	0	0.83	0.88	0.81	0.6	0	0.8	0.44	0.81	0.74	0	0.86	0.91	0.95	0.81	0	0.92	-	-	-	-	-	
Heavy	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Heavy %	0%	0%	0%	0%	0%	0%	0%	0.7%	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0.2%	0%	0%	0%	0.1%	-	-	-	
Lights	68	70	67	0	205	49	144	24	0	217	16	58	115	0	189	153	438	91	0	682	-	-	-	-	-	
Lights %	100%	100%	100%	0%	100%	100%	99.3%	100%	0%	99.5%	100%	100%	100%	0%	100%	100%	99.8%	100%	0%	99.9%	-	-	-	-	-	
Single-Unit Trucks	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	-	-	-	
Single-Unit Trucks %	0%	0%	0%	0%	0%	0%	0%	0.7%	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0.2%	0%	0%	0.1%	-	-	-	-	-
Buses	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	
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	
Pedestrians	-	-	-	-	10	-	-	-	-	20	-	-	-	-	13	-	-	-	-	-	-	-	13	-	-	
Pedestrians%	-	-	-	-	16.1%	-	-	-	-	32.3%	-	-	-	-	21%	-	-	-	-	-	-	-	21%	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	2	-	-	-	-	2	-	-	-	-	-	-	-	2	-	-	
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	3.2%	-	-	-	-	3.2%	-	-	-	-	-	-	-	3.2%	-	-	
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	0	-	-	
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	-	-	0%	-	-	

Peak Hour: 07:45 AM - 08:45 AM Weather:



Peak Hour: 04:30 PM - 05:30 PM Weather:





Turning Movement Count (2 . QUEENSGATE BLVD & SANT FARM DRIVE)

Start Time	N Approach SANT FARM DR						E Approach QUEENSGATE BLVD						S Approach LANDSBIDGE ST						W Approach QUEENSGATE BLVD						Int. Total (15 min)		Int. Total (1 hr)			
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total						
07:00:00	14	0	32	0	0	46	0	43	2	0	0	45	5	2	5	0	0	12	0	23	2	0	0	25	128					
07:15:00	17	0	27	0	0	44	3	32	2	0	2	37	10	1	2	0	0	13	0	17	3	0	1	20	114					
07:30:00	11	1	35	0	0	47	5	48	0	0	0	53	8	0	8	0	0	16	3	11	3	1	1	18	134					
07:45:00	12	2	36	0	0	50	7	54	3	0	0	64	5	0	6	0	0	11	3	19	1	0	2	23	148		524			
08:00:00	8	3	28	0	0	39	7	59	3	0	1	69	5	2	7	0	0	14	3	19	3	0	2	25	147		543			
08:15:00	13	1	35	0	0	49	3	42	2	0	1	47	10	1	7	0	1	18	2	24	3	1	2	30	144		573			
08:30:00	7	0	28	0	0	35	4	36	2	0	0	42	10	1	8	0	0	19	1	25	1	0	3	27	123		562			
08:45:00	13	1	22	0	0	36	5	49	2	0	0	56	8	0	3	0	0	11	1	20	4	0	0	25	128		542			
09:00:00	6	5	20	0	0	31	7	36	6	0	0	49	5	3	5	0	0	13	3	19	4	0	0	26	119		514			
09:15:00	7	1	15	0	0	23	9	42	3	0	0	54	4	1	6	0	1	11	4	21	3	0	2	28	116		486			
09:30:00	2	3	16	0	4	21	1	32	0	0	5	33	3	0	6	0	1	9	1	17	3	0	1	21	84		447			
09:45:00	10	3	25	0	0	38	5	26	4	0	0	35	2	3	4	0	0	9	2	23	3	0	0	28	110		429			
BREAK																														
16:00:00	6	1	10	0	0	17	37	33	5	0	0	75	4	5	10	0	0	19	5	61	15	0	2	81	192					
16:15:00	10	3	16	0	0	29	28	41	2	0	1	71	4	4	10	0	0	18	3	63	15	0	0	81	199					
16:30:00	6	4	19	0	0	29	29	31	5	0	0	65	5	4	6	0	0	15	11	71	17	0	0	99	208					
16:45:00	9	3	17	0	0	29	23	32	4	0	1	59	5	4	6	0	0	15	11	67	18	0	0	96	199		798			
17:00:00	8	3	11	0	0	22	47	34	5	0	0	86	6	7	8	0	0	21	5	87	20	0	0	112	241		847			
17:15:00	8	8	17	0	0	33	23	27	3	0	0	53	6	16	18	0	0	40	8	79	13	1	2	101	227		875			
17:30:00	10	3	23	0	0	36	29	45	3	0	0	77	9	15	9	0	0	33	15	53	14	0	0	82	228		895			
17:45:00	7	2	16	0	0	25	48	55	4	0	0	107	6	5	9	0	0	20	7	51	13	0	0	71	223		919			
18:00:00	6	3	10	0	0	19	43	34	2	0	0	79	5	1	3	0	0	9	8	45	18	0	1	71	178		856			
18:15:00	8	0	14	0	0	22	38	22	6	0	1	66	4	0	13	0	1	17	10	42	13	0	2	65	170		799			
18:30:00	10	4	17	0	0	31	38	26	5	0	1	69	5	5	3	0	0	13	9	47	17	0	3	73	186		757			
18:45:00	6	8	20	0	0	34	26	34	7	0	0	67	10	4	4	0	0	18	11	43	11	0	2	65	184		718			
Grand Total	214	62	509	0	4	785	465	913	80	0	13	1458	144	84	166	0	4	394	126	947	217	3	26	1293	3930		-			
Approach%	27.3%	7.9%	64.8%	0%	-	31.9%	62.6%	5.5%	0%	-	36.5%	21.3%	42.1%	0%	-	9.7%	73.2%	16.8%	0.2%	-	-	-	-	-	-	-	-	-	-	-
Totals %	5.4%	1.6%	13%	0%	20%	11.8%	23.2%	2%	0%	37.1%	3.7%	2.1%	4.2%	0%	10%	3.2%	24.1%	5.5%	0.1%	32.9%	-	-	-	-	-	-	-	-	-	-
Heavy	3	0	3	0	-	3	13	1	0	-	1	1	4	0	-	2	10	5	1	-	-	-	-	-	-	-	-	-	-	-
Heavy %	1.4%	0%	0.6%	0%	-	0.6%	1.4%	1.3%	0%	-	0.7%	1.2%	2.4%	0%	-	1.6%	1.1%	2.3%	33.3%	-	-	-	-	-	-	-	-	-	-	-
Bicycles	0	1	0	0	-	0	0	0	0	-	0	3	0	0	-	0	1	0	0	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	0%	1.6%	0%	0%	-	0%	0%	0%	0%	-	0%	3.6%	0%	0%	-	0%	0.1%	0%	0%	-	-	-	-	-	-	-	-	-	-	-



Turning Movement Count
Location Name: QUEENSGATE BLVD & SANT FARM DRIVE
Date: Wed, Aug 23, 2017 Deployment Lead: Patrick Filopoulos

NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

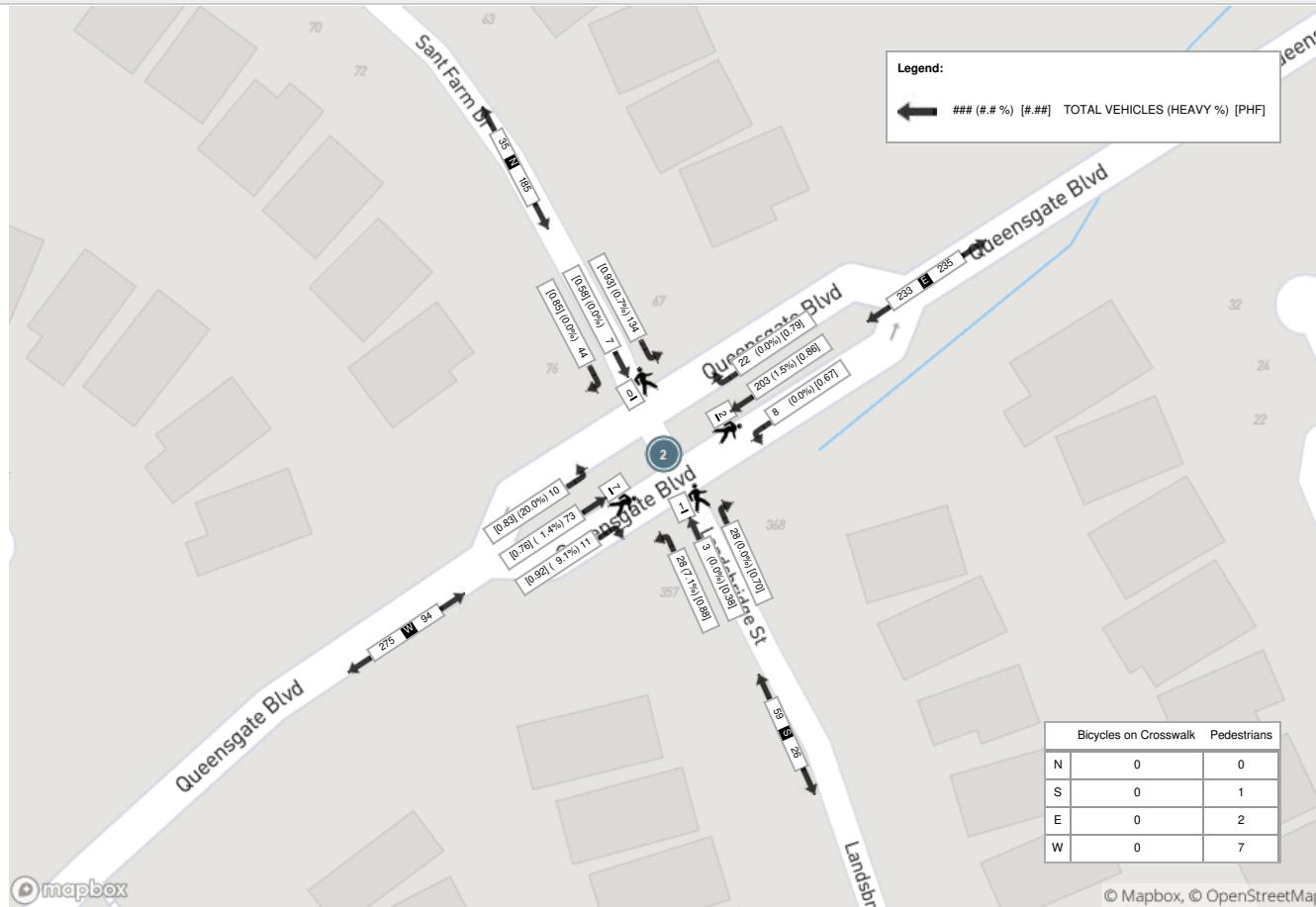
Peak Hour: 07:30 AM - 08:30 AM Weather: Clear (12.7 °C)																									
Start Time	N Approach SANT FARM DR						E Approach QUEENSGATE BLVD						S Approach LANDSBURIDGE ST						W Approach QUEENSGATE BLVD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:30:00	11	1	35	0	0	47	5	48	0	0	0	53	8	0	8	0	0	16	3	11	3	1	1	18	134
07:45:00	12	2	36	0	0	50	7	54	3	0	0	64	5	0	6	0	0	11	3	19	1	0	2	23	148
08:00:00	8	3	28	0	0	39	7	59	3	0	1	69	5	2	7	0	0	14	3	19	3	0	2	25	147
08:15:00	13	1	35	0	0	49	3	42	2	0	1	47	10	1	7	0	1	18	2	24	3	1	2	30	144
Grand Total	44	7	134	0	0	185	22	203	8	0	2	233	28	3	28	0	1	59	11	73	10	2	7	96	573
Approach%	23.8%	3.8%	72.4%	0%	-	9.4%	87.1%	3.4%	0%	-	47.5%	5.1%	47.5%	0%	-	-	11.5%	76%	10.4%	2.1%	-	-	-	-	
Totals %	7.7%	1.2%	23.4%	0%	32.3%	3.8%	35.4%	1.4%	0%	40.7%	4.9%	0.5%	4.9%	0%	10.3%	1.9%	12.7%	1.7%	0.3%	16.8%	-	-	-	-	
PHF	0.85	0.58	0.93	0	0.93	0.79	0.86	0.67	0	0.84	0.7	0.38	0.88	0	0.82	0.92	0.76	0.83	0.5	0.8	-	-	-	-	
Heavy	0	0	1	0	1	0	3	0	0	3	0	0	2	0	2	1	1	2	1	5	-	-	-		
Heavy %	0%	0%	0.7%	0%	0.5%	0%	1.5%	0%	0%	1.3%	0%	0%	7.1%	0%	3.4%	9.1%	1.4%	20%	50%	5.2%	-	-	-	-	
Lights	44	7	133	0	184	22	200	8	0	230	28	3	26	0	57	10	72	8	1	91	-	-	-	-	
Lights %	100%	100%	99.3%	0%	99.5%	100%	98.5%	100%	0%	98.7%	100%	100%	92.9%	0%	96.6%	90.9%	98.6%	80%	50%	94.8%	-	-	-	-	
Single-Unit Trucks	0	0	1	0	1	0	2	0	0	2	0	0	2	0	2	0	1	1	1	3	-	-	-	-	
Single-Unit Trucks %	0%	0%	0.7%	0%	0.5%	0%	1%	0%	0%	0.9%	0%	0%	7.1%	0%	3.4%	0%	1.4%	10%	50%	3.1%	-	-	-	-	
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	-	-	-	-	
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	1%	-	-	-	
Articulated Trucks	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	-	-	-	-	
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0.5%	0%	0%	0.4%	0%	0%	0%	0%	9.1%	0%	0%	0%	1%	-	-	-	-	
Pedestrians	-	-	-	-	0	-	-	-	-	2	-	-	-	-	1	-	-	-	-	7	-	-	-	-	
Pedestrians%	-	-	-	-	0%	-	-	-	-	20%	-	-	-	-	10%	-	-	-	-	70%	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	-	0	0	0	-	0	0	0	0	-	-	-	-		
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	



Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (22.3 °C)

Start Time	N Approach SANT FARM DR						E Approach QUEENSGATE BLVD						S Approach LANDSBIDGE ST						W Approach QUEENSGATE BLVD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	8	3	11	0	0	22	47	34	5	0	0	86	6	7	8	0	0	21	5	87	20	0	0	112	241
17:15:00	8	8	17	0	0	33	23	27	3	0	0	53	6	16	18	0	0	40	8	79	13	1	2	101	227
17:30:00	10	3	23	0	0	36	29	45	3	0	0	77	9	15	9	0	0	33	15	53	14	0	0	82	228
17:45:00	7	2	16	0	0	25	48	55	4	0	0	107	6	5	9	0	0	20	7	51	13	0	0	71	223
Grand Total	33	16	67	0	0	116	147	161	15	0	0	323	27	43	44	0	0	114	35	270	60	1	2	366	919
Approach%	28.4%	13.8%	57.8%	0%	-	45.5%	49.8%	4.6%	0%	-	23.7%	37.7%	38.6%	0%	-	9.6%	73.8%	16.4%	0.3%	-	-	-	-	-	-
Totals %	3.6%	1.7%	7.3%	0%	12.6%	16%	17.5%	1.6%	0%	35.1%	2.9%	4.7%	4.8%	0%	12.4%	3.8%	29.4%	6.5%	0.1%	39.8%	-	-	-	-	-
PHF	0.83	0.5	0.73	0	0.81	0.77	0.73	0.75	0	0.75	0.75	0.67	0.61	0	0.71	0.58	0.78	0.75	0.25	0.82	-	-	-	-	-
Heavy	0	0	1	0	1	1	1	0	0	2	0	1	0	0	1	0	0	0	2	0	0	0	0	2	-
Heavy %	0%	0%	1.5%	0%	0.9%	0.7%	0.6%	0%	0%	0.6%	0%	2.3%	0%	0%	0.9%	0%	0.7%	0%	0%	0.5%	-	-	-	-	-
Lights	33	16	66	0	115	146	160	15	0	321	27	42	44	0	113	35	268	60	1	364	-	-	-	-	-
Lights %	100%	100%	98.5%	0%	99.1%	99.3%	99.4%	100%	0%	99.4%	100%	97.7%	100%	0%	99.1%	100%	99.3%	100%	100%	99.5%	-	-	-	-	-
Single-Unit Trucks	0	0	1	0	1	1	1	0	0	2	0	1	0	0	1	0	2	0	0	2	-	-	-	-	-
Single-Unit Trucks %	0%	0%	1.5%	0%	0.9%	0.7%	0.6%	0%	0%	0.6%	0%	2.3%	0%	0%	0.9%	0%	0.7%	0%	0%	0.5%	-	-	-	-	-
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Buses %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-	-	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	100%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	-	0	3	0	0	0	-	0	0	0	0	0	0	0	-
Bicycles on Road%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear (12.7 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (22.3 °C)



Appendix D – Existing Traffic Level of Service Calculations

Queues

2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	4	28	284	284	100	342	386	100	96	1195
v/c Ratio	0.02	0.11	0.66	0.74	0.21	1.09	0.22	0.12	0.17	0.75
Control Delay	25.0	0.9	36.6	42.7	5.8	102.8	14.7	3.6	9.1	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	0.9	36.6	42.7	5.8	102.8	14.7	3.6	9.1	26.2
Queue Length 50th (m)	0.5	0.0	46.4	48.0	0.0	~56.7	22.2	0.0	7.0	99.4
Queue Length 95th (m)	0.8	0.0	72.3	60.1	8.6	34.5	33.1	7.5	12.6	126.7
Internal Link Dist (m)		66.0		160.6			356.6			133.7
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	487	700	444	482	663	313	1759	850	577	1599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.04	0.64	0.59	0.15	1.09	0.22	0.12	0.17	0.75

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓	↑	↑	↑↓	↑	↑	↑↓	
Traffic Volume (vph)	1	0	13	450	60	86	181	367	86	77	995	37
Future Volume (vph)	1	0	13	450	60	86	181	367	86	77	995	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fr _t	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1824	1610		1732	1761	1580	1825	3411	1555	1690	3549	
Flt Permitted	1.00	1.00		0.47	0.41	1.00	0.10	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	1920	1610		858	739	1580	194	3411	1555	931	3549	
Peak-hour factor, PHF	0.25	0.25		0.46	0.92	0.76	0.86	0.53	0.95	0.86	0.80	0.88
Adj. Flow (vph)	4	0		28	489	79	100	342	386	100	96	1131
RTOR Reduction (vph)	0	27		0	0	0	77	0	0	51	0	3
Lane Group Flow (vph)	4	1		0	284	284	23	342	386	49	96	1192
Confl. Peds. (#/hr)	1			2	2		1	1				1
Heavy Vehicles (%)	0%	0%		0%	0%	2%	0%	7%	5%	8%	2%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	5.1	4.0		28.5	28.5	22.9	57.4	49.0	49.0	48.7	43.3	
Effective Green, g (s)	5.1	4.0		28.5	28.5	22.9	57.4	49.0	49.0	48.7	43.3	
Actuated g/C Ratio	0.05	0.04		0.29	0.29	0.23	0.58	0.49	0.49	0.49	0.44	
Clearance Time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	97	64		423	418	365	295	1686	768	498	1550	
v/s Ratio Prot	0.00	0.00		0.14	c0.14		c0.13	0.11		0.01	0.34	
v/s Ratio Perm	0.00			0.06	c0.06	0.01	c0.54		0.03	0.08		
v/c Ratio	0.04	0.02		0.67	0.68	0.06	1.16	0.23	0.06	0.19	0.77	
Uniform Delay, d1	44.7	45.7		30.2	31.3	29.7	26.4	14.3	13.1	13.6	23.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.1		4.2	4.4	0.1	102.7	0.3	0.2	0.2	3.7	
Delay (s)	44.9	45.8		34.4	35.6	29.8	129.1	14.6	13.2	13.8	27.4	
Level of Service	D	D		C	D	C	F	B	B	B	C	
Approach Delay (s)		45.7				34.2			61.7		26.4	
Approach LOS		D			C			E			C	
Intersection Summary												
HCM 2000 Control Delay			38.8		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			99.1		Sum of lost time (s)				20.7			
Intersection Capacity Utilization			73.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: Landsbridge Street & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	28	181	20	484	213	168	24	120
v/c Ratio	0.15	0.22	0.08	0.57	0.33	0.18	0.04	0.14
Control Delay	18.0	12.3	16.2	20.4	10.3	6.3	8.0	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	12.3	16.2	20.4	10.3	6.3	8.0	3.7
Queue Length 50th (m)	2.2	5.2	1.5	21.4	11.1	5.5	1.1	1.3
Queue Length 95th (m)	5.0	7.8	2.7	28.1	24.3	6.6	3.1	5.2
Internal Link Dist (m)		160.6		416.7		343.6		135.1
Turn Bay Length (m)	40.0		100.0		35.0		35.0	
Base Capacity (vph)	439	1923	629	2030	653	930	568	855
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	0.06	0.09	0.03	0.24	0.33	0.18	0.04	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Landsbridge Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓		↑	↑↓		↑	↑↓	
Traffic Volume (vph)	18	88	41	9	360	16	179	52	36	15	20	72
Future Volume (vph)	18	88	41	9	360	16	179	52	36	15	20	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Fpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.96		1.00	0.99		1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	3333		1643	3552		1772	1758		1610	1573	
Flt Permitted	0.45	1.00		0.64	1.00		0.68	1.00		0.65	1.00	
Satd. Flow (perm)	770	3333		1103	3552		1268	1758		1103	1573	
Peak-hour factor, PHF	0.64	0.68	0.79	0.45	0.79	0.57	0.84	0.50	0.56	0.63	0.71	0.78
Adj. Flow (vph)	28	129	52	20	456	28	213	104	64	24	28	92
RTOR Reduction (vph)	0	40	0	0	8	0	0	24	0	0	45	0
Lane Group Flow (vph)	28	141	0	20	476	0	213	144	0	24	75	0
Confl. Peds. (#/hr)		1		1					7	7		
Heavy Vehicles (%)	11%	3%	7%	11%	2%	0%	3%	2%	3%	13%	15%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.0	13.0		13.0	13.0		28.1	28.1		28.1	28.1	
Effective Green, g (s)	13.0	13.0		13.0	13.0		28.1	28.1		28.1	28.1	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	183	795		263	847		653	906		568	811	
v/s Ratio Prot		0.04			c0.13			0.08			0.05	
v/s Ratio Perm	0.04			0.02			c0.17			0.02		
v/c Ratio	0.15	0.18		0.08	0.56		0.33	0.16		0.04	0.09	
Uniform Delay, d1	16.4	16.5		16.1	18.2		7.7	7.0		6.5	6.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.1	0.9		1.3	0.4		0.1	0.2	
Delay (s)	16.8	16.6		16.2	19.1		9.0	7.3		6.7	6.9	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		16.6			19.0			8.3			6.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		13.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.40										
Actuated Cycle Length (s)		54.5			Sum of lost time (s)			13.4				
Intersection Capacity Utilization		49.6%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Pembroke Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	139	0	0	385	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	139	0	0	385	0	0	0	0	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	151	0	0	418	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	418			151			360	569	76	494	569	209
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	418			151			360	569	76	494	569	209
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1138			1428			571	430	970	459	430	797
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	0	101	50	0	279	139	0	0				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	0	0	0	0	0				
cSH	1700	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.00	0.06	0.03	0.00	0.16	0.08	0.00	0.00				
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS							A	A				
Approach Delay (s)	0.0			0.0			0.0	0.0				
Approach LOS							A	A				
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		14.0%			ICU Level of Service				A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
5: Landsbridge Street/Sant Farm Drive & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	77	11	8	215	22	27	3	28	134	7	44
Future Volume (Veh/h)	10	77	11	8	215	22	27	3	28	134	7	44
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.83	0.76	0.92	0.67	0.86	0.79	0.88	0.38	0.70	0.93	0.58	0.85
Hourly flow rate (vph)	12	101	12	12	250	28	31	8	40	144	12	52
Pedestrians	7				2			1				
Lane Width (m)	3.7				3.7			3.7				
Walking Speed (m/s)	1.1				1.1			1.1				
Percent Blockage	1				0			0				
Right turn flare (veh)												
Median type	None				None							
Median storage veh)												
Upstream signal (m)					210							
pX, platoon unblocked												
vC, conflicting volume	278			114			346	434	60	408	426	146
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	278			114			346	434	60	408	426	146
tC, single (s)	4.5			4.1			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			94	98	96	71	98	94
cM capacity (veh/h)	1161			1486			516	508	997	494	513	875
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	12	67	46	12	167	111	79	208				
Volume Left	12	0	0	12	0	0	31	144				
Volume Right	0	0	12	0	0	28	40	52				
cSH	1161	1700	1700	1486	1700	1700	682	556				
Volume to Capacity	0.01	0.04	0.03	0.01	0.10	0.07	0.12	0.37				
Queue Length 95th (m)	0.2	0.0	0.0	0.2	0.0	0.0	3.0	13.1				
Control Delay (s)	8.1	0.0	0.0	7.4	0.0	0.0	11.0	15.3				
Lane LOS	A			A			B	C				
Approach Delay (s)	0.8			0.3			11.0	15.3				
Approach LOS							B	C				
Intersection Summary												
Average Delay				6.0								
Intersection Capacity Utilization				31.6%			ICU Level of Service					
Analysis Period (min)				15								

Queues

6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	136	164	28	260	1276
v/c Ratio	0.48	0.41	0.11	0.26	1.18
Control Delay	30.2	8.2	4.4	5.9	108.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	8.2	4.4	5.9	108.5
Queue Length 50th (m)	12.8	0.0	0.8	10.3	~158.6
Queue Length 95th (m)	24.8	11.5	2.7	21.2	#309.2
Internal Link Dist (m)	185.8			151.3	128.4
Turn Bay Length (m)			55.0		
Base Capacity (vph)	1002	986	361	1209	1083
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	0.14	0.17	0.08	0.22	1.18

Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis
6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	102	138	22	218	932	212
Future Volume (vph)	102	138	22	218	932	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1633	1674	1575	1826	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	1789	1633	175	1575	1826	
Peak-hour factor, PHF	0.75	0.84	0.79	0.84	0.91	0.84
Adj. Flow (vph)	136	164	28	260	1024	252
RTOR Reduction (vph)	0	138	0	0	6	0
Lane Group Flow (vph)	136	26	28	260	1270	0
Heavy Vehicles (%)	2%	0%	9%	22%	3%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.1	10.1	42.6	42.6	37.2	
Effective Green, g (s)	10.1	10.1	42.6	42.6	37.2	
Actuated g/C Ratio	0.16	0.16	0.66	0.66	0.57	
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	278	254	170	1033	1046	
v/s Ratio Prot	c0.08		0.01	c0.17	c0.70	
v/s Ratio Perm		0.02	0.10			
v/c Ratio	0.49	0.10	0.16	0.25	1.21	
Uniform Delay, d1	25.0	23.5	14.2	4.6	13.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.2	0.5	0.6	105.1	
Delay (s)	26.4	23.7	14.6	5.2	119.0	
Level of Service	C	C	B	A	F	
Approach Delay (s)	24.9			6.1	119.0	
Approach LOS	C			A	F	
Intersection Summary						
HCM 2000 Control Delay		86.4		HCM 2000 Level of Service		F
HCM 2000 Volume to Capacity ratio		1.02				
Actuated Cycle Length (s)		64.9		Sum of lost time (s)		15.2
Intersection Capacity Utilization		80.6%		ICU Level of Service		D
Analysis Period (min)		15				
c Critical Lane Group						

Queues

2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	44	307	121	119	120	24	1529	550	123	718
v/c Ratio	0.12	0.81	0.50	0.59	0.27	0.06	0.88	0.53	0.66	0.38
Control Delay	25.4	45.7	33.4	39.9	7.7	12.1	34.9	3.8	35.6	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	45.7	33.4	39.9	7.7	12.1	34.9	3.8	35.6	18.5
Queue Length 50th (m)	6.5	42.6	19.8	20.1	0.0	2.0	153.1	0.0	10.7	50.0
Queue Length 95th (m)	10.1	26.3	32.9	18.1	12.7	4.8	#248.8	17.4	#28.9	76.3
Internal Link Dist (m)		66.0		160.6			356.6			133.7
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	572	603	465	229	583	425	1735	1045	185	1871
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.51	0.26	0.52	0.21	0.06	0.88	0.53	0.66	0.38

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	36	137	204	4	104	15	1422	484	95	611	3
Future Volume (vph)	29	36	137	204	4	104	15	1422	484	95	611	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1817	1672		1716	1727	1585	1822	3614	1585	1825	3538	
Flt Permitted	0.68	1.00		0.18	0.17	1.00	0.35	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1294	1672		320	305	1585	674	3614	1585	132	3538	
Peak-hour factor, PHF	0.66	0.51	0.58	0.88	0.50	0.87	0.63	0.93	0.88	0.77	0.86	0.38
Adj. Flow (vph)	44	71	236	232	8	120	24	1529	550	123	710	8
RTOR Reduction (vph)	0	90	0	0	0	93	0	0	284	0	0	0
Lane Group Flow (vph)	44	217	0	121	119	27	24	1529	266	123	718	0
Confl. Peds. (#/hr)	4		5	5		4	5		4	4		5
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	26.4	20.3		35.9	35.9	25.3	58.1	55.2	55.2	65.2	59.3	
Effective Green, g (s)	26.4	20.3		35.9	35.9	25.3	58.1	55.2	55.2	65.2	59.3	
Actuated g/C Ratio	0.23	0.18		0.31	0.31	0.22	0.51	0.48	0.48	0.57	0.52	
Clearance Time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	326	296		236	233	350	371	1745	765	178	1835	
v/s Ratio Prot	0.01	c0.13		c0.05	0.05		0.00	c0.42		c0.04	0.20	
v/s Ratio Perm	0.02			0.11	0.11	0.02	0.03		0.17	0.35		
v/c Ratio	0.13	0.73		0.51	0.51	0.08	0.06	0.88	0.35	0.69	0.39	
Uniform Delay, d1	34.6	44.4		30.4	32.0	35.2	14.1	26.5	18.4	22.3	16.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	9.1		1.9	1.9	0.1	0.1	6.5	1.2	11.0	0.6	
Delay (s)	34.8	53.5		32.3	33.9	35.3	14.1	33.0	19.6	33.3	17.2	
Level of Service	C	D		C	C	D	B	C	B	C	B	
Approach Delay (s)		51.2			33.8			29.3			19.6	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay		29.6									C	
HCM 2000 Volume to Capacity ratio		0.79										
Actuated Cycle Length (s)		114.3									20.7	
Intersection Capacity Utilization		82.8%									E	
Analysis Period (min)		15										
c Critical Lane Group												

Queues

3: Landsbridge Street & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	112	668	40	250	155	108	76	191
v/c Ratio	0.33	0.62	0.23	0.23	0.27	0.12	0.12	0.22
Control Delay	18.6	18.0	18.7	12.0	12.5	8.0	11.1	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.6	18.0	18.7	12.0	12.5	8.0	11.1	8.3
Queue Length 50th (m)	9.3	28.0	3.2	8.0	9.4	4.0	4.3	7.6
Queue Length 95th (m)	17.5	41.6	6.0	13.0	19.3	11.6	12.6	12.9
Internal Link Dist (m)		160.6		416.7		343.6		135.1
Turn Bay Length (m)	40.0		100.0		35.0		35.0	
Base Capacity (vph)	598	1868	306	1856	577	879	619	878
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.36	0.13	0.13	0.27	0.12	0.12	0.22

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Landsbridge Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	
Traffic Volume (vph)	91	475	153	24	157	49	115	58	16	67	70	68
Future Volume (vph)	91	475	153	24	157	49	115	58	16	67	70	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		0.99	1.00	
Fr _t	1.00	0.96		1.00	0.97		1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1809	3479		1813	3475		1812	1809		1803	1784	
Flt Permitted	0.60	1.00		0.30	1.00		0.64	1.00		0.69	1.00	
Satd. Flow (perm)	1137	3479		581	3475		1216	1809		1305	1784	
Peak-hour factor, PHF	0.81	0.95	0.91	0.60	0.81	0.88	0.74	0.81	0.44	0.88	0.63	0.85
Adj. Flow (vph)	112	500	168	40	194	56	155	72	36	76	111	80
RTOR Reduction (vph)	0	56	0	0	39	0	0	19	0	0	30	0
Lane Group Flow (vph)	112	612	0	40	211	0	155	89	0	76	161	0
Confl. Peds. (#/hr)	10		15	15		10	15		22	22		15
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.5	17.5		17.5	17.5		28.2	28.2		28.2	28.2	
Effective Green, g (s)	17.5	17.5		17.5	17.5		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	1030		172	1028		580	863		622	851	
v/s Ratio Prot		c0.18			0.06			0.05			0.09	
v/s Ratio Perm	0.10			0.07			c0.13			0.06		
v/c Ratio	0.33	0.59		0.23	0.20		0.27	0.10		0.12	0.19	
Uniform Delay, d1	16.2	17.8		15.7	15.6		9.3	8.5		8.6	8.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.9		0.7	0.1		1.1	0.2		0.4	0.5	
Delay (s)	16.8	18.7		16.4	15.7		10.4	8.7		9.0	9.4	
Level of Service	B	B		B	B		B	A		A	A	
Approach Delay (s)		18.4			15.8			9.7			9.3	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		15.0			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		59.1			Sum of lost time (s)			13.4				
Intersection Capacity Utilization		75.2%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Pembroke Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	558	0	0	230	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	558	0	0	230	0	0	0	0	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	607	0	0	250	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	250			607			732	857	304	554	857	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			607			732	857	304	554	857	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1313			967			309	293	693	415	293	902
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	0	405	202	0	167	83	0	0				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	0	0	0	0	0				
cSH	1700	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.00	0.24	0.12	0.00	0.10	0.05	0.00	0.00				
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS							A	A				
Approach Delay (s)	0.0			0.0			0.0	0.0				
Approach LOS							A	A				
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		18.8%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
5: Landsbridge Street/Sant Farm Drive & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	287	35	15	171	147	44	43	27	67	16	33
Future Volume (Veh/h)	60	287	35	15	171	147	44	43	27	67	16	33
Sign Control	Free				Free				Stop			Stop
Grade	0%				0%				0%			0%
Peak Hour Factor	0.75	0.78	0.58	0.75	0.73	0.77	0.61	0.67	0.75	0.73	0.50	0.83
Hourly flow rate (vph)	80	368	60	20	234	191	72	64	36	92	32	40
Pedestrians	2											
Lane Width (m)	3.7											
Walking Speed (m/s)	1.1											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None				None							
Median storage veh)												
Upstream signal (m)					210							
pX, platoon unblocked												
vC, conflicting volume	425			428			773	1023	214	782	958	214
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	425			428			773	1023	214	782	958	214
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			98			69	70	95	53	87	95
cM capacity (veh/h)	1145			1142			232	214	797	196	237	795
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	80	245	183	20	156	269	172	164				
Volume Left	80	0	0	20	0	0	72	92				
Volume Right	0	0	60	0	0	191	36	40				
cSH	1145	1700	1700	1142	1700	1700	263	250				
Volume to Capacity	0.07	0.14	0.11	0.02	0.09	0.16	0.65	0.65				
Queue Length 95th (m)	1.7	0.0	0.0	0.4	0.0	0.0	31.6	31.3				
Control Delay (s)	8.4	0.0	0.0	8.2	0.0	0.0	41.3	43.1				
Lane LOS	A			A			E	E				
Approach Delay (s)	1.3			0.4			41.3	43.1				
Approach LOS							E	E				
Intersection Summary												
Average Delay				11.6								
Intersection Capacity Utilization				33.3%			ICU Level of Service					
Analysis Period (min)				15								

Queues

6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	374	96	229	870	618
v/c Ratio	0.77	0.20	0.58	0.79	0.83
Control Delay	39.3	6.0	13.8	21.4	32.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	6.0	13.8	21.4	32.7
Queue Length 50th (m)	53.9	0.0	13.7	95.1	79.3
Queue Length 95th (m)	68.0	7.4	21.9	#177.4	#156.9
Internal Link Dist (m)	185.8			151.3	128.4
Turn Bay Length (m)			55.0		
Base Capacity (vph)	782	728	402	1108	749
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	0.13	0.57	0.79	0.83

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑ ↗	↗ ↘	↖ ↗	↑ ↘	↖ ↗	↗ ↘
Traffic Volume (vph)	292	77	156	748	379	159
Future Volume (vph)	292	77	156	748	379	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Fr _t	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1825	1570	1807	1883	1711	
Flt Permitted	0.95	1.00	0.19	1.00	1.00	
Satd. Flow (perm)	1825	1570	362	1883	1711	
Peak-hour factor, PHF	0.78	0.80	0.68	0.86	0.88	0.85
Adj. Flow (vph)	374	96	229	870	431	187
RTOR Reduction (vph)	0	71	0	0	15	0
Lane Group Flow (vph)	374	25	229	870	603	0
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	21.7	21.7	48.0	48.0	35.2	
Effective Green, g (s)	21.7	21.7	48.0	48.0	35.2	
Actuated g/C Ratio	0.26	0.26	0.59	0.59	0.43	
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	483	415	385	1103	735	
v/s Ratio Prot	c0.20		0.07	c0.46	0.35	
v/s Ratio Perm		0.02	0.28			
v/c Ratio	0.77	0.06	0.59	0.79	0.82	
Uniform Delay, d1	27.8	22.5	11.9	13.0	20.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.6	0.1	2.5	5.7	10.0	
Delay (s)	35.4	22.6	14.4	18.8	30.5	
Level of Service	D	C	B	B	C	
Approach Delay (s)	32.8			17.9	30.5	
Approach LOS	C			B	C	
Intersection Summary						
HCM 2000 Control Delay		24.7		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.82				
Actuated Cycle Length (s)		81.9		Sum of lost time (s)	15.2	
Intersection Capacity Utilization		67.9%		ICU Level of Service	C	
Analysis Period (min)		15				
c Critical Lane Group						

Appendix E – Future Background Level of Service Calculations

Queues

2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	13	256	260	86	181	405	86	77	1136
v/c Ratio	0.01	0.03	0.66	0.72	0.19	0.53	0.21	0.09	0.13	0.63
Control Delay	31.0	0.2	45.8	52.2	3.7	14.7	14.3	0.9	9.7	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	0.2	45.8	52.2	3.7	14.7	14.3	0.9	9.7	25.3
Queue Length 50th (m)	0.2	0.0	52.9	55.2	0.0	14.3	24.0	0.0	5.7	95.7
Queue Length 95th (m)	1.5	0.0	78.9	#89.7	6.3	30.5	40.6	2.2	14.7	161.1
Internal Link Dist (m)		66.0		160.6			356.6			133.7
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	173	612	388	407	540	466	1936	939	588	1789
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02	0.66	0.64	0.16	0.39	0.21	0.09	0.13	0.63

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	1	0	13	450	66	86	181	405	86	77	1099	37
Future Volume (vph)	1	0	13	450	66	86	181	405	86	77	1099	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1824	1609		1732	1758	1580	1825	3411	1555	1690	3561	
Flt Permitted	0.59	1.00		0.49	0.51	1.00	0.14	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1135	1609		893	921	1580	269	3411	1555	914	3561	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	13	450	66	86	181	405	86	77	1099	37
RTOR Reduction (vph)	0	12	0	0	0	66	0	0	39	0	2	0
Lane Group Flow (vph)	1	1	0	256	260	20	181	405	47	77	1134	0
Confl. Peds. (#/hr)	1		2	2		1	1					1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	7%	5%	8%	2%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	9.4	8.5		33.1	33.1	27.7	73.4	65.2	65.2	63.6	58.4	
Effective Green, g (s)	9.4	8.5		33.1	33.1	27.7	73.4	65.2	65.2	63.6	58.4	
Actuated g/C Ratio	0.08	0.07		0.28	0.28	0.23	0.61	0.54	0.54	0.53	0.49	
Clearance Time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	94	114		387	395	365	320	1857	847	519	1737	
v/s Ratio Prot	0.00	0.00		c0.11	0.11		c0.06	0.12		0.01	c0.32	
v/s Ratio Perm	0.00			c0.07	0.07	0.01	0.29		0.03	0.07		
v/c Ratio	0.01	0.01		0.66	0.66	0.05	0.57	0.22	0.06	0.15	0.65	
Uniform Delay, d1	50.8	51.7		36.9	38.3	35.8	14.8	14.1	12.8	13.8	23.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		4.2	3.9	0.1	2.3	0.3	0.1	0.1	1.9	
Delay (s)	50.9	51.7		41.1	42.2	35.9	17.1	14.3	12.9	13.9	25.0	
Level of Service	D	D		D	D	D	B	B	B	B	C	
Approach Delay (s)						40.8			14.9		24.3	
Approach LOS						D			B		C	
Intersection Summary												
HCM 2000 Control Delay				25.9							C	
HCM 2000 Volume to Capacity ratio				0.67								
Actuated Cycle Length (s)				119.7							20.7	
Intersection Capacity Utilization				76.9%							D	
Analysis Period (min)				15								
c Critical Lane Group												

Queues

3: Landsbridge Street & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	18	138	9	413	179	88	15	92
v/c Ratio	0.09	0.18	0.04	0.52	0.26	0.09	0.02	0.11
Control Delay	17.1	12.7	16.0	20.4	8.9	5.2	7.3	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	12.7	16.0	20.4	8.9	5.2	7.3	3.5
Queue Length 50th (m)	1.4	3.9	0.7	18.0	8.2	2.1	0.6	0.8
Queue Length 95th (m)	5.3	9.3	3.4	28.5	21.0	8.4	3.1	6.7
Internal Link Dist (m)	160.6		416.7		343.6		135.1	
Turn Bay Length (m)	40.0	100.0		35.0		35.0		
Base Capacity (vph)	515	1958	670	2082	685	939	624	862
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	0.03	0.07	0.01	0.20	0.26	0.09	0.02	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Landsbridge Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	97	41	9	397	16	179	52	36	15	20	72
Future Volume (vph)	18	97	41	9	397	16	179	52	36	15	20	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.96		1.00	0.99		1.00	0.94		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	3326		1643	3560		1772	1749		1609	1571	
Flt Permitted	0.51	1.00		0.66	1.00		0.70	1.00		0.70	1.00	
Satd. Flow (perm)	883	3326		1149	3560		1301	1749		1186	1571	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	97	41	9	397	16	179	52	36	15	20	72
RTOR Reduction (vph)	0	32	0	0	5	0	0	17	0	0	34	0
Lane Group Flow (vph)	18	106	0	9	408	0	179	71	0	15	58	0
Confl. Peds. (#/hr)			1	1					7	7		
Heavy Vehicles (%)	11%	3%	7%	11%	2%	0%	3%	2%	3%	13%	15%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.7	11.7		11.7	11.7		28.1	28.1		28.1	28.1	
Effective Green, g (s)	11.7	11.7		11.7	11.7		28.1	28.1		28.1	28.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.53	0.53		0.53	0.53	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	194	731		252	782		687	923		626	829	
v/s Ratio Prot		0.03			c0.11			0.04			0.04	
v/s Ratio Perm	0.02			0.01			c0.14			0.01		
v/c Ratio	0.09	0.15		0.04	0.52		0.26	0.08		0.02	0.07	
Uniform Delay, d1	16.5	16.7		16.3	18.3		6.9	6.2		6.0	6.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		0.1	0.6		0.9	0.2		0.1	0.2	
Delay (s)	16.7	16.8		16.4	18.9		7.8	6.3		6.1	6.3	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		16.8			18.9			7.3			6.3	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			13.9		HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			53.2		Sum of lost time (s)			13.4				
Intersection Capacity Utilization			49.6%		ICU Level of Service			A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Pembroke Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			0	0			0	0	0	0	0	0
Traffic Volume (veh/h)	0	148	0	0	422	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	148	0	0	422	0	0	0	0	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	148	0	0	422	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	422			148			359	570	74	496	570	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422			148			359	570	74	496	570	211
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1134			1431			572	430	973	457	430	794
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	0	99	49	0	281	141	0	0				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	0	0	0	0	0				
cSH	1700	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.00	0.06	0.03	0.00	0.17	0.08	0.00	0.00				
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS							A	A				
Approach Delay (s)	0.0			0.0			0.0	0.0				
Approach LOS							A	A				
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		15.0%			ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
5: Landsbridge Street/Sant Farm Drive & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	85	11	8	237	22	27	3	28	134	7	44
Future Volume (Veh/h)	10	85	11	8	237	22	27	3	28	134	7	44
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	85	11	8	237	22	27	3	28	134	7	44
Pedestrians	7			2			1					
Lane Width (m)	3.7			3.7			3.7					
Walking Speed (m/s)	1.1			1.1			1.1					
Percent Blockage	1			0			0					
Right turn flare (veh)												
Median type	None			None								
Median storage veh)												
Upstream signal (m)				210								
pX, platoon unblocked												
vC, conflicting volume	259			97			300	386	51	358	381	136
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	259			97			300	386	51	358	381	136
tC, single (s)	4.5			4.1			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	99	97	76	99	95
cM capacity (veh/h)	1182			1508			569	543	1010	550	547	888
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	10	57	39	8	158	101	58	185				
Volume Left	10	0	0	8	0	0	27	134				
Volume Right	0	0	11	0	0	22	28	44				
cSH	1182	1700	1700	1508	1700	1700	719	604				
Volume to Capacity	0.01	0.03	0.02	0.01	0.09	0.06	0.08	0.31				
Queue Length 95th (m)	0.2	0.0	0.0	0.1	0.0	0.0	2.0	9.8				
Control Delay (s)	8.1	0.0	0.0	7.4	0.0	0.0	10.4	13.6				
Lane LOS	A			A			B	B				
Approach Delay (s)	0.8			0.2			10.4	13.6				
Approach LOS							B	B				
Intersection Summary												
Average Delay				5.3								
Intersection Capacity Utilization				31.6%			ICU Level of Service		A			
Analysis Period (min)				15								

Queues

6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	102	138	22	241	1241
v/c Ratio	0.57	0.48	0.14	0.20	0.91
Control Delay	53.0	13.0	3.9	3.6	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	13.0	3.9	3.6	24.1
Queue Length 50th (m)	17.8	0.0	0.7	10.2	134.4
Queue Length 95th (m)	33.8	16.3	1.9	17.0	#315.5
Internal Link Dist (m)	185.8			151.3	128.4
Turn Bay Length (m)			55.0		
Base Capacity (vph)	205	309	161	1217	1359
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	0.50	0.45	0.14	0.20	0.91

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↓	↑
Traffic Volume (vph)	102	138	22	241	1029	212
Future Volume (vph)	102	138	22	241	1029	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1633	1674	1575	1831	
Flt Permitted	0.95	1.00	0.06	1.00	1.00	
Satd. Flow (perm)	1789	1633	101	1575	1831	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	102	138	22	241	1029	212
RTOR Reduction (vph)	0	124	0	0	7	0
Lane Group Flow (vph)	102	14	22	241	1234	0
Heavy Vehicles (%)	2%	0%	9%	22%	3%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	9.8	9.8	76.7	76.7	71.7	
Effective Green, g (s)	9.8	9.8	76.7	76.7	71.7	
Actuated g/C Ratio	0.10	0.10	0.78	0.78	0.73	
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	177	162	110	1223	1330	
v/s Ratio Prot	c0.06		0.00	c0.15	c0.67	
v/s Ratio Perm		0.01	0.15			
v/c Ratio	0.58	0.08	0.20	0.20	0.93	
Uniform Delay, d1	42.5	40.4	19.8	2.9	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.5	0.2	0.9	0.4	12.6	
Delay (s)	47.0	40.6	20.6	3.3	23.9	
Level of Service	D	D	C	A	C	
Approach Delay (s)	43.3			4.7	23.9	
Approach LOS	D			A	C	
Intersection Summary						
HCM 2000 Control Delay		23.7	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio		0.87				
Actuated Cycle Length (s)		98.7	Sum of lost time (s)		15.2	
Intersection Capacity Utilization		85.7%	ICU Level of Service		E	
Analysis Period (min)		15				
c Critical Lane Group						

Queues

2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	29	177	104	104	104	15	1570	484	95	678
v/c Ratio	0.11	0.67	0.39	0.47	0.29	0.03	0.82	0.46	0.47	0.32
Control Delay	28.1	31.0	32.9	37.6	9.9	7.8	25.5	3.1	18.8	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	31.0	32.9	37.6	9.9	7.8	25.5	3.1	18.8	12.2
Queue Length 50th (m)	4.3	12.2	16.8	17.3	0.0	0.9	128.4	0.5	6.0	29.4
Queue Length 95th (m)	10.9	34.2	30.6	31.5	14.1	3.8	192.3	17.0	19.9	59.1
Internal Link Dist (m)		66.0		160.6			356.6			133.7
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	537	655	494	318	620	517	1913	1062	203	2113
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.27	0.21	0.33	0.17	0.03	0.82	0.46	0.47	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	40	137	204	4	104	15	1570	484	95	675	3
Future Volume (vph)	29	40	137	204	4	104	15	1570	484	95	675	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fr _t	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1818	1671		1714	1722	1586	1821	3614	1586	1825	3541	
Flt Permitted	0.69	1.00		0.33	0.31	1.00	0.39	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1313	1671		595	565	1586	755	3614	1586	131	3541	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	40	137	204	4	104	15	1570	484	95	675	3
RTOR Reduction (vph)	0	99	0	0	0	86	0	0	225	0	0	0
Lane Group Flow (vph)	29	78	0	104	104	18	15	1570	259	95	678	0
Confl. Peds. (#/hr)	4		5	5		4	5		4	4		5
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	16.1	11.8		26.5	26.5	17.7	57.5	55.6	55.6	65.4	60.5	
Effective Green, g (s)	16.1	11.8		26.5	26.5	17.7	57.5	55.6	55.6	65.4	60.5	
Actuated g/C Ratio	0.15	0.11		0.25	0.25	0.17	0.55	0.53	0.53	0.62	0.58	
Clearance Time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	221	187		258	254	267	432	1911	839	191	2038	
v/s Ratio Prot	0.01	0.05		0.04	c0.04		0.00	c0.43		c0.03	0.19	
v/s Ratio Perm	0.01			0.06	c0.06	0.01	0.02		0.16	0.28		
v/c Ratio	0.13	0.41		0.40	0.41	0.07	0.03	0.82	0.31	0.50	0.33	
Uniform Delay, d1	38.3	43.4		31.6	32.8	36.7	10.9	20.6	13.9	17.3	11.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.5		1.0	1.1	0.1	0.0	4.1	1.0	2.0	0.4	
Delay (s)	38.6	44.9		32.7	33.9	36.9	10.9	24.7	14.9	19.3	12.1	
Level of Service	D	D		C	C	D	B	C	B	B	B	
Approach Delay (s)			44.0			34.5			22.3		13.0	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			22.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			105.1				Sum of lost time (s)			20.7		
Intersection Capacity Utilization			87.1%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: Landsbridge Street & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	91	677	24	222	115	74	67	138
v/c Ratio	0.26	0.62	0.14	0.21	0.19	0.08	0.11	0.16
Control Delay	17.3	18.5	16.5	11.9	11.8	8.9	11.0	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	18.5	16.5	11.9	11.8	8.9	11.0	6.7
Queue Length 50th (m)	7.4	29.2	1.9	7.2	6.5	3.1	3.6	3.8
Queue Length 95th (m)	16.5	43.0	6.5	13.5	18.7	11.0	11.7	14.3
Internal Link Dist (m)		160.6		416.7		343.6		135.1
Turn Bay Length (m)	40.0		100.0		35.0		35.0	
Base Capacity (vph)	612	1868	299	1851	605	886	636	871
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	0.15	0.36	0.08	0.12	0.19	0.08	0.11	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Landsbridge Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	524	153	24	173	49	115	58	16	67	70	68
Future Volume (vph)	91	524	153	24	173	49	115	58	16	67	70	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		0.99	1.00	
Fr _t	1.00	0.97		1.00	0.97		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1808	3496		1813	3477		1811	1848		1802	1760	
Flt Permitted	0.61	1.00		0.30	1.00		0.67	1.00		0.71	1.00	
Satd. Flow (perm)	1167	3496		571	3477		1275	1848		1345	1760	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	91	524	153	24	173	49	115	58	16	67	70	68
RTOR Reduction (vph)	0	46	0	0	34	0	0	8	0	0	36	0
Lane Group Flow (vph)	91	631	0	24	188	0	115	66	0	67	102	0
Confl. Peds. (#/hr)	10		15	15		10	15		22	22		15
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.7	17.7		17.7	17.7		28.2	28.2		28.2	28.2	
Effective Green, g (s)	17.7	17.7		17.7	17.7		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.48	0.48		0.48	0.48	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	348	1043		170	1037		606	878		639	836	
v/s Ratio Prot		c0.18			0.05			0.04			0.06	
v/s Ratio Perm	0.08			0.04			c0.09			0.05		
v/c Ratio	0.26	0.60		0.14	0.18		0.19	0.07		0.10	0.12	
Uniform Delay, d1	15.8	17.8		15.2	15.4		9.0	8.5		8.6	8.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.0		0.4	0.1		0.7	0.2		0.3	0.3	
Delay (s)	16.2	18.8		15.6	15.5		9.7	8.6		8.9	9.0	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		18.5			15.5			9.3			8.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		15.3					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		59.3					Sum of lost time (s)			13.4		
Intersection Capacity Utilization		76.0%					ICU Level of Service			D		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Pembrook Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	607	0	0	246	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	607	0	0	246	0	0	0	0	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	607	0	0	246	0	0	0	0	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	246			607			730	853	304	550	853	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246			607			730	853	304	550	853	123
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1317			967			310	295	693	418	295	905
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	0	405	202	0	164	82	0	0				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	0	0	0	0	0				
cSH	1700	1700	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.00	0.24	0.12	0.00	0.10	0.05	0.00	0.00				
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS							A	A				
Approach Delay (s)	0.0			0.0			0.0	0.0				
Approach LOS							A	A				
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		20.1%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
5: Landsbridge Street/Sant Farm Drive & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	317	35	15	189	147	44	43	27	67	16	33
Future Volume (Veh/h)	60	317	35	15	189	147	44	43	27	67	16	33
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	60	317	35	15	189	147	44	43	27	67	16	33
Pedestrians	2											
Lane Width (m)	3.7											
Walking Speed (m/s)	1.1											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)				210								
pX, platoon unblocked												
vC, conflicting volume	336			352			622	820	176	620	764	170
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336			352			622	820	176	620	764	170
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			87	85	97	78	95	96
cM capacity (veh/h)	1235			1218			330	289	843	305	316	849
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	60	211	141	15	126	210	114	116				
Volume Left	60	0	0	15	0	0	44	67				
Volume Right	0	0	35	0	0	147	27	33				
cSH	1235	1700	1700	1218	1700	1700	363	375				
Volume to Capacity	0.05	0.12	0.08	0.01	0.07	0.12	0.31	0.31				
Queue Length 95th (m)	1.2	0.0	0.0	0.3	0.0	0.0	10.0	9.8				
Control Delay (s)	8.1	0.0	0.0	8.0	0.0	0.0	19.4	18.8				
Lane LOS	A			A			C	C				
Approach Delay (s)	1.2			0.3			19.4	18.8				
Approach LOS							C	C				
Intersection Summary												
Average Delay				5.0								
Intersection Capacity Utilization				33.8%			ICU Level of Service			A		
Analysis Period (min)				15								

Queues

6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	292	77	156	826	577
v/c Ratio	0.71	0.19	0.33	0.72	0.72
Control Delay	37.2	7.2	7.9	15.7	24.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	7.2	7.9	15.7	24.0
Queue Length 50th (m)	39.1	0.0	7.4	73.2	62.4
Queue Length 95th (m)	64.0	9.3	17.8	145.2	#131.2
Internal Link Dist (m)	185.8			151.3	128.4
Turn Bay Length (m)			55.0		
Base Capacity (vph)	840	764	493	1189	801
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	0.10	0.32	0.69	0.72

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020

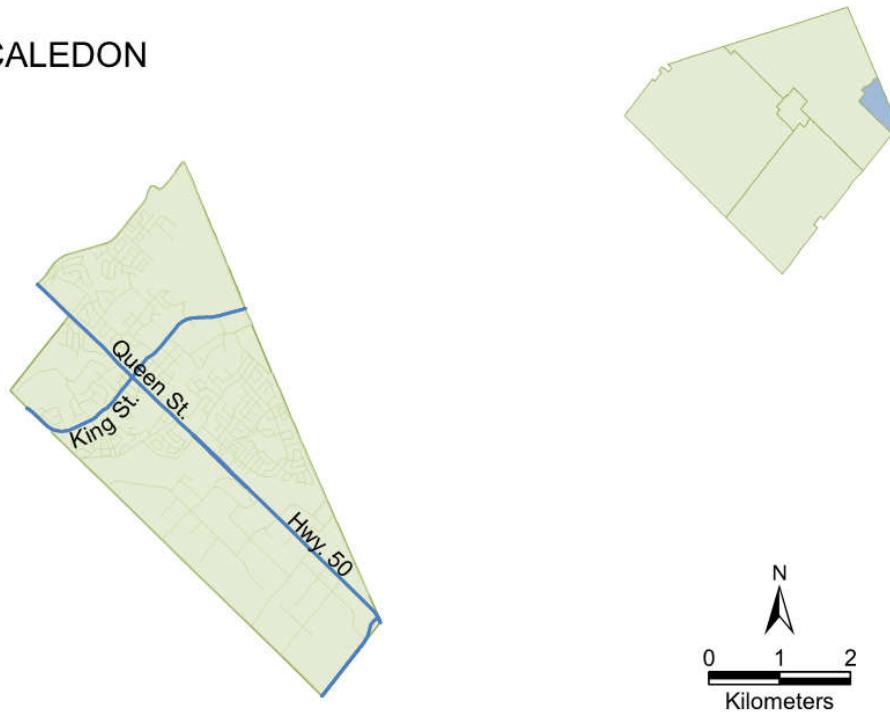


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑ ↗	↗ ↓	↖ ↗	↑ ↘	↓ ↖	
Traffic Volume (vph)	292	77	156	826	418	159
Future Volume (vph)	292	77	156	826	418	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Fr _t	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1825	1570	1807	1883	1713	
Flt Permitted	0.95	1.00	0.26	1.00	1.00	
Satd. Flow (perm)	1825	1570	489	1883	1713	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	292	77	156	826	418	159
RTOR Reduction (vph)	0	60	0	0	12	0
Lane Group Flow (vph)	292	17	156	826	565	0
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	17.3	17.3	46.9	46.9	35.3	
Effective Green, g (s)	17.3	17.3	46.9	46.9	35.3	
Actuated g/C Ratio	0.23	0.23	0.61	0.61	0.46	
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	355	448	1155	791	
v/s Ratio Prot	c0.16		0.04	c0.44	0.33	
v/s Ratio Perm		0.01	0.17			
v/c Ratio	0.71	0.05	0.35	0.72	0.71	
Uniform Delay, d1	27.2	23.1	8.4	10.2	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.5	0.1	0.5	3.8	5.4	
Delay (s)	32.7	23.2	8.8	14.0	21.9	
Level of Service	C	C	A	B	C	
Approach Delay (s)	30.7			13.1	21.9	
Approach LOS	C			B	C	
Intersection Summary						
HCM 2000 Control Delay		19.1		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.75				
Actuated Cycle Length (s)		76.4		Sum of lost time (s)		15.2
Intersection Capacity Utilization		70.0%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

Appendix F – TTS Data for Ward 5 (Town of Caledon)

TOWN OF CALEDON

WARD 5



WARD 5

HOUSEHOLD CHARACTERISTICS

Households	Dwelling Type			Household Size					Number of Available Vehicles					Household Averages				
	House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4+	Persons	Workers	Drivers	Vehicles	Trips/Day
7,300	85%	8%	7%	13%	26%	20%	28%	13%	2%	21%	51%	16%	10%	3.1	1.8	2.2	2.2	6.1

POPULATION CHARACTERISTICS

Population	Age							Daily Trips per Person (age 11+)	Daily Work Trips per Worker	Population	Employment Type			Student	Licensed	Transit Pass	
	0-10	11-15	16-25	26-45	46-64	65+	Median				Full Time	Part Time	At Home				
	Male										11,200	51%	6%	2%	25%	73%	4%
22,300	12%	8%	15%	24%	29%	11%	40.3	2.3	0.72	11,200	37%	13%	5%	24%	72%	5%	
Female																	

TRIPS MADE BY RESIDENTS OF TOWN OF CALEDON - WARD 5

Time Period	Trips	% 24hr	Trip Purpose				Mode of Travel					Median Trip Length (km)				
			HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	11,800	26.7%	54%	23%	17%	6%	72%	11%	1%	1%	7%	9%	18.3	4.1	32.7	37.9
24 Hrs	44,200		37%	14%	36%	14%	74%	14%	1%	1%	6%	5%	15.2	9.5	31.2	37.9

TRIPS MADE TO TOWN OF CALEDON - WARD 5 - BY RESIDENTS OF THE TTS AREA

Time Period	Trips	% 24 hr	Trip Purpose				Mode of Travel					Median Trip Length (km)				
			Work	School	Home	Other	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	12,500	27.1%	63%	20%	4%	13%	74%	9%	*	*	5%	12%	14.2	2.8	*	*
24 Hrs	46,100		26%	6%	41%	26%	76%	13%	0%	0%	5%	6%	11.7	4.8	12.7	37.6

Appendix G – Future Total Traffic Level of Service Calculations

Queues

2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	13	271	273	91	181	405	90	81	1136
v/c Ratio	0.01	0.03	0.68	0.74	0.19	0.54	0.21	0.10	0.14	0.64
Control Delay	31.0	0.2	46.9	53.1	4.2	15.2	14.6	1.0	9.9	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	0.2	46.9	53.1	4.2	15.2	14.6	1.0	9.9	25.7
Queue Length 50th (m)	0.2	0.0	56.6	58.5	0.0	15.0	24.8	0.0	6.3	98.9
Queue Length 95th (m)	1.5	0.0	#84.1	#98.4	7.9	30.8	40.6	2.9	15.3	161.1
Internal Link Dist (m)		66.0		160.6			356.6			133.7
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	172	610	398	410	537	460	1921	933	583	1775
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02	0.68	0.67	0.17	0.39	0.21	0.10	0.14	0.64

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	1	0	13	475	69	91	181	405	90	81	1099	37
Future Volume (vph)	1	0	13	475	69	91	181	405	90	81	1099	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1824	1609		1732	1758	1580	1825	3411	1555	1690	3561	
Flt Permitted	0.58	1.00		0.49	0.51	1.00	0.14	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1121	1609		896	925	1580	266	3411	1555	914	3561	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	13	475	69	91	181	405	90	81	1099	37
RTOR Reduction (vph)	0	12	0	0	0	69	0	0	41	0	2	0
Lane Group Flow (vph)	1	1	0	271	273	22	181	405	49	81	1134	0
Confl. Peds. (#/hr)	1		2	2		1	1					1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	7%	5%	8%	2%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	9.5	8.6		34.0	34.0	28.6	73.4	65.2	65.2	63.6	58.4	
Effective Green, g (s)	9.5	8.6		34.0	34.0	28.6	73.4	65.2	65.2	63.6	58.4	
Actuated g/C Ratio	0.08	0.07		0.28	0.28	0.24	0.61	0.54	0.54	0.53	0.48	
Clearance Time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	93	114		397	405	374	317	1844	840	515	1724	
v/s Ratio Prot	0.00	0.00		c0.12	0.12		c0.06	0.12		0.01	c0.32	
v/s Ratio Perm	0.00			c0.07	0.07	0.01	0.29		0.03	0.08		
v/c Ratio	0.01	0.01		0.68	0.67	0.06	0.57	0.22	0.06	0.16	0.66	
Uniform Delay, d1	51.2	52.0		37.0	38.4	35.6	15.3	14.4	13.1	14.1	23.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		4.8	4.4	0.1	2.5	0.3	0.1	0.1	2.0	
Delay (s)	51.2	52.1		41.8	42.8	35.6	17.7	14.7	13.3	14.3	25.5	
Level of Service	D	D		D	D	D	B	B	B	B	C	
Approach Delay (s)		52.0			41.3			15.3			24.8	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			26.5		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			120.6		Sum of lost time (s)				20.7			
Intersection Capacity Utilization			77.6%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: Landsbridge Street & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	18	146	10	447	179	91	16	92
v/c Ratio	0.09	0.18	0.04	0.55	0.26	0.10	0.03	0.11
Control Delay	17.1	12.7	15.8	20.6	9.2	5.2	7.6	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	12.7	15.8	20.6	9.2	5.2	7.6	3.6
Queue Length 50th (m)	1.4	4.2	0.8	19.7	8.4	2.2	0.7	0.8
Queue Length 95th (m)	5.4	9.7	3.6	30.8	21.5	8.7	3.3	6.8
Internal Link Dist (m)		160.6		416.7		343.6		135.1
Turn Bay Length (m)	40.0		100.0		35.0		35.0	
Base Capacity (vph)	484	1948	658	2062	679	928	616	855
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	0.04	0.07	0.02	0.22	0.26	0.10	0.03	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Landsbridge Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	105	41	10	430	17	179	52	39	16	20	72
Future Volume (vph)	18	105	41	10	430	17	179	52	39	16	20	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.99		1.00	0.94		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	3338		1643	3561		1772	1743		1609	1571	
Flt Permitted	0.48	1.00		0.66	1.00		0.70	1.00		0.70	1.00	
Satd. Flow (perm)	837	3338		1140	3561		1301	1743		1182	1571	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	105	41	10	430	17	179	52	39	16	20	72
RTOR Reduction (vph)	0	32	0	0	5	0	0	19	0	0	34	0
Lane Group Flow (vph)	18	114	0	10	442	0	179	72	0	16	58	0
Confl. Peds. (#/hr)			1	1					7	7		
Heavy Vehicles (%)	11%	3%	7%	11%	2%	0%	3%	2%	3%	13%	15%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.2	12.2		12.2	12.2		28.1	28.1		28.1	28.1	
Effective Green, g (s)	12.2	12.2		12.2	12.2		28.1	28.1		28.1	28.1	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.52	0.52		0.52	0.52	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	190	758		258	809		680	912		618	822	
v/s Ratio Prot		0.03			c0.12			0.04			0.04	
v/s Ratio Perm	0.02			0.01			c0.14			0.01		
v/c Ratio	0.09	0.15		0.04	0.55		0.26	0.08		0.03	0.07	
Uniform Delay, d1	16.4	16.6		16.2	18.3		7.1	6.4		6.2	6.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		0.1	0.8		0.9	0.2		0.1	0.2	
Delay (s)	16.6	16.7		16.2	19.1		8.0	6.5		6.3	6.5	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		16.7			19.0			7.5			6.5	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		14.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		53.7			Sum of lost time (s)			13.4				
Intersection Capacity Utilization		49.6%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Pembroke Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	148	12	4	422	0	35	0	13	0	0	0
Future Volume (Veh/h)	0	148	12	4	422	0	35	0	13	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	148	12	4	422	0	35	0	13	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	422			160			373	584	80	517	590	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	422			160			373	584	80	517	590	211
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	99	100	100	100
cM capacity (veh/h)	1134			1417			558	421	964	434	417	794
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	0	99	61	4	281	141	48	0				
Volume Left	0	0	0	4	0	0	35	0				
Volume Right	0	0	12	0	0	0	13	0				
cSH	1700	1700	1700	1417	1700	1700	629	1700				
Volume to Capacity	0.00	0.06	0.04	0.00	0.17	0.08	0.08	0.00				
Queue Length 95th (m)	0.0	0.0	0.0	0.1	0.0	0.0	1.9	0.0				
Control Delay (s)	0.0	0.0	0.0	7.5	0.0	0.0	11.2	0.0				
Lane LOS				A			B	A				
Approach Delay (s)	0.0			0.1			11.2	0.0				
Approach LOS							B	A				
Intersection Summary												
Average Delay				0.9								
Intersection Capacity Utilization				21.7%			ICU Level of Service			A		
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
5: Landsbridge Street/Sant Farm Drive & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	96	12	8	240	22	27	3	28	134	7	45
Future Volume (Veh/h)	11	96	12	8	240	22	27	3	28	134	7	45
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	96	12	8	240	22	27	3	28	134	7	45
Pedestrians	7				2			1				
Lane Width (m)	3.7				3.7			3.7				
Walking Speed (m/s)	1.1				1.1			1.1				
Percent Blockage	1				0			0				
Right turn flare (veh)												
Median type	None				None							
Median storage veh)												
Upstream signal (m)					210							
pX, platoon unblocked												
vC, conflicting volume	262			109			316	403	57	368	398	138
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262			109			316	403	57	368	398	138
tC, single (s)	4.5			4.1			7.6	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			95	99	97	75	99	95
cM capacity (veh/h)	1178			1493			553	531	1001	540	534	886
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	11	64	44	8	160	102	58	186				
Volume Left	11	0	0	8	0	0	27	134				
Volume Right	0	0	12	0	0	22	28	45				
cSH	1178	1700	1700	1493	1700	1700	704	596				
Volume to Capacity	0.01	0.04	0.03	0.01	0.09	0.06	0.08	0.31				
Queue Length 95th (m)	0.2	0.0	0.0	0.1	0.0	0.0	2.0	10.1				
Control Delay (s)	8.1	0.0	0.0	7.4	0.0	0.0	10.6	13.8				
Lane LOS	A			A			B	B				
Approach Delay (s)	0.7			0.2			10.6	13.8				
Approach LOS							B	B				
Intersection Summary												
Average Delay				5.2								
Intersection Capacity Utilization				32.4%			ICU Level of Service					
Analysis Period (min)				15								

Queues

6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	107	144	22	241	1244
v/c Ratio	0.58	0.49	0.14	0.20	0.92
Control Delay	53.8	12.9	4.0	3.6	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	12.9	4.0	3.6	24.6
Queue Length 50th (m)	18.8	0.0	0.7	10.4	137.4
Queue Length 95th (m)	35.3	16.6	1.9	17.0	#317.0
Internal Link Dist (m)	185.8			151.3	128.4
Turn Bay Length (m)			55.0		
Base Capacity (vph)	205	314	157	1214	1357
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	0.52	0.46	0.14	0.20	0.92

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑ ↗	↑ ↗	↑ ↗	↑ ↗	↑ ↗	↑ ↗
Traffic Volume (vph)	107	144	22	241	1029	215
Future Volume (vph)	107	144	22	241	1029	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1789	1633	1674	1575	1831	
Flt Permitted	0.95	1.00	0.05	1.00	1.00	
Satd. Flow (perm)	1789	1633	96	1575	1831	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	107	144	22	241	1029	215
RTOR Reduction (vph)	0	130	0	0	7	0
Lane Group Flow (vph)	107	14	22	241	1237	0
Heavy Vehicles (%)	2%	0%	9%	22%	3%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	9.9	9.9	76.5	76.5	71.5	
Effective Green, g (s)	9.9	9.9	76.5	76.5	71.5	
Actuated g/C Ratio	0.10	0.10	0.78	0.78	0.73	
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	179	163	106	1221	1327	
v/s Ratio Prot	c0.06		0.00	c0.15	c0.68	
v/s Ratio Perm		0.01	0.16			
v/c Ratio	0.60	0.09	0.21	0.20	0.93	
Uniform Delay, d1	42.4	40.3	20.2	2.9	11.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	0.2	1.0	0.4	13.1	
Delay (s)	47.7	40.5	21.2	3.3	24.6	
Level of Service	D	D	C	A	C	
Approach Delay (s)	43.6			4.8	24.6	
Approach LOS	D			A	C	
Intersection Summary						
HCM 2000 Control Delay		24.3		HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio		0.88				
Actuated Cycle Length (s)		98.6		Sum of lost time (s)	15.2	
Intersection Capacity Utilization		86.3%		ICU Level of Service	E	
Analysis Period (min)		15				
c Critical Lane Group						

Queues

2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	29	178	106	106	106	15	1570	495	97	678
v/c Ratio	0.10	0.68	0.39	0.48	0.29	0.03	0.82	0.46	0.48	0.32
Control Delay	28.0	31.7	33.0	37.6	9.8	7.9	25.7	3.1	19.3	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	31.7	33.0	37.6	9.8	7.9	25.7	3.1	19.3	12.3
Queue Length 50th (m)	4.3	12.8	17.2	17.7	0.0	0.9	129.0	0.5	6.1	29.6
Queue Length 95th (m)	10.7	34.9	30.9	32.0	14.1	3.8	#194.0	17.3	20.8	59.5
Internal Link Dist (m)		66.0		160.6			356.6			133.7
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	537	653	494	319	620	516	1909	1066	203	2109
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.27	0.21	0.33	0.17	0.03	0.82	0.46	0.48	0.32

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: Highway 50/Queen Street South & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	41	137	208	4	106	15	1570	495	97	675	3
Future Volume (vph)	29	41	137	208	4	106	15	1570	495	97	675	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fr _t	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1818	1672		1714	1722	1586	1821	3614	1586	1825	3541	
Flt Permitted	0.69	1.00		0.33	0.31	1.00	0.39	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1311	1672		595	565	1586	755	3614	1586	131	3541	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	41	137	208	4	106	15	1570	495	97	675	3
RTOR Reduction (vph)	0	97	0	0	0	88	0	0	231	0	0	0
Lane Group Flow (vph)	29	81	0	106	106	18	15	1570	264	97	678	0
Confl. Peds. (#/hr)	4		5	5		4	5		4	4		5
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	16.3	12.0		26.8	26.8	18.0	57.5	55.6	55.6	65.5	60.6	
Effective Green, g (s)	16.3	12.0		26.8	26.8	18.0	57.5	55.6	55.6	65.5	60.6	
Actuated g/C Ratio	0.15	0.11		0.25	0.25	0.17	0.55	0.53	0.53	0.62	0.57	
Clearance Time (s)	4.5	6.7		4.5	6.7	6.7	3.0	6.5	6.5	3.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	223	190		260	256	270	430	1904	835	192	2033	
v/s Ratio Prot	0.01	0.05		0.04	c0.04		0.00	c0.43		c0.03	0.19	
v/s Ratio Perm	0.01			0.06	c0.06	0.01	0.02		0.17	0.28		
v/c Ratio	0.13	0.42		0.41	0.41	0.07	0.03	0.82	0.32	0.51	0.33	
Uniform Delay, d1	38.3	43.5		31.6	32.8	36.7	11.0	20.9	14.2	17.5	11.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.5		1.0	1.1	0.1	0.0	4.2	1.0	2.1	0.4	
Delay (s)	38.6	45.1		32.7	33.9	36.8	11.0	25.1	15.1	19.6	12.3	
Level of Service	D	D		C	C	D	B	C	B	B	B	
Approach Delay (s)		44.1			34.5			22.6			13.2	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			22.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			105.5				Sum of lost time (s)			20.7		
Intersection Capacity Utilization			87.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

3: Landsbridge Street & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	91	691	25	230	115	74	69	138
v/c Ratio	0.26	0.63	0.15	0.21	0.19	0.08	0.11	0.16
Control Delay	17.1	18.5	16.6	11.8	12.1	9.1	11.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	18.5	16.6	11.8	12.1	9.1	11.3	6.8
Queue Length 50th (m)	7.4	30.2	2.0	7.4	6.9	3.3	4.0	4.0
Queue Length 95th (m)	16.5	44.1	6.7	13.8	18.9	11.0	12.2	14.6
Internal Link Dist (m)		160.6		416.7		343.6		135.1
Turn Bay Length (m)	40.0		100.0		35.0		35.0	
Base Capacity (vph)	602	1853	290	1836	599	879	631	863
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	0.15	0.37	0.09	0.13	0.19	0.08	0.11	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Landsbridge Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	
Traffic Volume (vph)	91	538	153	25	179	51	115	58	16	69	70	68
Future Volume (vph)	91	538	153	25	179	51	115	58	16	69	70	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		0.99	1.00	
Fr _t	1.00	0.97		1.00	0.97		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1809	3499		1813	3476		1811	1848		1802	1760	
Flt Permitted	0.61	1.00		0.29	1.00		0.67	1.00		0.71	1.00	
Satd. Flow (perm)	1158	3499		557	3476		1275	1848		1344	1760	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	91	538	153	25	179	51	115	58	16	69	70	68
RTOR Reduction (vph)	0	44	0	0	35	0	0	8	0	0	36	0
Lane Group Flow (vph)	91	647	0	25	195	0	115	66	0	69	102	0
Confl. Peds. (#/hr)	10		15	15		10	15		22	22		15
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.2	18.2		18.2	18.2		28.2	28.2		28.2	28.2	
Effective Green, g (s)	18.2	18.2		18.2	18.2		28.2	28.2		28.2	28.2	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.47	0.47		0.47	0.47	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.4	7.4		7.4	7.4	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	352	1064		169	1057		601	871		633	829	
v/s Ratio Prot		c0.18			0.06			0.04			0.06	
v/s Ratio Perm	0.08			0.04			c0.09			0.05		
v/c Ratio	0.26	0.61		0.15	0.18		0.19	0.08		0.11	0.12	
Uniform Delay, d1	15.7	17.8		15.2	15.3		9.2	8.7		8.8	8.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.0		0.4	0.1		0.7	0.2		0.3	0.3	
Delay (s)	16.1	18.7		15.6	15.4		9.9	8.8		9.1	9.2	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		18.4			15.4			9.5			9.2	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		15.4			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		59.8			Sum of lost time (s)			13.4				
Intersection Capacity Utilization		76.3%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Pembrook Street & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	607	16	38	246	0	9	0	23	0	0	0
Future Volume (Veh/h)	0	607	16	38	246	0	9	0	23	0	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	607	16	38	246	0	9	0	23	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	246			623			814	937	312	648	945	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246			623			814	937	312	648	945	123
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			97	100	97	100	100	100
cM capacity (veh/h)	1317			954			261	253	684	333	250	905
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	0	405	218	38	164	82	32	0				
Volume Left	0	0	0	38	0	0	9	0				
Volume Right	0	0	16	0	0	0	23	0				
cSH	1700	1700	1700	954	1700	1700	470	1700				
Volume to Capacity	0.00	0.24	0.13	0.04	0.10	0.05	0.07	0.00				
Queue Length 95th (m)	0.0	0.0	0.0	0.9	0.0	0.0	1.7	0.0				
Control Delay (s)	0.0	0.0	0.0	8.9	0.0	0.0	13.2	0.0				
Lane LOS				A			B	A				
Approach Delay (s)	0.0			1.2			13.2	0.0				
Approach LOS							B	A				
Intersection Summary												
Average Delay				0.8								
Intersection Capacity Utilization				34.0%			ICU Level of Service					
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
5: Landsbridge Street/Sant Farm Drive & Queensgate Boulevard

12/16/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	334	37	15	215	147	51	43	27	67	16	38
Future Volume (Veh/h)	64	334	37	15	215	147	51	43	27	67	16	38
Sign Control	Free				Free			Stop			Stop	
Grade		0%				0%			0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	64	334	37	15	215	147	51	43	27	67	16	38
Pedestrians		2										
Lane Width (m)		3.7										
Walking Speed (m/s)		1.1										
Percent Blockage		0										
Right turn flare (veh)												
Median type	None				None							
Median storage veh)												
Upstream signal (m)					210							
pX, platoon unblocked												
vC, conflicting volume	362			371			666	872	186	662	818	183
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	362			371			666	872	186	662	818	183
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			83	84	97	76	95	95
cM capacity (veh/h)	1208			1199			303	269	831	280	293	833
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	64	223	148	15	143	219	121	121				
Volume Left	64	0	0	15	0	0	51	67				
Volume Right	0	0	37	0	0	147	27	38				
cSH	1208	1700	1700	1199	1700	1700	335	357				
Volume to Capacity	0.05	0.13	0.09	0.01	0.08	0.13	0.36	0.34				
Queue Length 95th (m)	1.3	0.0	0.0	0.3	0.0	0.0	12.2	11.1				
Control Delay (s)	8.1	0.0	0.0	8.0	0.0	0.0	21.7	20.2				
Lane LOS	A			A			C	C				
Approach Delay (s)	1.2			0.3			21.7	20.2				
Approach LOS							C	C				
Intersection Summary												
Average Delay			5.4									
Intersection Capacity Utilization		34.4%			ICU Level of Service				A			
Analysis Period (min)		15										

Queues

6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	305	81	169	826	590
v/c Ratio	0.72	0.19	0.37	0.72	0.74
Control Delay	37.6	7.0	8.6	16.3	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	7.0	8.6	16.3	25.4
Queue Length 50th (m)	41.6	0.0	8.3	75.3	66.6
Queue Length 95th (m)	66.8	9.4	19.7	148.8	#138.2
Internal Link Dist (m)	185.8			151.3	128.4
Turn Bay Length (m)			55.0		
Base Capacity (vph)	831	759	472	1176	794
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	0.37	0.11	0.36	0.70	0.74

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
6: Albion Vaughan Road & Queensgate Boulevard

12/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑ ↗	↗ ↘	↖ ↗	↑ ↗	↖ ↘	
Traffic Volume (vph)	305	81	169	826	418	172
Future Volume (vph)	305	81	169	826	418	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Fr _t	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1825	1570	1807	1883	1712	
Flt Permitted	0.95	1.00	0.24	1.00	1.00	
Satd. Flow (perm)	1825	1570	459	1883	1712	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	305	81	169	826	418	172
RTOR Reduction (vph)	0	62	0	0	14	0
Lane Group Flow (vph)	305	19	169	826	576	0
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	18.0	18.0	47.1	47.1	35.3	
Effective Green, g (s)	18.0	18.0	47.1	47.1	35.3	
Actuated g/C Ratio	0.23	0.23	0.61	0.61	0.46	
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	424	365	433	1147	781	
v/s Ratio Prot	c0.17		0.04	c0.44	0.34	
v/s Ratio Perm		0.01	0.19			
v/c Ratio	0.72	0.05	0.39	0.72	0.74	
Uniform Delay, d1	27.3	23.0	9.0	10.5	17.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.8	0.1	0.6	3.9	6.2	
Delay (s)	33.1	23.1	9.5	14.4	23.4	
Level of Service	C	C	A	B	C	
Approach Delay (s)	31.0			13.6	23.4	
Approach LOS	C			B	C	
Intersection Summary						
HCM 2000 Control Delay		19.9		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.75				
Actuated Cycle Length (s)		77.3		Sum of lost time (s)		15.2
Intersection Capacity Utilization		72.2%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						