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Transportation Impact Study

PROPOSED RESIDENTIAL PLAN OF SUBDIVISION

9229 5th Sideroad
TOWN OF CALEDON, ON

March 14, 2022
Project No: NT-20-179

520 Industrial Parkway South, Suit
Aurora, Ontario L4G

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NextEng Consulting Group Inc.

March 14, 2022

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

Attention: Joseph Pavia

Re: Transportation Impact Study - Addendum
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.

On behalf of the Client, Nextrans acknowledges the Town of Caledon and Region of Peel Transportation comments dated August 27, 2021 and the Region of Peel comments dated December 16, 2021 on the submitted Transportation Impact Study prepared by Nextrans dated January 19, 2021.

The Town comments are reiterated below, and responses are stated below each respective comment.

Region of Peel Comments

a. *The auto turn assessment used a waste collection vehicle width of 2.60m. Please refer to WCDSM Appendix 1, the width of the collection vehicle must be min. 2.77m width. The 13m turning radius requirement is from the centerline of the road and must be labelled on all turns.*
   - *The submitted auto turn assessment measures the turning radius from the outside of the road.*

Response: Autoturn assessment was revised. See Figure 7-2.

b. *It is acknowledged that comments regarding the pedestrian design features will be addressed through the future engineering design. Please confirm if sidewalks are proposed on both sides of the street. (Region of Peel)*

Response: Sidewalks are proposed on both sides of the Pembrook Street extension.

Town of Caledon Comments

a. *Some of the Level of Service results presented in the PM peak hour in Table 2.1 do not match the Synchro reports in Appendix D.*

Response: Revised.

a. *Please ensure that the changes to the amber/yellow and all-red timings adhere to the recommendations within OTM Book 12.*

Response: Amber and All-red timings satisfy the minimum interval timings recommended in OTM Book 12.

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:

Janus Mora, B.Eng
Transportation Analyst

Approved by:

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 acceptable levels of service.

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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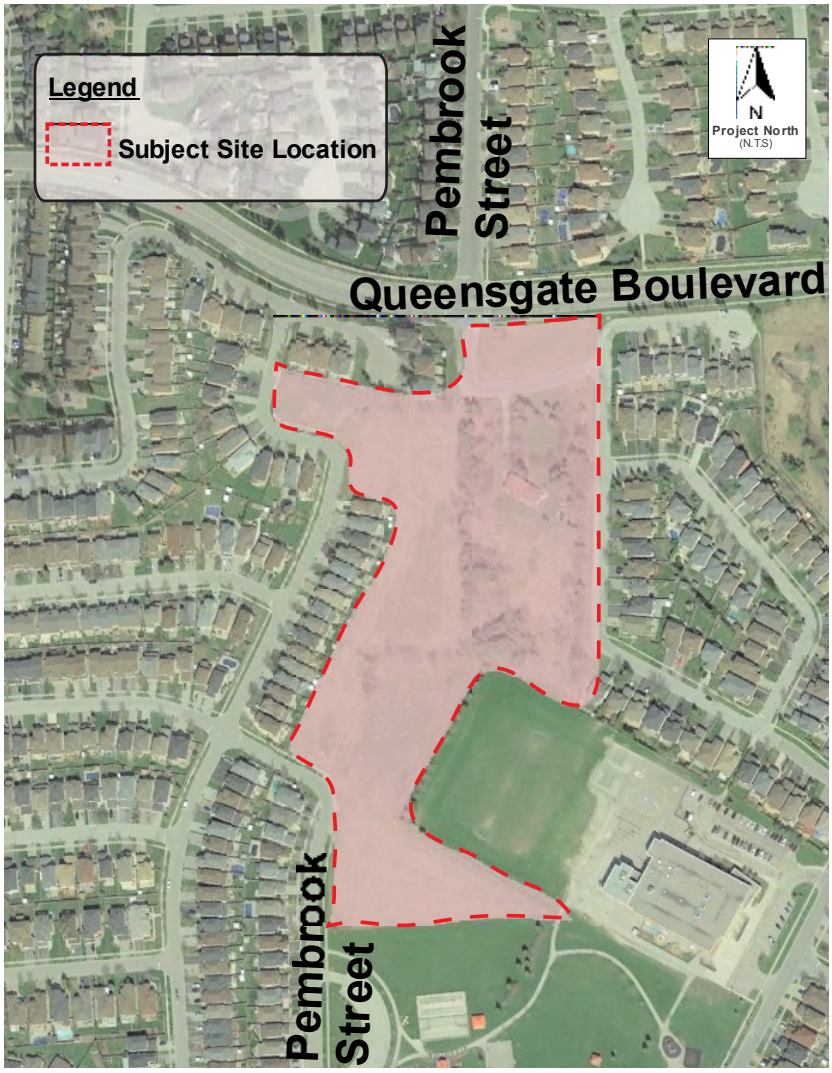
1.0 INTRODUCTION

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

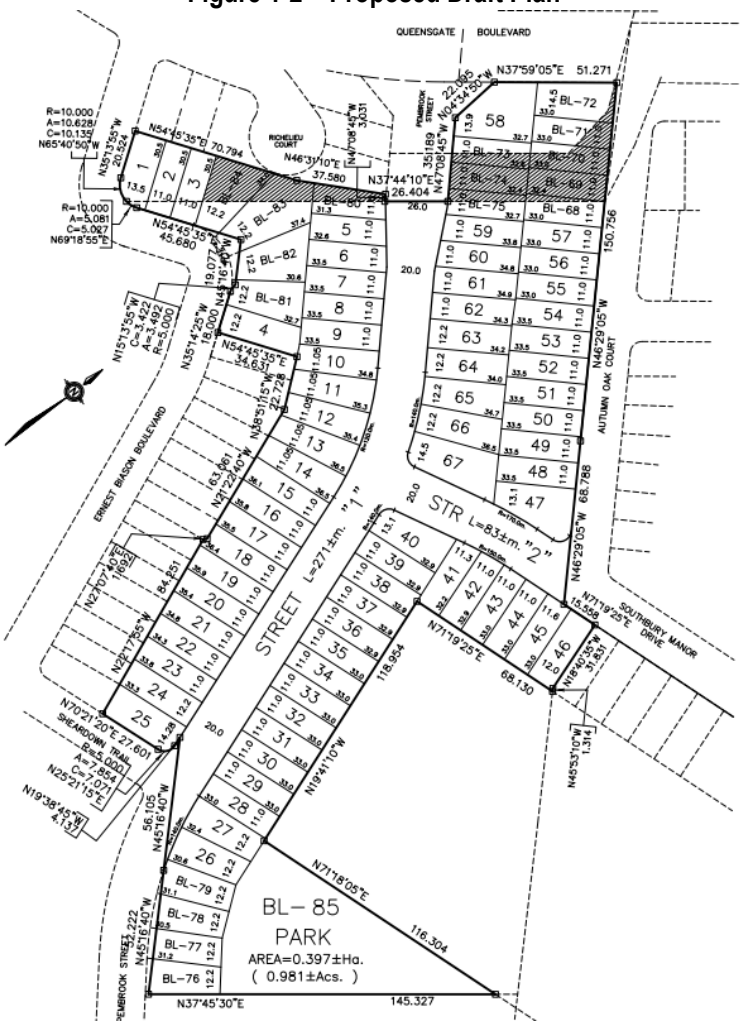


The subject site is currently vacant. Based on the Draft Plan of Subdivision prepared by KLM Planning Partners Inc., dated December 8, 2020, the development proposal is to develop the existing lands to a residential subdivision development with a total floor area of 84 dwelling units. A minimum of four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

The proposed draft 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 Draft 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 Queesgate 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.

Pembrook 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

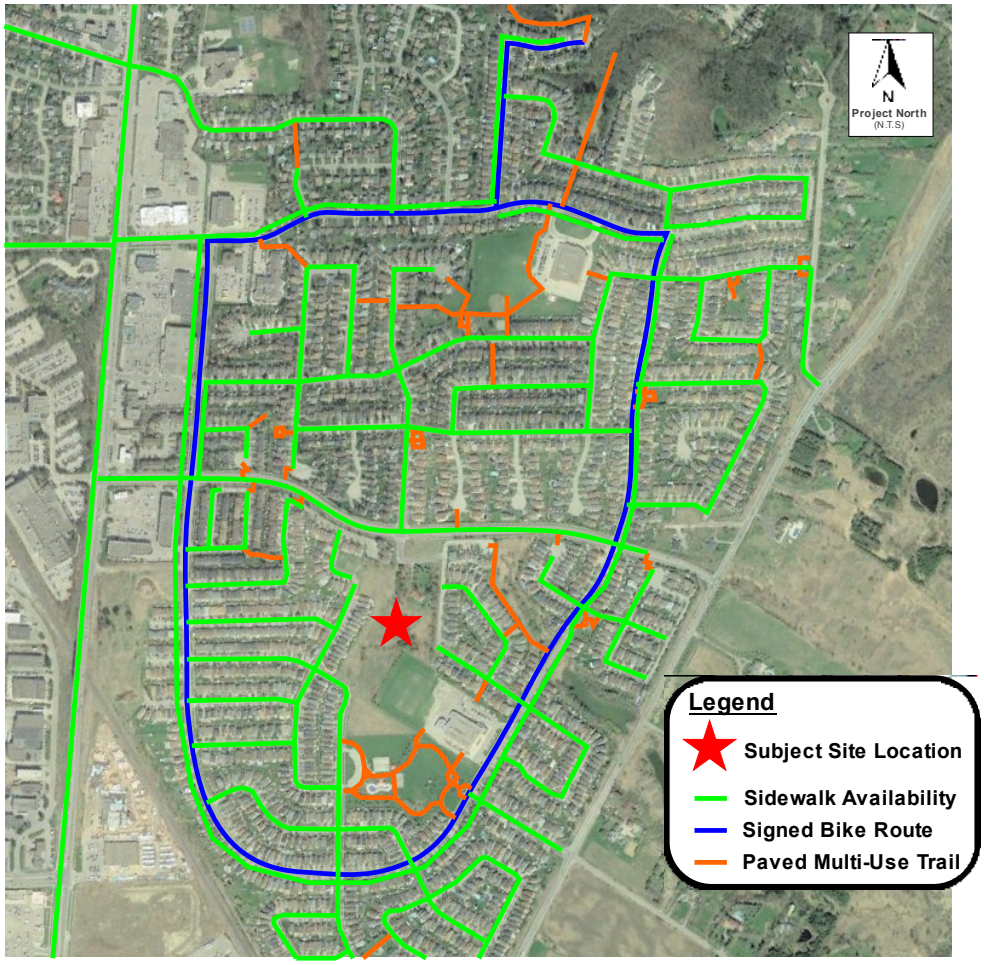
There are currently sidewalks available on Queensgate Boulevard, Queen Street South (Highway 50), Allan Drive, Pembrook Street as well as throughout the residential streets within the vicinity of the subject site.

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

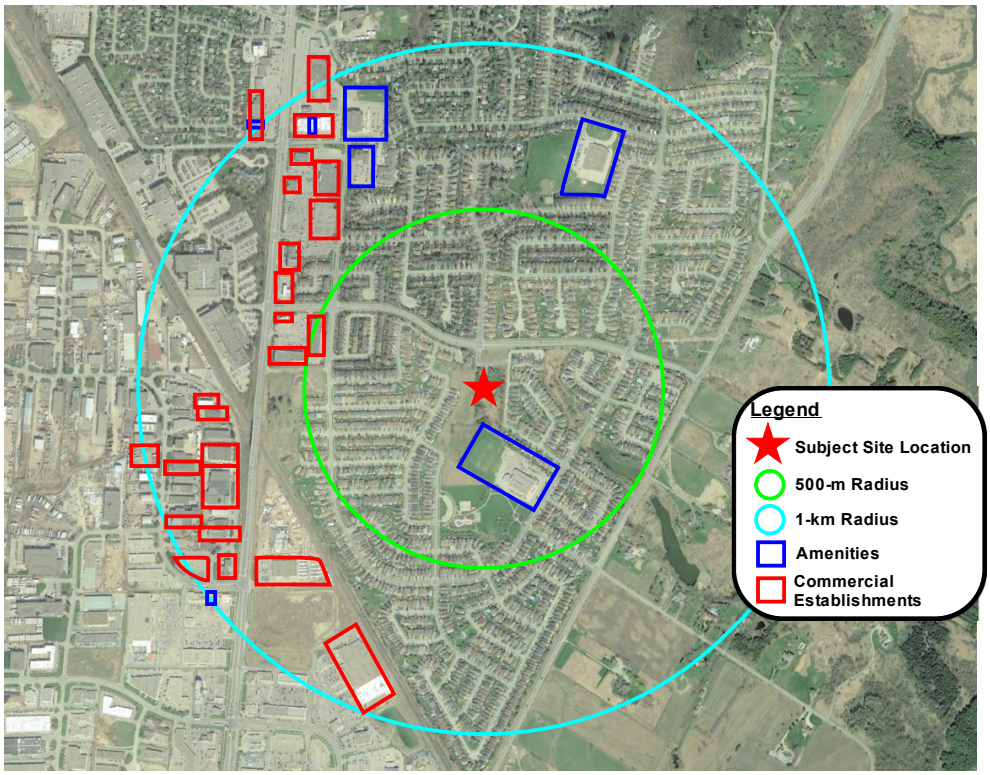
Existing Amenities

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 Pembrook Street intersection, through volumes have been projected to this intersection. Detailed existing traffic data are provided in **Appendix C**.

2.5. Synchro Parameters

Peak hour factors were calculated and applied per intersection using the following equation:

$$PHF = \frac{total\ peak\ hour\ volume}{4 * peak\ 15\ minute\ volume}$$

The calculated peak hour factors were used in all analysis scenarios.

2.6. 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**.

Table 2.1 – Level of Service – Existing Traffic Assessments

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
AM Peak Hour							
Highway 50 / Queen Street South & Queensgate Boulevard	**Overall**	**0.71**	**29.2**	**C**	--	--	--
	EBL	0.02	49.5	D	0.2	2.0	90.0
	EBT	0.01	49.4	D	0.0	0.0	90.0
	WBL	0.75	45.7	D	48.3	88.6	65.0
	WBT	0.75	45.6	D	48.9	89.6	184.6
	WBR	0.06	32.1	C	0.0	3.9	184.6
	NBL	0.68	23.2	C	12.1	59.0	40.0
	NBT	0.24	16.3	B	19.5	45.8	380.6
	NBR	0.06	14.7	B	0.0	7.3	150.0
	SBL	0.18	15.3	B	5.0	19.4	100.0
	SBT	0.74	28.3	C	77.9	161.4	254.2
Landsbridge Street & Queensgate Boulevard	**Overall**	**0.35**	**15.2**	**B**	--	--	--
	EBL	0.06	13.2	B	1.6	5.3	40.0
	EBT	0.09	13.3	B	4.2	9.0	184.6
	WBL	0.02	12.8	B	0.8	3.3	100.0
	WBT	0.29	14.9	B	19.3	28.2	440.7
	NBL	0.41	18.7	B	19.6	35.1	35.0
	NBT	0.11	14.6	B	5.0	13.2	367.6
	SBL	0.04	14.0	B	1.4	4.9	35.0
	SBT	0.09	14.4	B	1.9	10.1	159.1
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.81**	**22.9**	**C**	--	--	--
	EBL	0.44	26.3	C	11.1	27.2	209.8
	EBR	0.10	24.0	C	0.0	13.6	209.8
	NBL	0.15	12.4	B	0.6	2.7	55.0
	NBT	0.26	7.5	A	9.1	30.6	299.5
	SBT	0.95	29.9	C	73.2	220.9	399.0
	SBR	0.26	7.5	A	6.5	25.6	30.0
Pembrook Street & Queensgate Boulevard	NBLTR	0.0	0.00	A	--	0.0	71.7
	SBLTR	0.0	0.00	A	--	0.0	211.6
Landsbridge Street / Sant Farm Drive & Queensgate Boulevard	EBL	0.01	8.0	A	--	0.2	90.0
	WBL	0.01	7.4	A	--	0.1	209.8
	NBLTR	0.08	10.4	B	--	2.0	262.8
	SBLTR	0.31	13.4	B	--	9.9	298.3

Table 2.1 – Level of Service – Existing Traffic Assessments (continued)

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
PM Peak Hour							
Highway 50 / Queen Street South & Queensgate Boulevard	**Overall**	**0.73**	**26.4**	**C**	--	--	--
	EBL	0.17	45.4	D	6.0	15.5	90.0
	EBT	0.49	48.7	D	14.3	38.4	90.0
	WBL	0.58	49.9	D	24.2	45.6	65.0
	WBT	0.58	49.8	D	24.2	45.6	184.6
	WBR	0.07	43.3	D	0.0	16.0	184.6
	NBL	0.04	12.5	B	1.1	4.8	40.0
	NBT	0.83	27.6	C	137.5	229.5	380.6
	NBR	0.34	17.2	B	0.0	18.9	150.0
	SBL	0.57	23.2	C	7.9	29.8	100.0
	SBT	0.34	13.8	B	33.1	67.6	254.1
Landsbridge Street & Queensgate Boulevard	**Overall**	**0.34**	**15.4**	**B**	--	--	--
	EBL	0.20	14.7	B	8.2	17.5	40.0
	EBT	0.43	16.3	B	28.1	41.3	184.6
	WBL	0.09	13.7	B	2.0	6.6	100.0
	WBT	0.13	13.6	B	7.1	13.2	440.7
	NBL	0.25	16.3	B	10.8	22.1	35.0
	NBT	0.09	14.4	B	5.1	12.8	367.6
	SBL	0.14	14.9	B	6.1	13.9	35.0
	SBT	0.15	14.9	B	6.3	16.8	159.1
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.77**	**26.0**	**C**	--	--	--
	EBL	0.70	30.8	C	44.5	71.8	209.8
	EBR	0.06	21.7	C	0.0	9.5	209.8
	NBL	0.30	8.2	A	9.0	21.4	55.0
	NBT	0.92	35.9	D	107.2	215.3	299.2
	SBT	0.51	17.0	B	40.9	80.1	399.3
	SBR	0.17	13.3	B	4.1	17.9	30.0
Pembrook Street & Queensgate Boulevard	NBLTR	0.0	0.00	A	--	0.0	71.7
	SBLTR	0.0	0.00	A	--	0.0	211.6
Landsbridge Street / Sant Farm Drive & Queensgate Boulevard	EBL	0.05	8.1	A	--	1.2	90.0
	WBL	0.01	8.0	A	--	0.3	209.8
	NBLTR	0.33	19.6	C	--	10.5	262.8
	SBLTR	0.33	19.2	C	--	10.7	298.3

Under existing conditions, the study intersections are currently operating at acceptable levels of service during both peak 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. The 2% growth rate was also applied to turning volumes at the Queensgate Boulevard and Highway 50 intersection and the Queensgate Boulevard and Albion Vaughan Road intersection.

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**.

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

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
AM Peak Hour							
Highway 50 / Queen Street South & Queensgate Boulevard	**Overall**	**0.78**	**32.4**	**C**	--	--	--
	EBL	0.02	50.1	D	0.2	2.0	90.0
	EBT	0.01	49.9	D	0.0	0.0	90.0
	WBL	0.78	47.4	D	54.5	98.9	65.0
	WBT	0.78	47.2	D	55.1	99.7	184.6
	WBR	0.07	31.5	C	0.0	7.9	184.6
	NBL	0.75	35.0	C	16.7	69.0	40.0
	NBT	0.27	17.2	B	22.8	50.6	380.6
	NBR	0.07	15.3	B	0.0	10.4	150.0
	SBL	0.21	15.8	B	5.9	20.9	100.0
	SBT	0.82	32.3	C	93.7	196.8	254.9
Landsbridge Street & Queensgate Boulevard	**Overall**	**0.36**	**15.3**	**B**	--	--	--
	EBL	0.06	13.3	B	1.6	5.3	40.0
	EBT	0.10	13.3	B	4.6	9.5	184.6
	WBL	0.02	12.9	B	0.8	3.3	100.0
	WBT	0.32	15.1	B	21.6	31.0	440.7
	NBL	0.41	18.7	B	19.6	35.1	35.0
	NBT	0.11	14.6	B	5.0	13.2	367.6
	SBL	0.04	14.0	B	1.4	4.9	35.0
	SBT	0.09	14.4	B	1.9	10.1	159.1
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.90**	**40.1**	**D**	--	--	--
	EBL	0.46	25.9	C	12.4	29.7	209.8
	EBR	0.11	23.5	C	0.0	14.4	209.8
	NBL	0.17	14.1	B	0.8	3.2	55.0
	NBT	0.30	8.0	A	11.0	34.8	299.0
	SBT	1.06	60.2	E	99.2	256.9	399.1
	SBR	0.30	8.2	A	8.1	29.8	30.0
Pembrook Street & Queensgate Boulevard	NBLTR	0.0	0.00	A	--	0.0	71.7
	SBLTR	0.0	0.00	A	--	0.0	211.6
Landsbridge Street / Sant Farm Drive & Queensgate Boulevard	EBL	0.01	8.1	A	--	0.2	90.0
	WBL	0.01	7.4	A	--	0.1	209.8
	NBLTR	0.08	10.5	B	--	2.1	262.8
	SBLTR	0.32	13.9	B	--	10.4	298.3

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

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
PM Peak Hour							
Highway 50 / Queen Street South & Queensgate Boulevard	**Overall**	**0.81**	**31.3**	**C**	--	--	--
	EBL	0.16	45.6	D	6.1	15.8	90.0
	EBT	0.54	50.5	D	17.4	42.8	90.0
	WBL	0.61	51.1	D	27.4	50.4	65.0
	WBT	0.59	50.5	D	27.0	49.5	184.6
	WBR	0.08	43.4	D	0.0	16.7	184.6
	NBL	0.04	13.2	B	1.2	5.1	40.0
	NBT	0.93	36.6	D	171.1	281.2	380.6
	NBR	0.41	19.1	B	5.2	33.4	150.0
	SBL	0.64	30.4	C	9.3	38.5	100.0
	SBT	0.38	15.1	B	39.4	79.1	254.1
Landsbridge Street & Queensgate Boulevard	**Overall**	**0.36**	**15.6**	**B**	--	--	--
	EBL	0.20	14.8	B	8.2	17.5	40.0
	EBT	0.47	16.7	B	32.0	46.1	184.6
	WBL	0.10	13.9	B	2.0	6.6	100.0
	WBT	0.14	13.6	B	7.8	14.3	440.7
	NBL	0.25	16.3	B	10.8	22.1	35.0
	NBT	0.09	14.4	B	5.1	12.8	367.6
	SBL	0.14	14.9	B	6.1	13.9	35.0
	SBT	0.15	14.9	B	6.3	16.8	159.1
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.88**	**41.1**	**D**	--	--	--
	EBL	0.77	34.4	C	52.0	81.1	209.8
	EBR	0.06	22.2	C	0.0	9.9	209.8
	NBL	0.39	10.4	B	11.4	26.4	55.0
	NBT	1.08	76.6	E	155.5	261.4	299.7
	SBT	0.59	20.5	C	50.9	96.9	398.9
	SBR	0.20	14.7	B	6.0	22.1	30.0
Pembrook Street & Queensgate Boulevard	NBLTR	0.0	0.00	A	--	0.0	71.7
	SBLTR	0.0	0.00	A	--	0.0	211.6
Landsbridge Street / Sant Farm Drive & Queensgate Boulevard	EBL	0.05	8.1	A	--	1.2	90.0
	WBL	0.01	8.0	A	--	0.3	209.8
	NBLTR	0.35	21.1	C	--	11.6	262.8
	SBLTR	0.35	20.6	C	--	11.6	298.3

As summarized in **Table 3.1**, under future background conditions, the study area intersections are expected to operate at acceptable levels of service during the AM and PM peak hours.

The southbound through movement at the Albion Vaughan Road and Queensgate Boulevard intersection operates at 'E' LOS during the AM peak hour, with a v/c of 1.06, delay of 60.2 seconds and 95th percentile queueing length of 256.9 m. During the PM peak hour, the northbound through movement at his intersection operates at 'E' LOS with a v/c of 1.08, 76.6 second delay, and 95th percentile queueing length of 261.4 m.

3.1. Evaluation of Existing Capacity Analysis at Signalized Intersection

Under future conditions, the signalized study area intersection of Albion Vaughan Road and Queensgate Boulevard is expected to operate near capacity and experiences failing intersection movements.

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 and PM peak hours, to ensure all movements are operating below v/c ratio of 1.00.

The recommended signal timings at the Albion Vaughan Road and Queensgate Boulevard intersectionduring the morning peak hour period is detailed in **Tables 2.2**.

Table 3.2 – Optimized Signal Timing Plan (Albion Vaughan Road and Queensgate Boulevard)

Phase	Parameter	AM		PM	
		Existing	Optimized	Existing	Optimized
NBL	Yellow time	3.0	3.0	3.0	3.0
	All-red time	0.0	0.0	0.0	0.0
	Total Split	13.0	8.0	13.0	13.0
NB-SB-SBR	Yellow time	4.0	3.0	4.0	4.0
	All-red time	2.1	2.1	2.1	2.1
	Total Split	41.1	56.0	41.1	51.0
EB	Yellow time	4.0	3.0	4.0	4.0
	All-red time	2.1	2.1	2.1	2.1
	Total Split	41.1	31.2	41.1	31.2

3.2. Future Background Intersection Capacity Analysis (Optimized)

The future background intersection capacity analysis for the Albion Vaughan Road and Queensgate Boulevard intersection was conducted using the optimized signal timing plan shown in **Table 2.2**. The capacity analysis is summarized in **Table 2.3**. Results are provided in **Appendix F**.

Table 3.3 – Albion Vaughan Road and Queensgate Boulevard Capacity Analysis (Optimized)

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
AM Peak Hour							
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.82**	**18.5**	**B**	--	--	--
	EBL	0.52	33.1	C	16.5	35.1	209.8
	EBR	0.16	30.0	C	1.5	17.9	209.8
	NBL	0.22	14.5	B	0.8	3.0	55.0
	NBT	0.25	5.6	A	10.2	30.8	299.9
	SBT	0.90	21.2	C	92.0	265.9	399.3
	SBR	0.25	5.7	A	6.4	23.4	30.0

Table 3.3 – Albion Vaughan Road and Queensgate Boulevard Capacity Analysis (Optimized) (continued)

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
PM Peak Hour							
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.85**	**31.8**	**C**	--	--	--
	EBL	0.84	46.0	D	62.0	102.5	209.8
	EBR	0.06	26.7	C	0.0	11.4	209.8
	NBL	0.36	9.5	A	12.9	21.9	55.0
	NBT	0.95	42.5	D	153.5	241.2	298.2
	SBT	0.53	18.1	B	55.3	85.3	399.8
	SBR	0.17	13.3	B	4.0	15.8	30.0

With the Implementation of the optimized signal timing plan, Albion Vaughan Road and Queensgate Boulevard intersection will experience improved traffic operations. The v/c of the southbound through movement has been reduced to 0.90 in the Am peak hour and the v/c of the northbound through movement has been reduced to 0.95 in the PM peak hour.

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	**New Trips**	**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.

Trip distribution was determined from trip data from the 2016 Transportation Tomorrow Survey (TTS) for traffic zones 3190 and 3192 (see **Appendix F**) and existing traffic patterns and routes that drivers would likely take to access the subject site based on the existing road network. Based on the existing road network configuration, all site generated trips were assigned from Queensgate Boulevard to the northbound and southbound directions along either Highway 50 or Albion Vaughan Road. The site trip distribution is shown in **table 4.3**.

Table 4.3 – Site Traffic Trip Distribution

Via	Travel Direction	AM Peak Period		PM Peak Period	
		Inbound	Outbound	Inbound	Outbound
Albion Vaughan Road	NB	22%	20%	43%	25%
	SB	35%	37%	18%	37%
Highway 50	NB	8%	11%	28%	33%
	SB	36%	32%	11%	5%
Total		**100%**	**100%**	**100%**	**100%**

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 optimized signal timing plan for the Albion Vaughan Road and Queensgate Boulevard intersection was used in the future total analysis. The detailed calculations are provided in **Appendix G** and summarized in **Table 5.1.**

Table 5.1 – Level of Service – Future Total Traffic Assessments

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
AM Peak Hour							
Highway 50 / Queen Street South & Queensgate Boulevard	**Overall**	**0.78**	**32.9**	**C**	--	--	--
	EBL	0.02	50.1	D	0.2	2.0	90.0
	EBT	0.01	49.9	D	0.0	0.0	90.0
	WBL	0.79	47.0	D	56.4	101.7	65.0
	WBT	0.78	46.4	D	56.7	102.2	184.6
	WBR	0.07	31.1	C	0.0	8.9	184.6
	NBL	0.75	34.9	C	16.7	68.6	40.0
	NBT	0.29	18.5	B	23.1	50.6	380.6
	NBR	0.07	16.5	B	0.0	10.6	150.0
	SBL	0.21	15.3	B	6.4	22.0	100.0
	SBT	0.84	33.3	C	94.8	196.8	254.7
Landsbridge Street & Queensgate Boulevard	**Overall**	**0.37**	**15.4**	**B**	--	--	--
	EBL	0.07	13.4	B	1.8	5.3	40.0
	EBT	0.10	13.3	B	5.0	10.0	184.6
	WBL	0.02	12.9	B	0.8	3.3	100.0
	WBT	0.33	15.3	B	22.9	32.6	440.7
	NBL	0.41	18.7	B	19.6	35.1	35.0
	NBT	0.11	14.6	B	5.0	13.2	367.6
	SBL	0.04	14.0	B	1.4	4.9	35.0
	SBT	0.09	14.4	B	1.9	10.1	159.1
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.82**	**19.3**	**B**	--	--	--
	EBL	0.54	33.1	C	17.9	37.2	209.8
	EBR	0.24	30.1	C	3.9	21.8	209.8
	NBL	0.24	15.1	B	0.9	3.3	55.0
	NBT	0.25	5.8	A	10.5	31.5	299.5
	SBT	0.91	22.3	C	94.9	269.1	399.3
	SBR	0.26	5.9	A	6.8	24.6	30.0
Pembrook Street & Queensgate Boulevard	NBLTR	0.01	7.6	A	--	0.2	71.7
	SBLTR	0.07	10.5	B	--	1.8	211.6
Landsbridge Street / Sant Farm Drive & Queensgate Boulevard	EBL	0.01	8.1	A	--	0.2	90.0
	WBL	0.01	7.5	A	--	0.1	209.8
	NBLTR	0.09	10.8	B	--	2.2	262.8
	SBLTR	0.33	14.3	B	--	11.0	298.3

Table 5.1 – Level of Service – Future Total Traffic Assessments (continued)

Intersection	Movement	V/C	Delay (s)	LOS	Queue (m)		Link Distance / Storage Length (m)
					50th	95th	
PM Peak Hour							
Highway 50 / Queen Street South & Queensgate Boulevard	**Overall**	**0.81**	**31.7**	**C**	--	--	--
	EBL	0.16	45.6	D	6.1	15.5	90.0
	EBT	0.56	50.9	D	18.3	43.9	90.0
	WBL	0.61	51.2	D	27.7	50.8	65.0
	WBT	0.60	50.7	D	27.3	50.2	184.6
	WBR	0.09	43.5	D	0.0	17.4	184.6
	NBL	0.04	13.3	B	1.2	5.1	40.0
	NBT	0.94	37.1	D	172.6	282.5	380.6
	NBR	0.42	19.4	B	5.4	34.7	150.0
	SBL	0.68	33.1	C	10.0	43.5	100.0
	SBT	0.38	15.2	B	39.7	79.5	255.0
Landsbridge Street & Queensgate Boulevard	**Overall**	**0.37**	**15.8**	**B**	--	--	--
	EBL	0.21	14.8	B	8.2	17.6	40.0
	EBT	0.49	17.0	B	33.8	48.4	184.6
	WBL	0.10	14.0	B	2.0	6.7	100.0
	WBT	0.15	13.7	B	8.4	15.1	440.7
	NBL	0.25	16.3	B	10.8	22.1	35.0
	NBT	0.09	14.4	B	5.1	12.8	367.6
	SBL	0.14	14.9	B	6.1	13.9	35.0
	SBT	0.15	14.9	B	6.3	16.8	159.1
Albion Vaughan Road & Queensgate Boulevard	**Overall**	**0.86**	**32.3**	**C**	--	--	--
	EBL	0.85	47.1	D	64.2	106.0	209.8
	EBR	0.07	26.7	C	0.0	12.0	209.8
	NBL	0.40	9.9	A	15.1	24.6	55.0
	NBT	0.96	43.8	D	157.2	241.2	299.2
	SBT	0.53	18.4	B	56.7	85.3	399.8
	SBR	0.18	13.6	B	4.4	16.4	30.0
Pembrook Street & Queensgate Boulevard	NBLTR	0.04	9.1	A	--	0.9	71.7
	SBLTR	0.09	15.0	C	--	2.2	211.6
Landsbridge Street / Sant Farm Drive & Queensgate Boulevard	EBL	0.05	8.2	A	--	1.3	90.0
	WBL	0.01	8.1	A	--	0.3	209.8
	NBLTR	0.37	22.8	C	--	12.7	262.8
	SBLTR	0.38	22.7	C	--	13.0	298.3

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. **As such, it is our opinion that the proposed development will have a manageable traffic impact to the surrounding 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

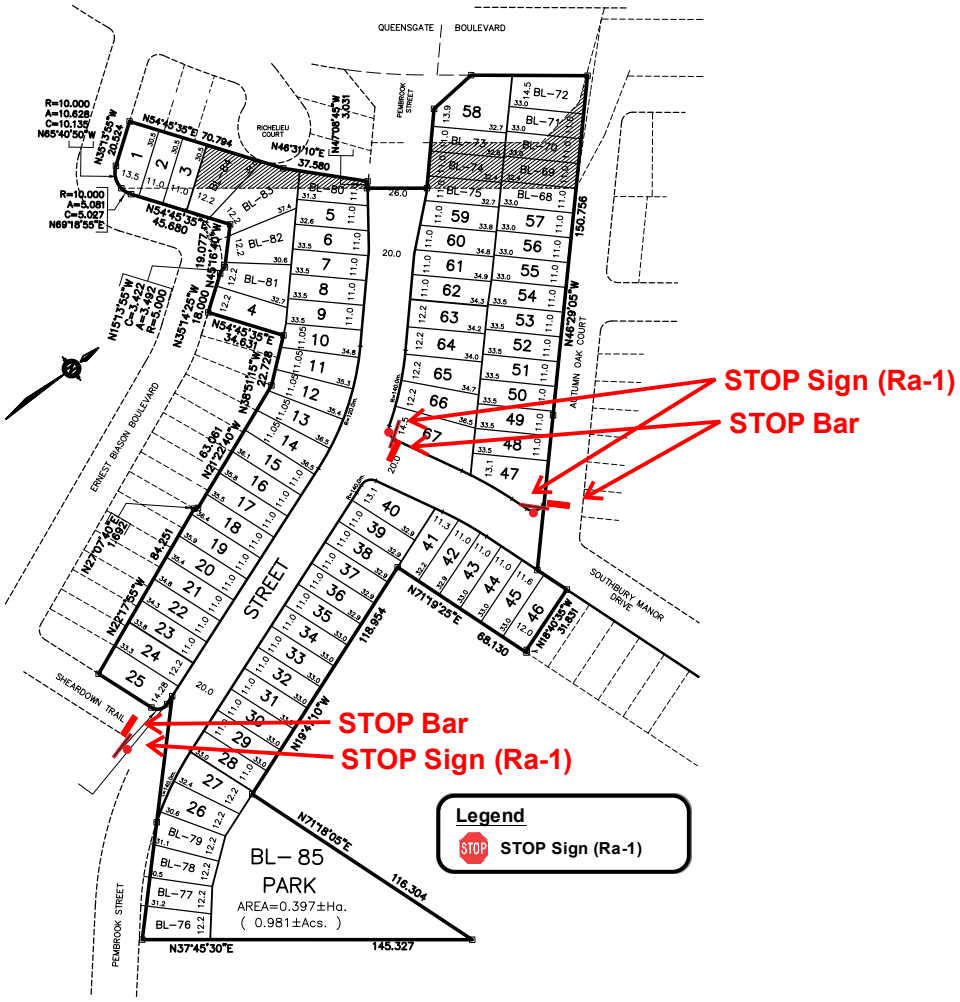
Use	Units	Rate	Parking Requirement	Parking Provided	Difference
Dwelling, Detached	84 units	2 parking spaces per unit	168	336	+168
Total			**168**	**336**	**+168**

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



7.1. Site Circulation

AutoTURN analysis confirmed that a Region waste collection vehicle can maneuver the waste collection access route without conflict. The AutoTURN vehicle turning diagram is shown in **Figure 7-2**.

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.

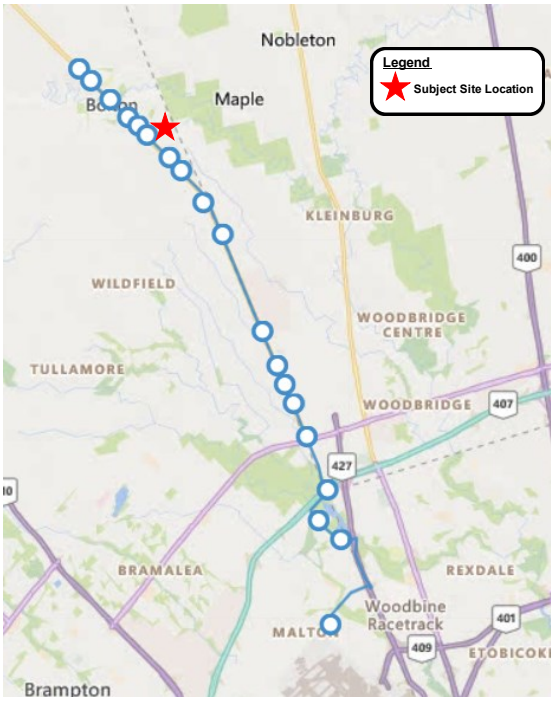
8.1. Transit and Active Transportation Mode Assessment

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



The proposed development will provide concrete sidewalks on both sides of the proposed extension of Pembrook Street, both sides of the extension of Southbury Manor Drive, and on the west side of Autumn Oak Court. **Figure 8.2** illustrates the proposed active transportation facilites and their connections to existing facilities.

8.2. 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.
- Under existing conditions, the study intersections are currently operating at acceptable levels of service during both peak periods.
- With the Implementation of the optimized signal timing plan, Albion Vaughan Road and Queensgate Boulevard intersection will experience improved traffic operations. The v/c of the southbound through-right movement has been reduced to 0.90 in the Am peak hour and the v/c of the northbound through movement has been reduced to 0.95 in the PM peak hour.
- 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. **As such, it is our opinion that the proposed development will have a manageable traffic impact to the surrounding road network.**
- 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.

Figure 2-3: Existing Traffic Volumes

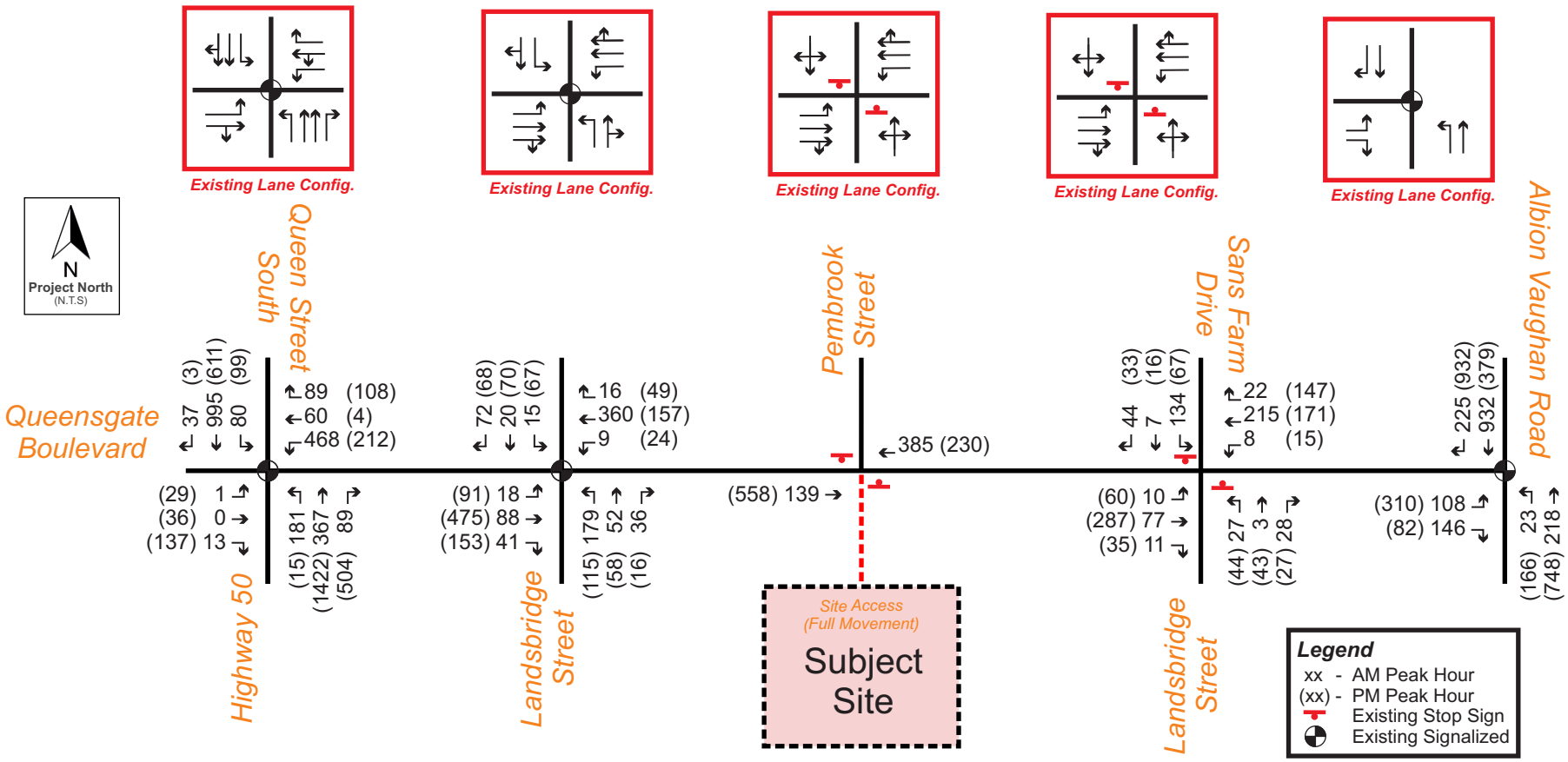


Figure 3-1: Future (2025) Background Traffic Volumes

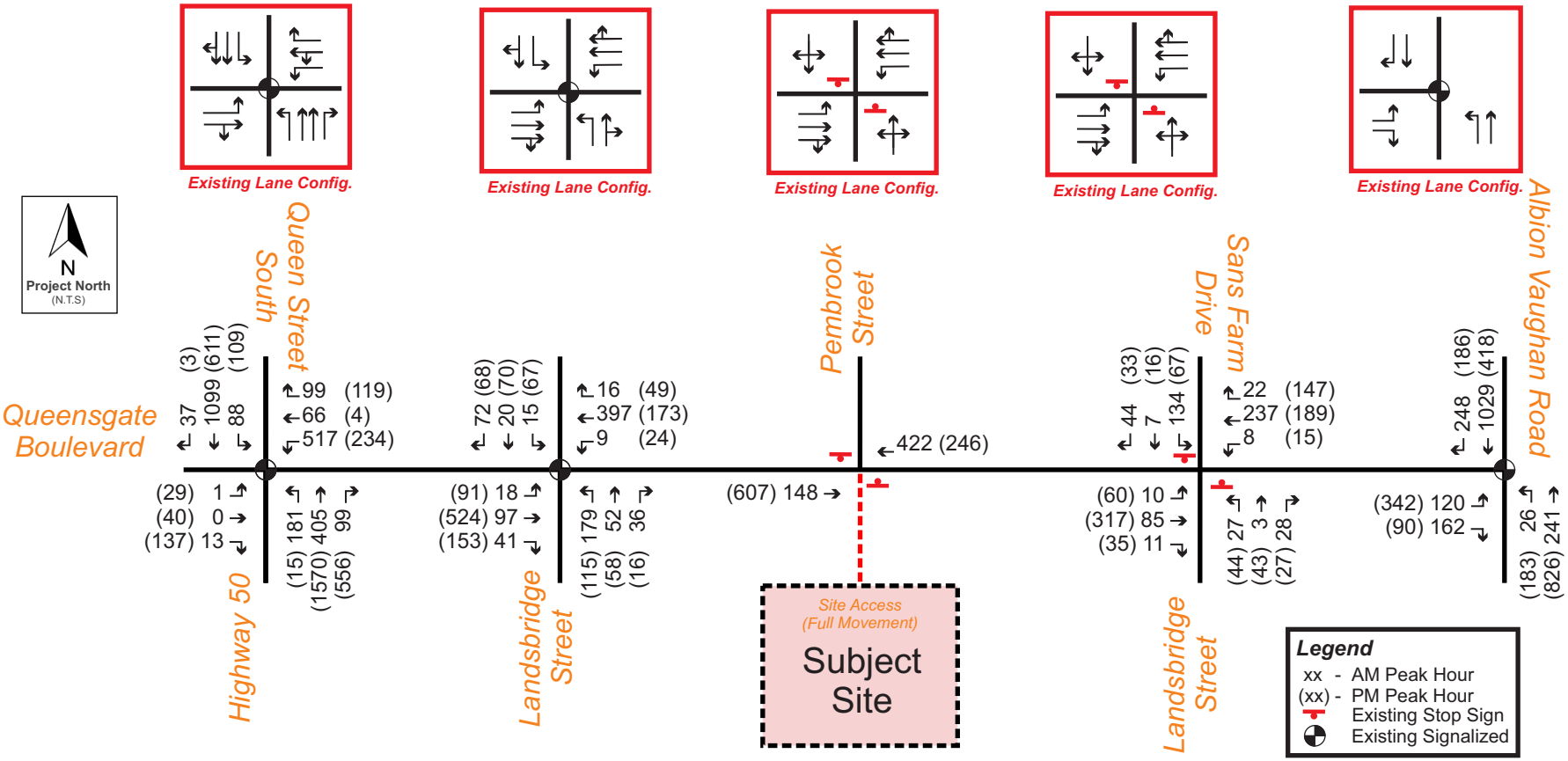


Figure 4-1: Site Generated Traffic Volumes

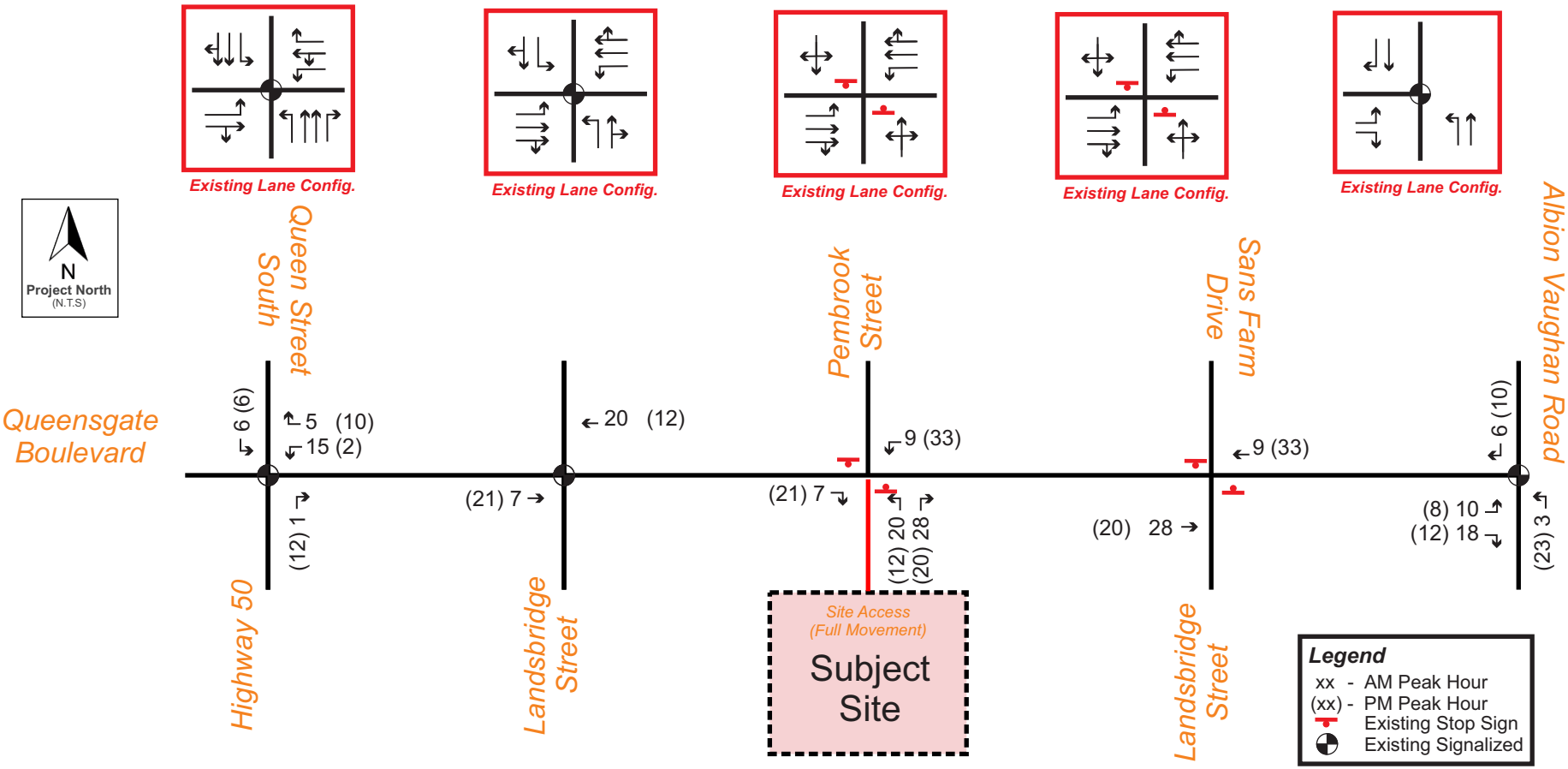
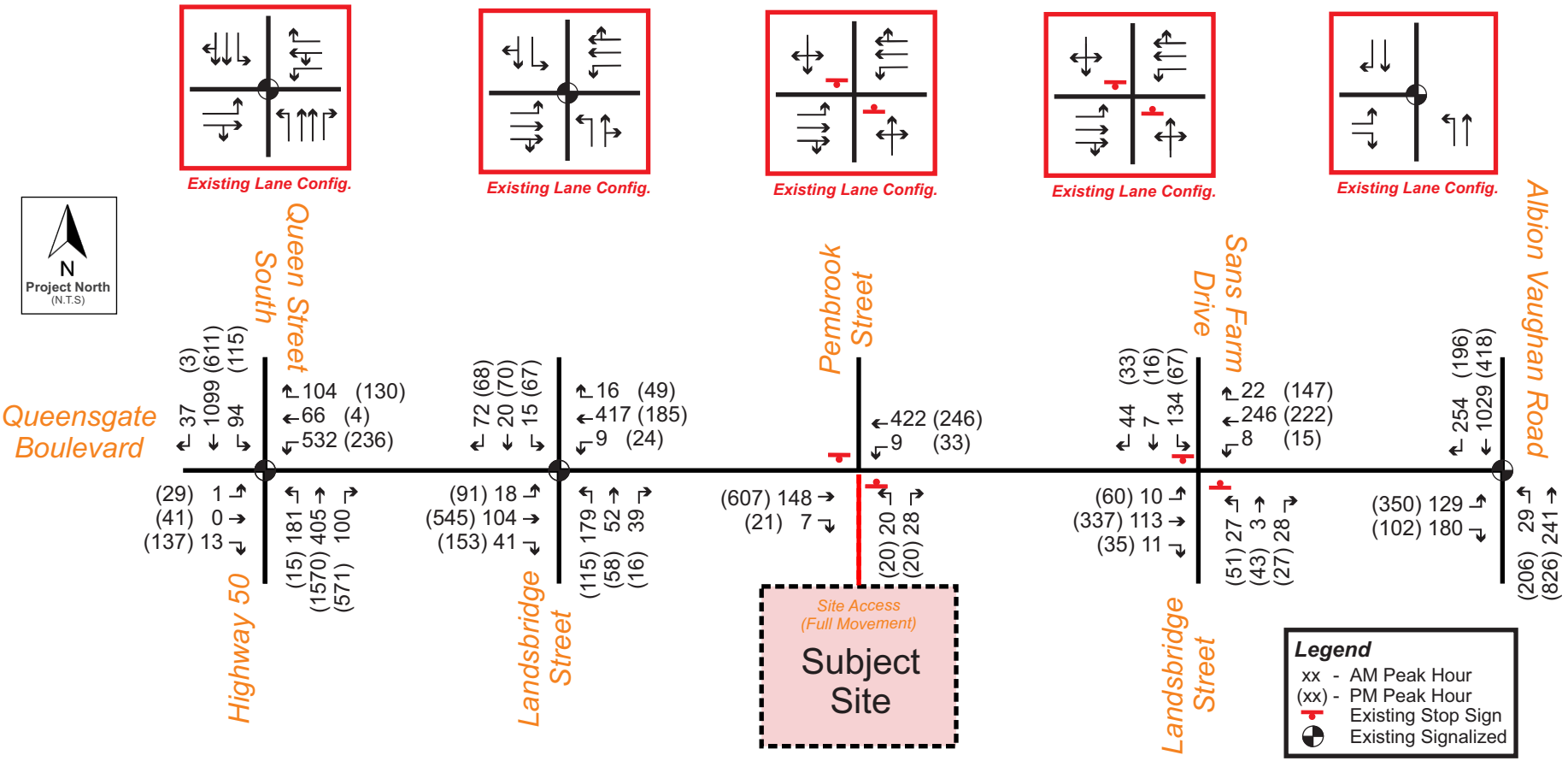
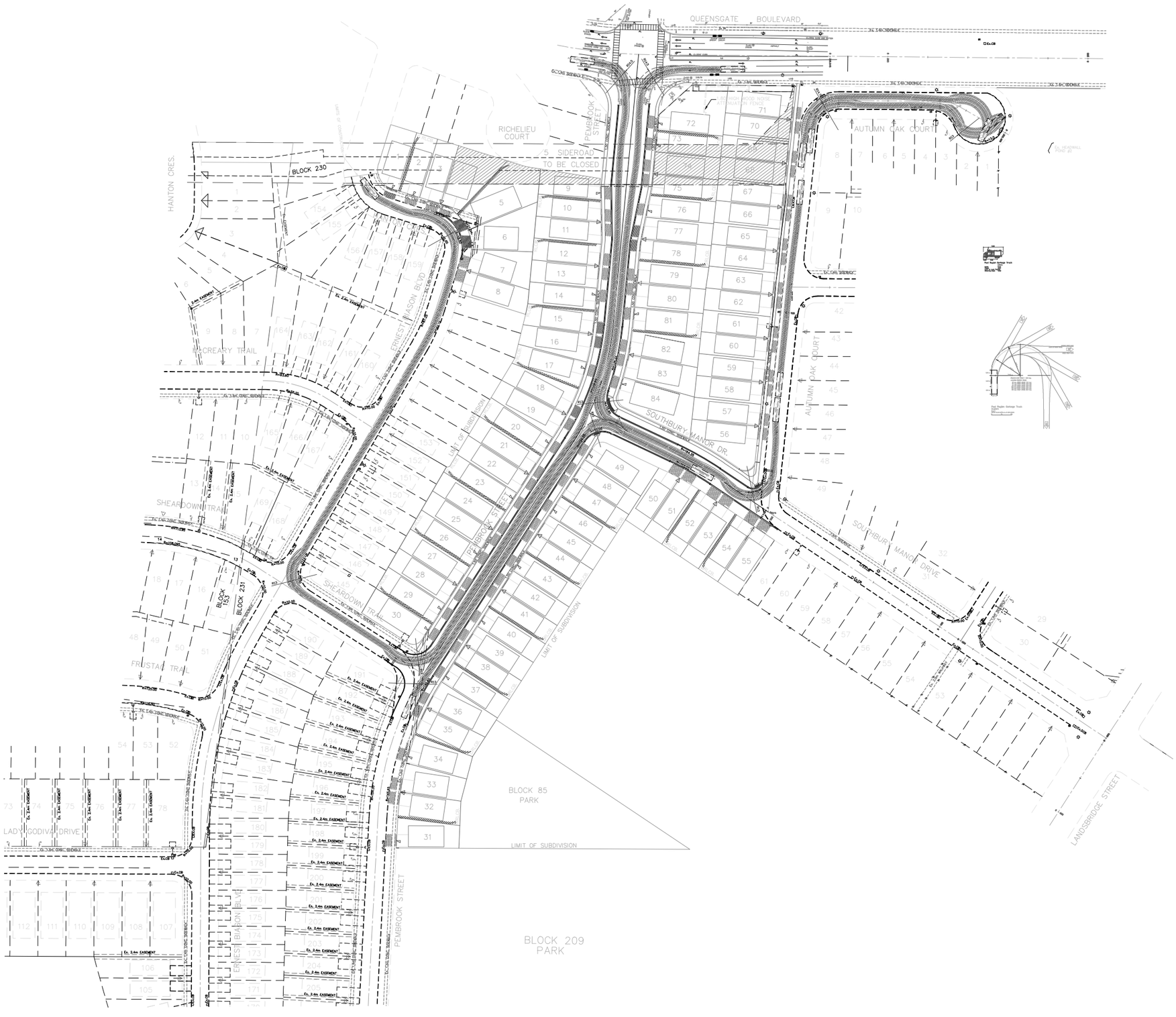


Figure 5-1: Future (2025) Traffic Volumes





KEY PLAN

BENCHMARK

REVISONS

NO	REVISION	DATE	BY

STAMP

nextrans
CONSULTING ENGINEERS
Suite 201, 520 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:
RESIDENTIAL DEVELOPMENT
9299 5th SIDEROAD
(TOWN OF CALEDION)

DRAWING TITLE:
AutoTURN Analysis
(Peel Region
Waste Collection)

DESIGN BY: K.A.	DATE: March 2022
CHECKED BY: R.P.	PROJECT NO. NT-20-179
DRAWN BY: K.A.	
SCALE: NTS	DRAWING NO. Figure 7-2

Figure 8-2: Proposed Active Transportation Facilites

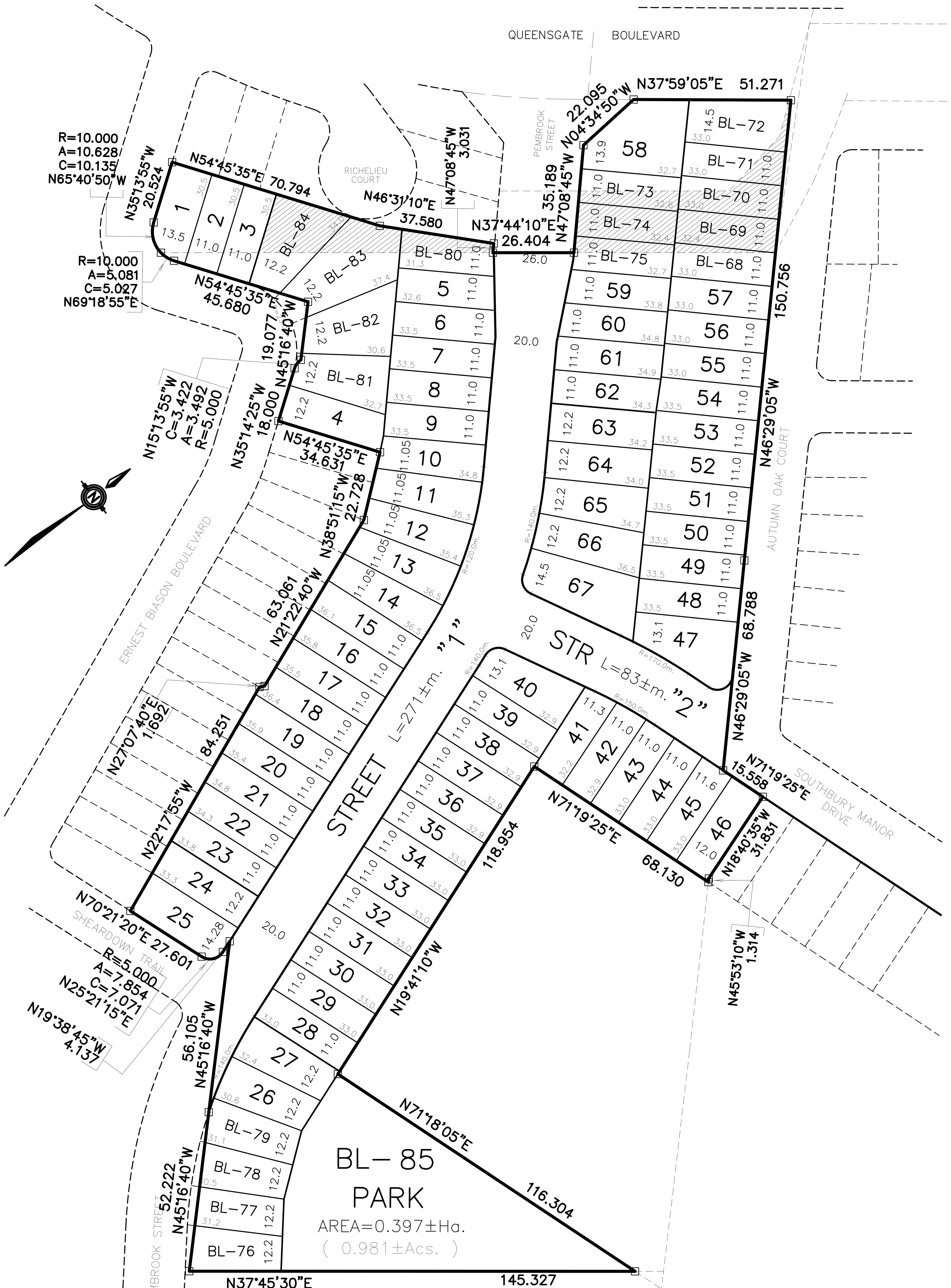
Appendix A – Proposed Site Plan

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 (TRAVELLED 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

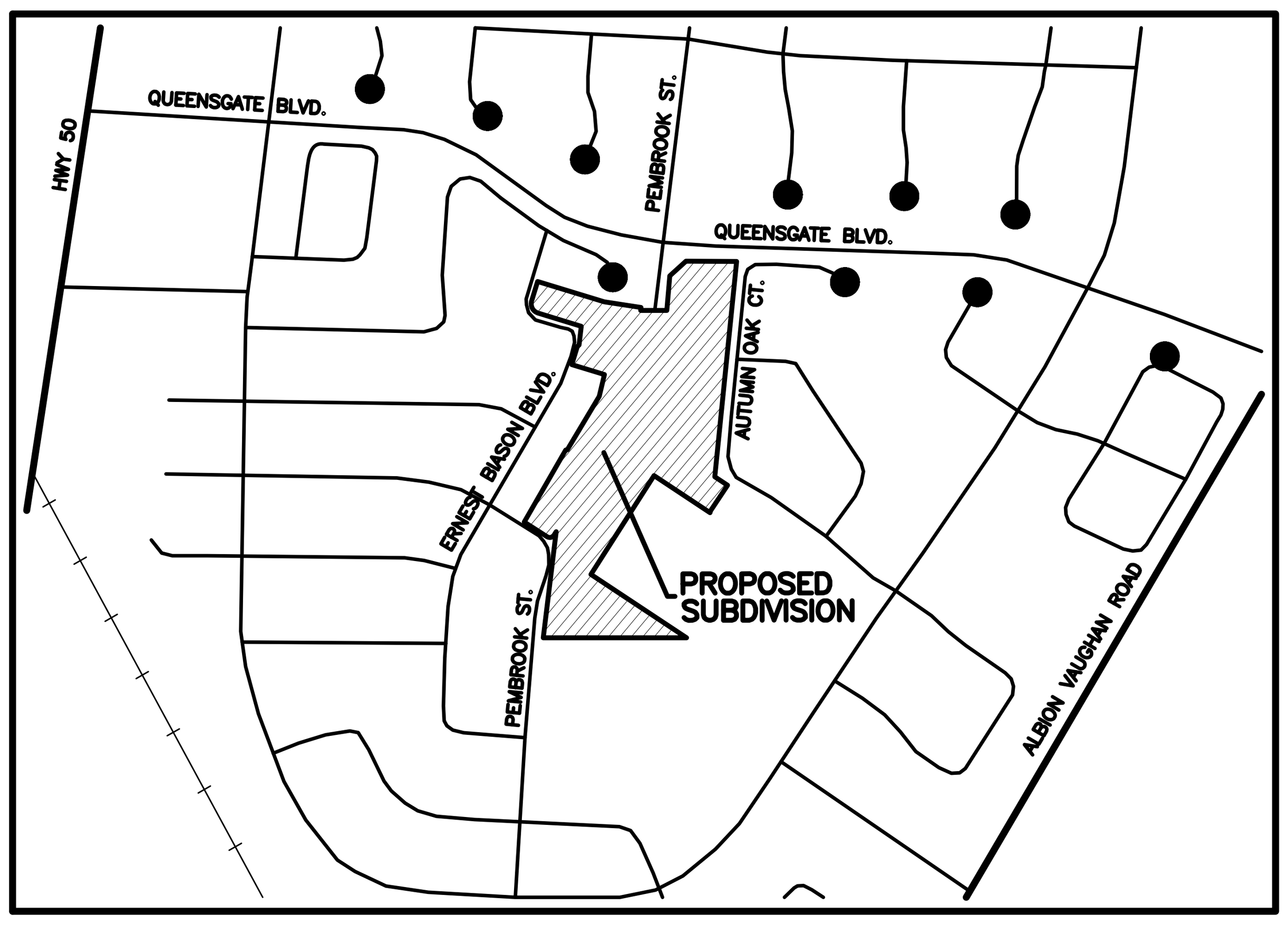
SCALE 1:1000



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 MIN. LOT FRONTAGE=12.2m. MIN LOT AREA=398.9sq.m.		10	10	0.454	1.121
plus BLOCKS 76–79 and 81–84	8		4	0.375	0.927
LOTS 1–3, 5–23 and 28–62 MIN. LOT FRONTAGE=11.0m. MIN LOT AREA=335.5sq.m.		57	57	2.197	5.429
plus BLOCKS 68–75 and 80	9		4.5	0.339	0.838
SUBTOTAL	17	67	75.5	3.365	8.315
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= 329±m. AREA= 0.660±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)

DWG. No. - 20:2

KLM 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

PAVEMENT MARKING SYMBOLS

(M.T.O.D. – 101.070)

PAVEMENT MARKINGS TO BE ACCORDANCE WITH MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES

(NOTE: ALL MARKINGS MUST CONFORM TO O.P.S.S. 532, VOLUME 1)

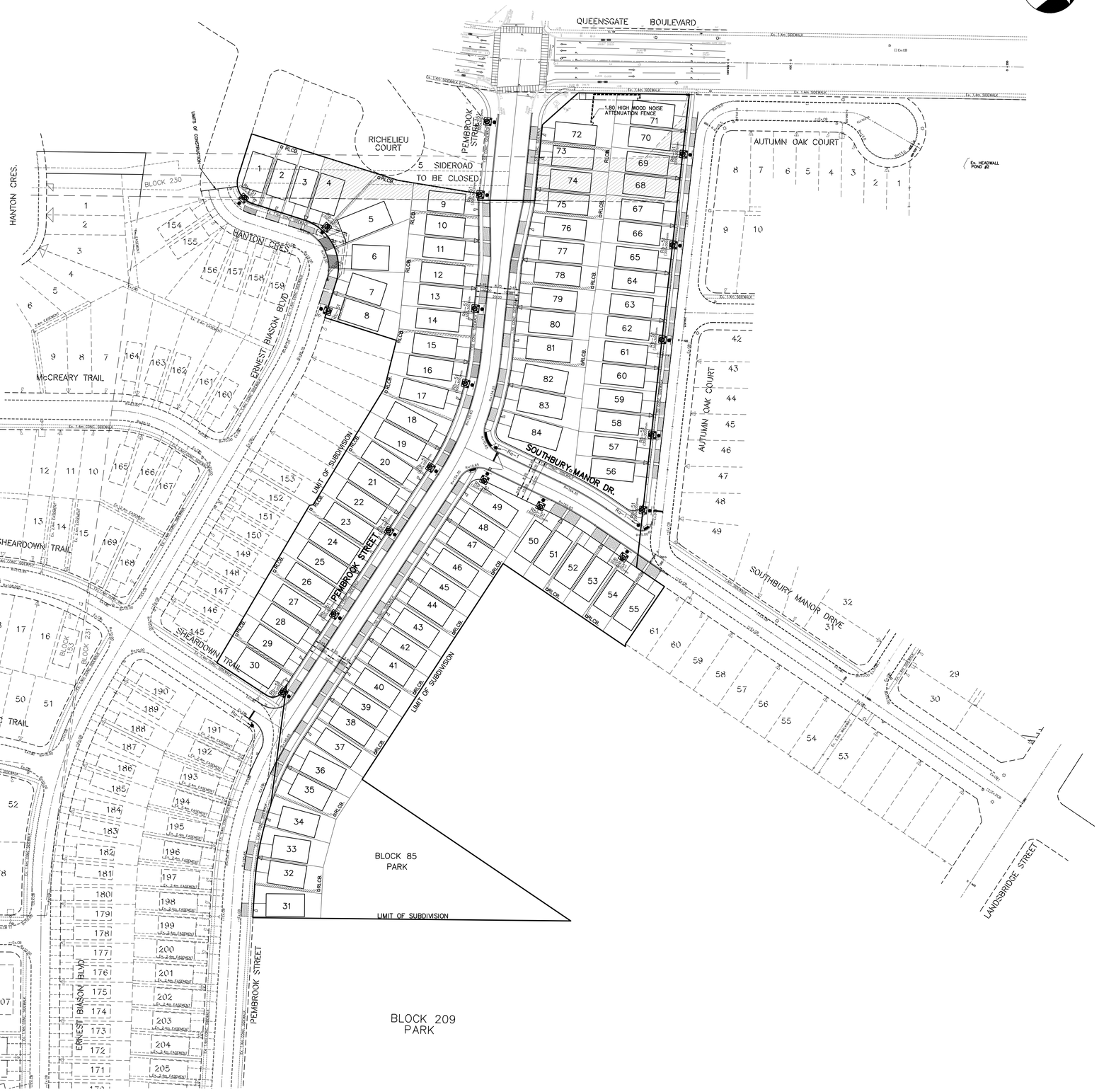
1	SOLID YELLOW, 10 cm.
2	SOLID DOUBLE YELLOW, 10cm.
3	363 BROKEN YELLOW, 10cm.
4	SOLID YELLOW, 20cm.
5	SOLID WHITE, 10cm.
6	333 BROKEN WHITE, 10cm.
7	363 BROKEN WHITE, 10cm.
8	393 BROKEN WHITE, 10cm.
9	SOLID WHITE, 20cm.
10	111 BROKEN WHITE, 10cm.
11	333 BROKEN WHITE, 20cm.
12	333 BROKEN WHITE, 30cm.
13	SOLID WHITE, 30cm.
14	SOLID WHITE, 45cm.
15	SOLID WHITE, 60cm.
16	3–3–3 BROKEN YELLOW, 10cm.
20	SYMBOLS
21	SOLID YELLOW, 60cm.
⊐⊏	LIMITS OF MARKINGS

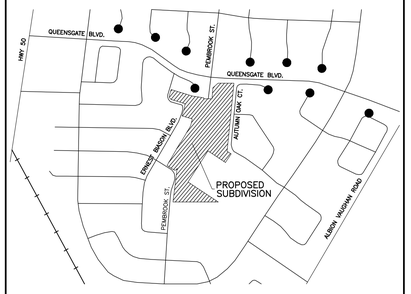
NOTES:

1. 333, 363, 393. DENOTES PAVEMENT MARKING SPACING (ie. 3 m LINE, 3 m GAP, 3 m LINE)
2. USE ◯ TO DENOTE PAVEMENT MARKING (PAINT)
3. USE □ TO DENOTE PAVEMENT MARKING, TEMPORARY (PAINT)
4. USE △ TO DENOTE PAVEMENT MARKING, TEMPORARY – REMOVEABLE
5. USE ⬡ TO DENOTE PAVEMENT MARKING DURABLE THERMOPLASTIC
6. ALL MARKINGS MUST CONFORM TO O.T.M. BOOK 11

LEGEND

- SANITARY MANHOLE
- STORM MANHOLE
- CATCHBASIN MANHOLE
- SINGLE CATCHBASIN
- DOUBLE CATCHBASIN
- VALVE AND BOX
- HYDRANT AND VALVE
- EXISTING DOUBLE SERVICE CONNECTION
- EXISTING SINGLE SERVICE CONNECTION
- PROPOSED DOUBLE SERVICE CONNECTION
- PROPOSED SINGLE SERVICE CONNECTION
- STOP SIGN
- STOP SIGN c/w "NO EXIT" SIGN
- STREET NAME SIGN
- STOP BARS
- HYDRO TRANSFORMER
- TRANSFORMER DOOR OPENING LOCATION
- PROPOSED STREETLIGHT SERVICE PEDESTAL
- CONC. LIGHT POLE
- CMB DENOTES COMMUNITY MAILBOX PAD LOCATION (WITH SIDEWALK) CPC SPEC E201–ENG–08
- CMB DENOTES COMMUNITY MAILBOX PAD LOCATION (WITH NO SIDEWALK) CPC SPEC E201–ENG–06
- Rb–51 (300x300)mm PARKING PROHIBITION SIGN (Rb–51)
- STOP STOP SIGN Ra–1 (60x60cm)





KEY PLAN N.T.S.

No.	By	Date	Revision	Cons. Checked	Town Approved

TOWN OF CALEDON
APPROVED AS NOTED

THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY

THIS APPROVAL IS SUBJECT TO FURTHER CERTIFICATION OF THE "AS RECORDED" WORKS BY A PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO

DATE: _____ APPROVED BY: _____

PRINT NAME: _____

BENCH MARK:
ELEVATIONS ARE GEODETIC AND ARE REFERRED TO MTO BENCHMARK No. 00819758056, HAVING AN ELEVATION OF 251.263 METRES.

Originally Approved By The Region of Peel

CARANTANIA INVESTMENTS (BT) INC.

RAND ENGINEERING
5285 Solar Drive
Mississauga, ON
Canada, L4W 5B8
Tel: 905.625.9500

Region of Peel
Public Works

TOWN OF CALEDON

TRAFFIC CONTROL PLAN

Scale	1:1000		Project No. 20036
Designed By	T.A.	Drawn By ACAD	Drawing No. TCP–1
Checked By	T.A.	Date FEBUARY 2021	

R:\20\20036\036-TCP-01.dwg Mar 14, 2022 - 3:08pm

Appendix B – Terms for Reference

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

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

nexTrans CONSULTING ENGINEERS

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

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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 Pembrook 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 typica 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

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

Turning Movement Count (1 . ALBION VAUGHAN RD & QUEENSGATE BLVD) CustID: 99900001 MioID: 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%		-	**-**	-

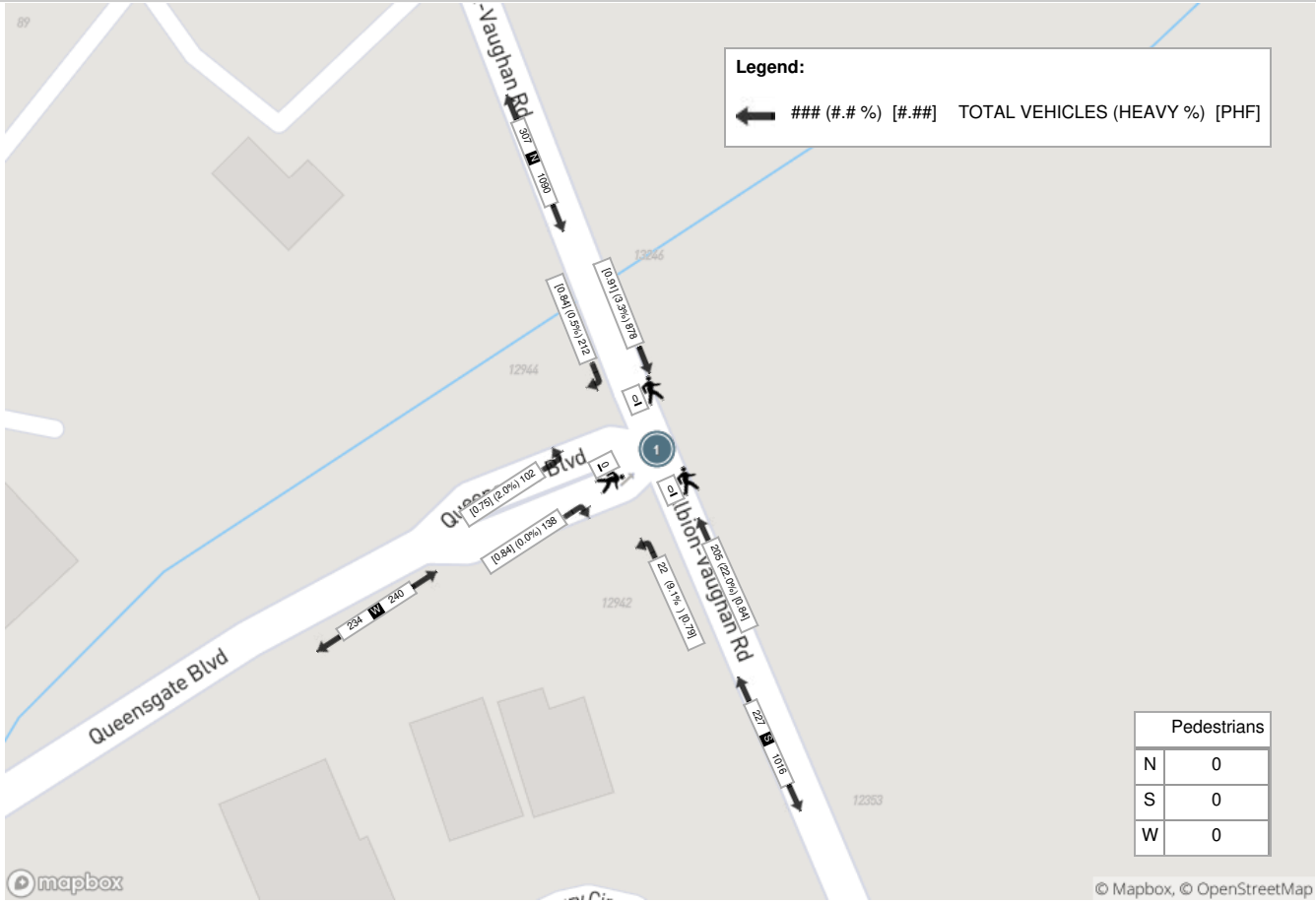
Peak Hour: 07:30 AM - 08:30 AM Weather: Clear (12.7 °C)

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	-	0	1	0	0	-	**-**
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

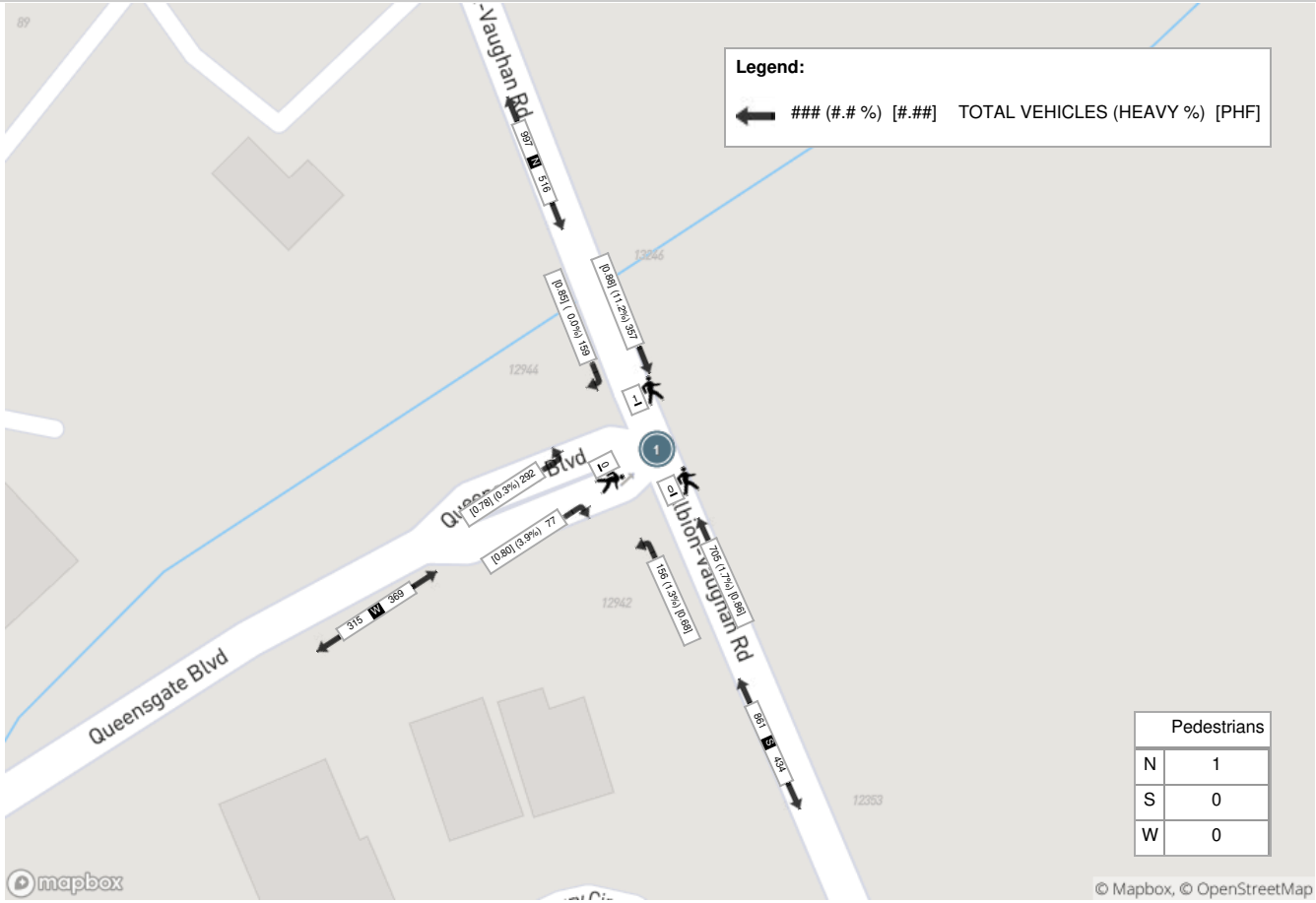
Peak Hour: 05:00 PM - 06:00 PM Weather: Partly Cloudy (22.3 °C)

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%	**-**
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	100%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Road	0	0	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)



Spectrum

Turning Movement Count
Location Name: HWY 50 & QUEENSGATE BLVD
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

Turning Movement Count (48 . HWY 50 & QUEENSGATE BLVD) CustID: 05014978 MioID: 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	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0.8%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: HWY 50 & QUEENSGATE BLVD
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

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	**-**
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		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	**-**
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	**-**
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	**-**
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%		**-**

Spectrum

Turning Movement Count
Location Name: HWY 50 & QUEENSGATE BLVD
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

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	**-**
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%	**-**
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	**-**
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%	**-**
Buses	0	1	0	0		1	0	0	0	0		0	0	3	1	0		4	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%	**-**
Articulated Trucks	0	3	0	0		3	0	0	0	0		0	0	9	1	0		10	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%	**-**
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%		**-**

Spectrum

Turning Movement Count
Location Name: HWY 50 & QUEENSGATE BLVD
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

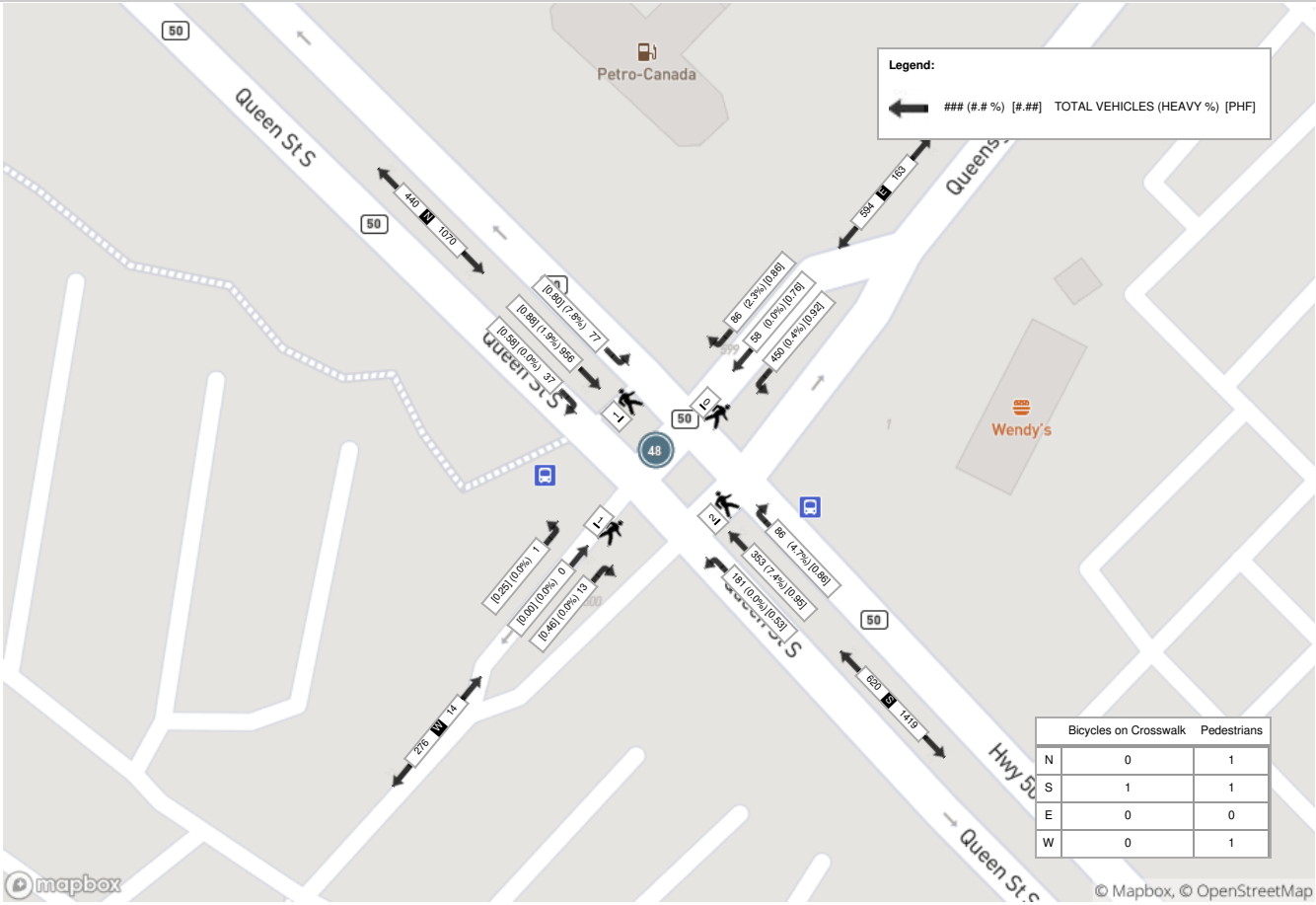
Peak Hour: 04:00 PM - 05:00 PM Weather: Clear (1.4 °C)

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	**-**
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%	**-**
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	**-**
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%	**-**
Buses	0	5	0	0		5	0	0	0	0		0	0	1	3	0		4	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%	**-**
Articulated Trucks	0	2	0	0		2	0	0	0	0		0	0	4	0	0		4	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%	**-**
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	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: HWY 50 & QUEENSGATE BLVD
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

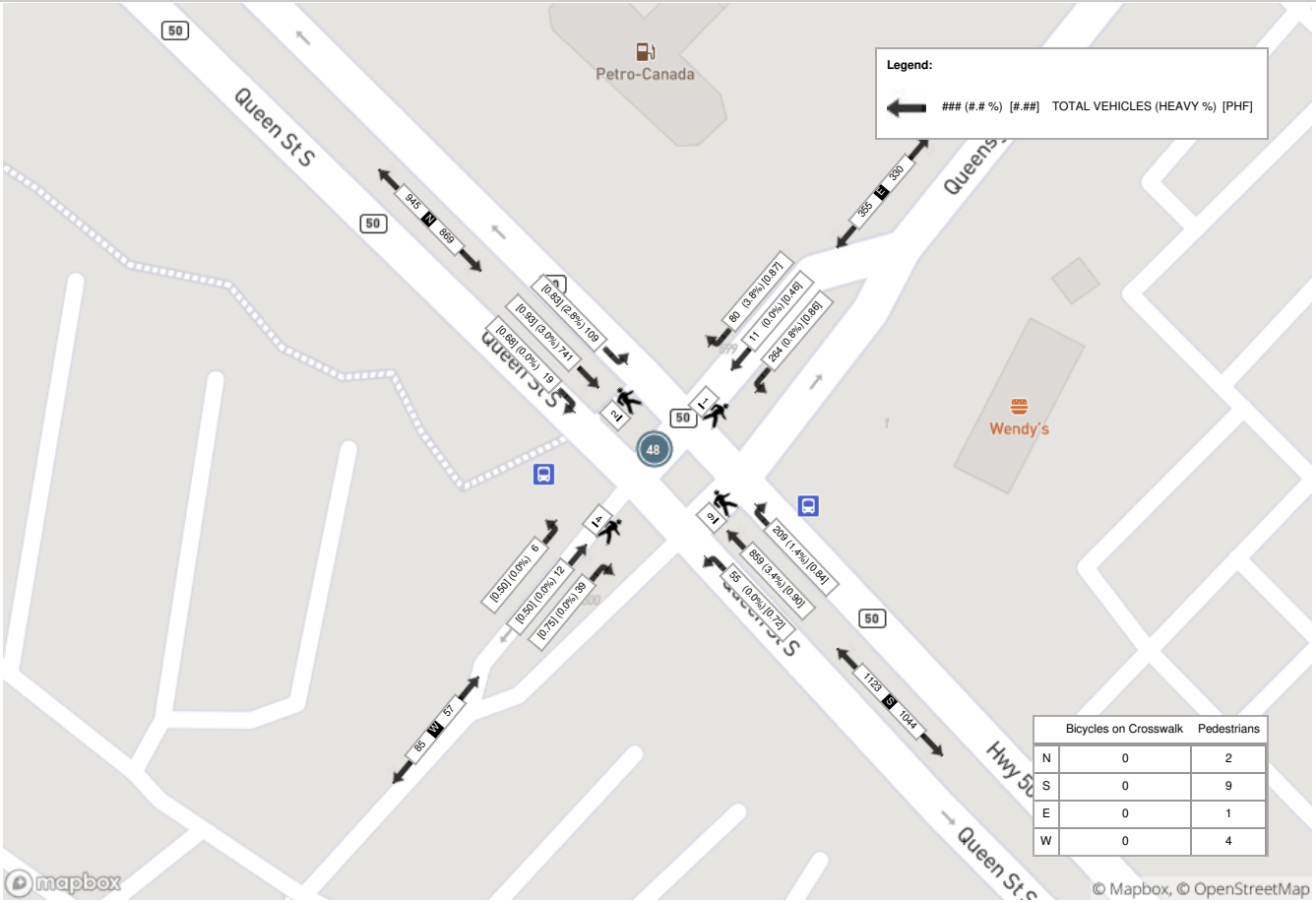
Peak Hour: 07:45 AM - 08:45 AM Weather: Clear (-6.4 °C)



Spectrum

Turning Movement Count
Location Name: HWY 50 & QUEENSGATE BLVD
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

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

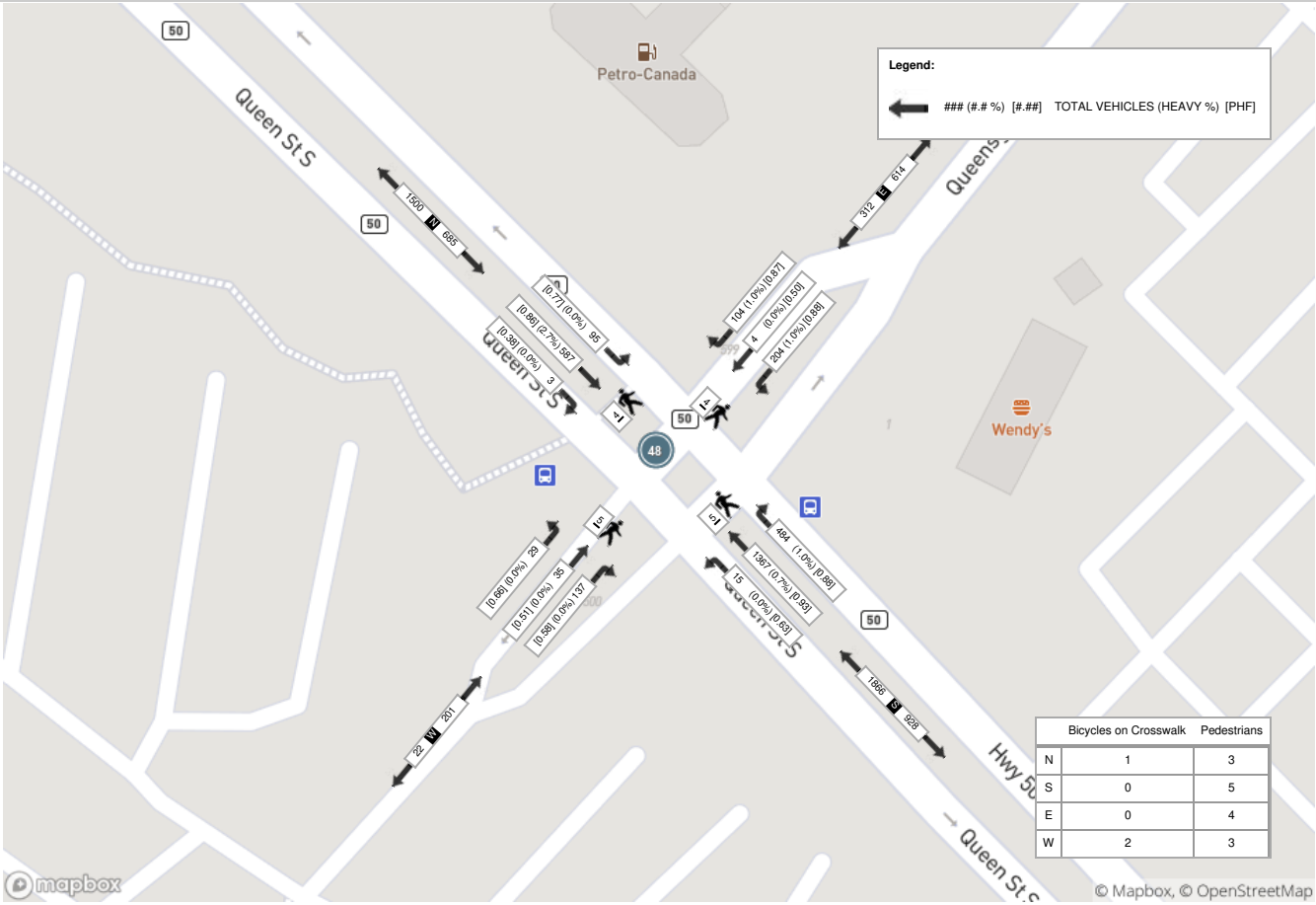


	Bicycles on Crosswalk	Pedestrians
N	0	2
S	0	9
E	0	1
W	0	4

Spectrum

Turning Movement Count
Location Name: HWY 50 & QUEENSGATE BLVD
Date: Tue, Mar 20, 2018 Deployment Lead: Patrick Filopoulos

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



	Bicycles on Crosswalk	Pedestrians
N	1	3
S	0	5
E	0	4
W	2	3

Spectrum

Turning Movement Count
Location Name: LANDSBRIDGE STREET & QUEENSGATE BOULEVARD (SIGNALIZED)
Date: Wed, Mar 09, 2016 Deployment Lead: Chris Koukaras

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

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

Start Time	N Approach LANDSBRIDGE STREET						E Approach QUEENSGATE BOULEVARD						S Approach LANDSBRIDGE 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%		-	-	-

Spectrum

Turning Movement Count
Location Name: LANDSBRIDGE STREET & QUEENSGATE BOULEVARD (SIGNALIZED)
Date: Wed, Mar 09, 2016 Deployment Lead: Chris Koukaras

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

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	**-**
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%	**-**
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	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: LANDSBRIDGE STREET & QUEENSGATE BOULEVARD (SIGNALIZED)
Date: Wed, Mar 09, 2016 Deployment Lead: Chris Koukaras

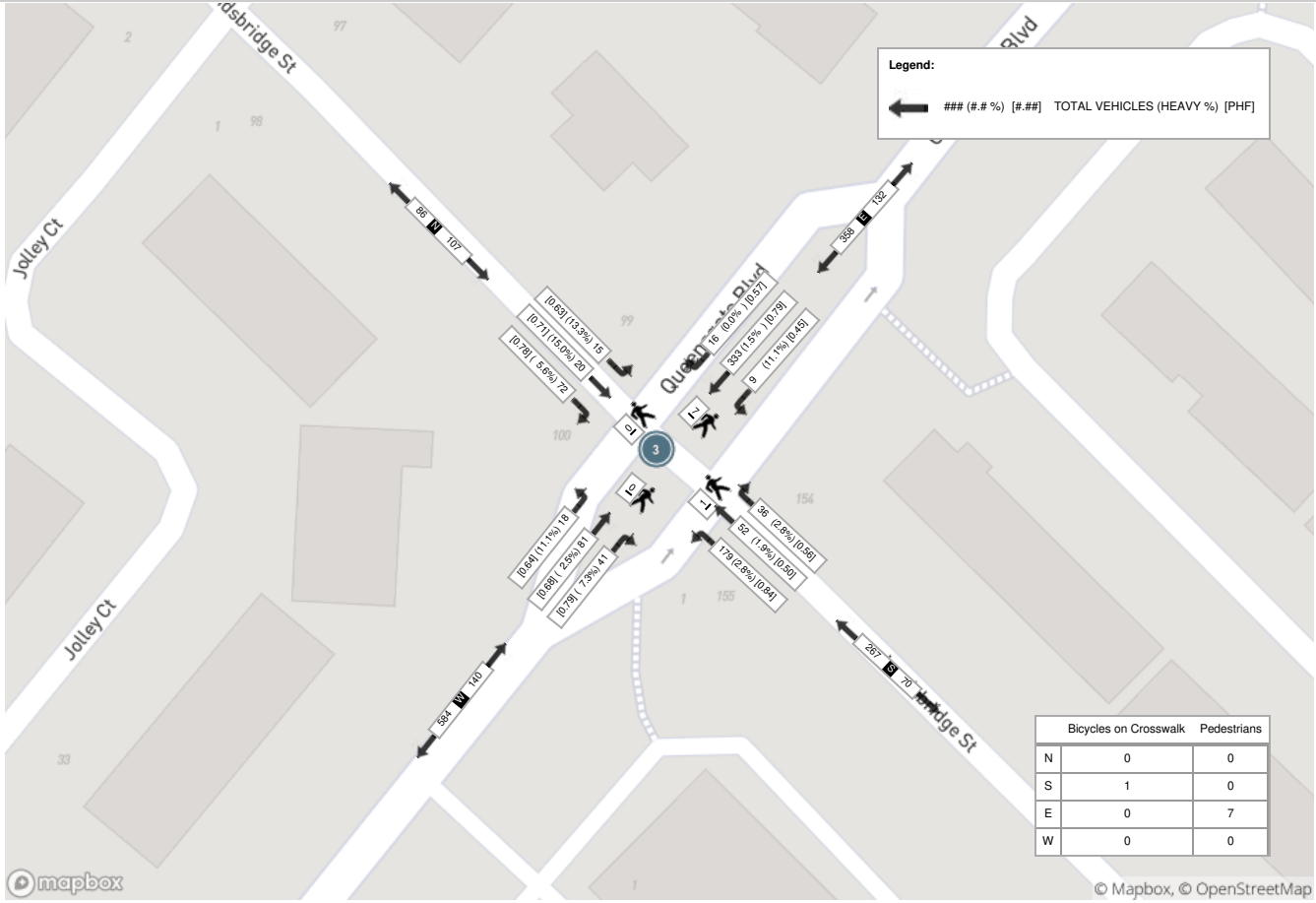
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

Peak Hour: 04:30 PM - 05:30 PM 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	
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	1	0	0		1	0	0	0	0		0	0	1	0	0		1	**-**
Heavy %	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.2%	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	1	0	0		1	0	0	0	0		0	0	1	0	0		1	**-**
Single-Unit Trucks %	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	**-**
Buses %	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%		**-**

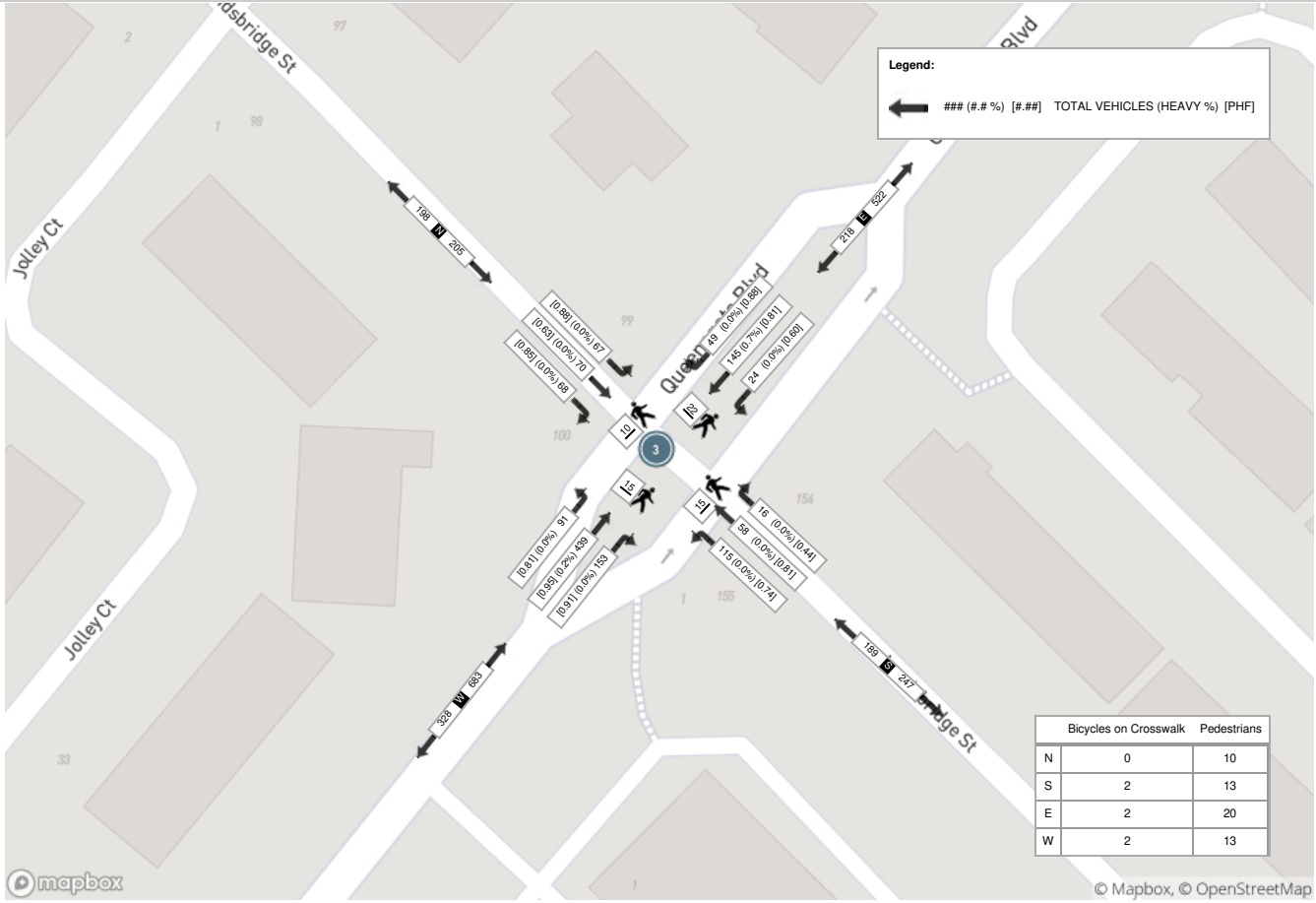
NexTrans
SUITE 204 15260 YONGE ST
AURORA ONTARIO, L4G 1N4
CANADA

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



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

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



	Bicycles on Crosswalk	Pedestrians
N	0	10
S	2	13
E	2	20
W	2	13

Spectrum

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

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

Start Time	N Approach SANT FARM DR						E Approach QUEENSGATE BLVD						S Approach LANDSBRIDGE 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%		-	-	-

Spectrum

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 LANDSBRIDGE 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	1	0		1	**-**
Buses %	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	1	0	0		1	0	0	0	0		0	1	0	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	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	0	0	0	0	-	**-**
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

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: 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 LANDSBRIDGE 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	2	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	-	0	3	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)**

	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	1
E	0	2
W	0	7

Spectrum

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

	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	0	0
W	0	2

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
Yes

Semi-Actuated Mode
Yes

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

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
Yes

Semi-Actuated Mode
Yes

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

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**

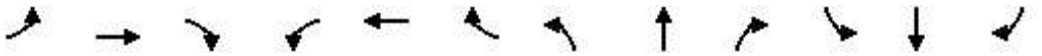
Phase #	**Street Name - Direction**	**Vehicle Minimum (s)**	**Pedestrian Minimum (s)**		**Amber (s)**	**All Red (s)**	**TIME PERIOD (s) (Green+Amber+All Red)**
			WALK	**FDWALK**			**AM/OFF/PM**
1	Not in use	-	-	-	-	-	-
2	Queensgate Blvd. - EB/WB	8	8	16	4	2	37.0 (max)
3	Not in use	-	-	-	-	-	-
4	Landsbridge 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
Yes

Semi-Actuated Mode
Yes

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

Appendix D – Existing Traffic Level of Service Calculations



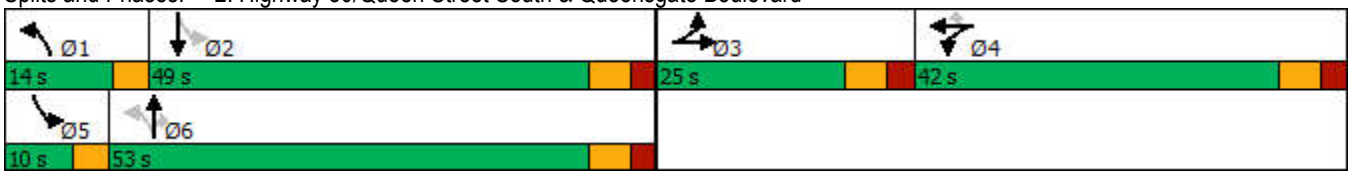
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	65.0		0.0	40.0		150.0	100.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	0.99		1.00	1.00	0.99					1.00	
Frt		0.850				0.850			0.850		0.995	
Flt Protected	0.950			0.950	0.963		0.950			0.950		
Satd. Flow (prot)	1825	1609	0	1734	1758	1601	1825	3411	1555	1690	3560	0
Flt Permitted	0.950			0.950	0.963		0.115			0.517		
Satd. Flow (perm)	1823	1609	0	1729	1754	1580	221	3411	1555	920	3560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		144				144			117		3	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		90.0			184.6			380.6			254.2	
Travel Time (s)		6.8			13.8			28.5			19.1	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	1	0	468	60	89	181	367	89	80	995
Future Volume (vph)	1	0	468	60	89	181	367	89	80	995
Turn Type	Split	NA	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	3	4	4		1	6		5	2
Permitted Phases					4	6		6	2	
Detector Phase	3	3	4	4	4	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	34.7	34.7	34.7	34.7	34.7	8.5	36.5	36.5	8.5	36.5
Total Split (s)	25.0	25.0	42.0	42.0	42.0	14.0	53.0	53.0	10.0	49.0
Total Split (%)	19.2%	19.2%	32.3%	32.3%	32.3%	10.8%	40.8%	40.8%	7.7%	37.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.5	4.0	4.0	3.5	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	0.0	2.5	2.5	0.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	6.7	6.7	6.7	3.5	6.5	6.5	3.5	6.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	8.2	8.2	22.9	22.9	22.9	60.8	49.9	49.9	53.0	43.4
Actuated g/C Ratio	0.08	0.08	0.23	0.23	0.23	0.61	0.50	0.50	0.53	0.44
v/c Ratio	0.01	0.05	0.71	0.71	0.20	0.64	0.23	0.12	0.16	0.72
Control Delay	50.0	0.4	45.9	45.7	2.4	25.0	17.9	3.1	12.7	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	0.4	45.9	45.7	2.4	25.0	17.9	3.1	12.7	28.8
LOS	D	A	D	D	A	C	B	A	B	C
Approach Delay		3.7		39.5			17.8			27.6
Approach LOS		A		D			B			C

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 99.1	
Natural Cycle: 125	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 28.0	Intersection LOS: C
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

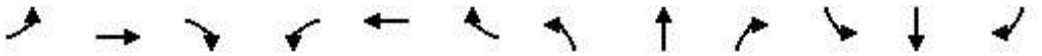
Splits and Phases: 2: Highway 50/Queen Street South & Queensgate Boulevard



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	14	285	289	97	197	399	97	87	1122
v/c Ratio	0.01	0.05	0.71	0.71	0.20	0.64	0.23	0.12	0.16	0.72
Control Delay	50.0	0.4	45.9	45.7	2.4	25.0	17.9	3.1	12.7	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	0.4	45.9	45.7	2.4	25.0	17.9	3.1	12.7	28.8
Queue Length 50th (m)	0.2	0.0	48.3	48.9	0.0	12.1	19.5	0.0	5.0	77.9
Queue Length 95th (m)	2.0	0.0	88.6	89.6	3.9	#59.0	45.8	7.3	19.4	#161.4
Internal Link Dist (m)		66.0		160.6			356.6			230.2
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	344	420	630	639	666	309	1717	840	544	1561
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	0.00	0.03	0.45	0.45	0.15	0.64	0.23	0.12	0.16	0.72

Intersection Summary

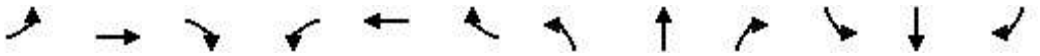
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	13	468	60	89	181	367	89	80	995	37
Future Volume (vph)	1	0	13	468	60	89	181	367	89	80	995	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7	6.7	3.5	6.5	6.5	3.5	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	0.99	
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)	1825	1610		1734	1757	1580	1825	3411	1555	1690	3559	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.11	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	1825	1610		1734	1757	1580	221	3411	1555	919	3559	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	14	509	65	97	197	399	97	87	1082	40
RTOR Reduction (vph)	0	14	0	0	0	76	0	0	50	0	2	0
Lane Group Flow (vph)	1	0	0	285	289	21	197	399	47	87	1120	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	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases						4	6		6	2		
Actuated Green, G (s)	2.7	2.7		22.9	22.9	22.9	58.5	49.9	49.9	49.4	44.3	
Effective Green, g (s)	2.7	2.7		22.9	22.9	22.9	58.5	49.9	49.9	49.4	44.3	
Actuated g/C Ratio	0.03	0.03		0.22	0.22	0.22	0.56	0.48	0.48	0.47	0.43	
Clearance Time (s)	6.7	6.7		6.7	6.7	6.7	3.5	6.5	6.5	3.5	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)	47	41		381	386	347	289	1636	746	474	1515	
v/s Ratio Prot	c0.00	0.00		0.16	c0.16		c0.07	0.12		0.01	c0.31	
v/s Ratio Perm						0.01	0.31		0.03	0.08		
v/c Ratio	0.02	0.01		0.75	0.75	0.06	0.68	0.24	0.06	0.18	0.74	
Uniform Delay, d1	49.4	49.3		37.9	37.9	32.1	16.7	15.9	14.5	15.1	25.0	
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	0.2	0.1		7.8	7.7	0.1	6.5	0.4	0.2	0.2	3.3	
Delay (s)	49.5	49.4		45.7	45.6	32.1	23.2	16.3	14.7	15.3	28.3	
Level of Service	D	D		D	D	C	C	B	B	B	C	
Approach Delay (s)		49.4			43.7			18.0			27.4	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	104.0	Sum of lost time (s)	23.4
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



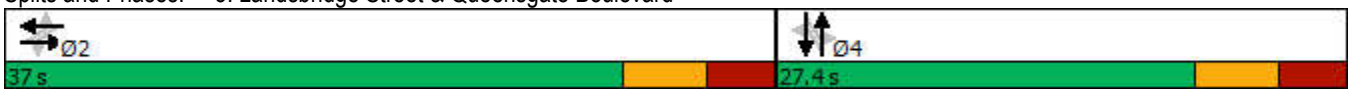
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	100.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		1.00				0.99		1.00		
Frt		0.952			0.994			0.938			0.883	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1644	3310	0	1644	3560	0	1772	1748	0	1615	1571	0
Flt Permitted	0.503			0.659			0.689			0.692		
Satd. Flow (perm)	871	3310	0	1139	3560	0	1285	1748	0	1172	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			9			41			82	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		184.6			440.7			367.6			159.1	
Travel Time (s)		13.8			33.1			27.6			11.9	

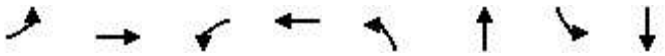
Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	18	88	9	360	179	52	15	20
Future Volume (vph)	18	88	9	360	179	52	15	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phase	2	2	2	2	4	4	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Total Split (s)	37.0	37.0	37.0	37.0	27.4	27.4	27.4	27.4
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39
v/c Ratio	0.06	0.11	0.02	0.29	0.41	0.14	0.04	0.16
Control Delay	13.6	9.4	13.1	14.7	19.3	9.9	14.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	9.4	13.1	14.7	19.3	9.9	14.3	6.0
LOS	B	A	B	B	B	A	B	A
Approach Delay		9.9		14.7		16.2		7.2
Approach LOS		A		B		B		A

Intersection Summary	
Cycle Length: 64.4	
Actuated Cycle Length: 72.4	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 13.5	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Landsbridge Street & Queensgate Boulevard





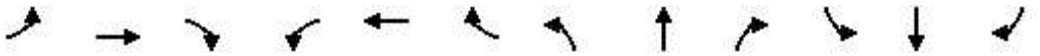
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	147	10	427	203	100	17	105
v/c Ratio	0.06	0.11	0.02	0.29	0.41	0.14	0.04	0.16
Control Delay	13.6	9.4	13.1	14.7	19.3	9.9	14.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	9.4	13.1	14.7	19.3	9.9	14.3	6.0
Queue Length 50th (m)	1.6	4.2	0.8	19.3	19.6	5.0	1.4	1.9
Queue Length 95th (m)	5.3	9.0	3.3	28.2	35.1	13.2	4.9	10.1
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)	356	1381	465	1460	496	701	453	657
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	0.11	0.02	0.29	0.41	0.14	0.04	0.16

Intersection Summary

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)	7.4	7.4		7.4	7.4		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	0.95		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	3310		1642	3559		1772	1748		1607	1571	
Flt Permitted	0.50	1.00		0.66	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	871	3310		1139	3559		1285	1748		1171	1571	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	20	100	47	10	409	18	203	59	41	17	23	82
RTOR Reduction (vph)	0	28	0	0	5	0	0	25	0	0	50	0
Lane Group Flow (vph)	20	119	0	10	422	0	203	75	0	17	55	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		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.39	0.39		0.39	0.39	
Clearance Time (s)	7.4	7.4		7.4	7.4		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)	356	1353		465	1455		496	676		452	607	
v/s Ratio Prot		0.04			c0.12			0.04			0.03	
v/s Ratio Perm	0.02			0.01			c0.16			0.01		
v/c Ratio	0.06	0.09		0.02	0.29		0.41	0.11		0.04	0.09	
Uniform Delay, d1	12.9	13.1		12.8	14.4		16.2	14.2		13.8	14.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.1	0.5		2.5	0.3		0.2	0.3	
Delay (s)	13.2	13.3		12.8	14.9		18.7	14.6		14.0	14.4	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		13.3			14.8			17.3			14.3	
Approach LOS		B			B			B			B	

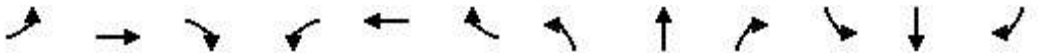
Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.8
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	85.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Flt Permitted												
Satd. Flow (perm)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		440.7			430.4			71.7			211.6	
Travel Time (s)		33.1			32.3			5.4			15.9	

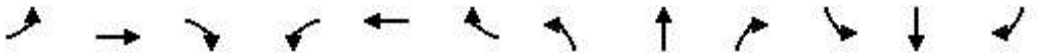
Intersection Summary	
Area Type:	Other



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

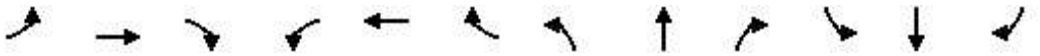
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	101	50	0	279	139	0	0
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.06	0.03	0.00	0.16	0.08	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	70.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.982			0.986			0.935			0.968	
Flt Protected	0.950			0.950				0.977			0.965	
Satd. Flow (prot)	1521	3515	0	1825	3535	0	0	1699	0	0	1782	0
Flt Permitted	0.950			0.950				0.977			0.965	
Satd. Flow (perm)	1521	3515	0	1825	3535	0	0	1699	0	0	1782	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		430.4			209.8			262.8			298.3	
Travel Time (s)		32.3			15.7			19.7			22.4	

Intersection Summary	
Area Type:	Other



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	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	79	11	8	222	23	28	3	29	138	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	245			91			288	366	48	342	360	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	245			91			288	366	48	342	360	130
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)	1197			1515			581	557	1014	564	561	896

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	10	53	37	8	148	97	60	190
Volume Left	10	0	0	8	0	0	28	138
Volume Right	0	0	11	0	0	23	29	45
cSH	1197	1700	1700	1515	1700	1700	730	618
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	9.9
Control Delay (s)	8.0	0.0	0.0	7.4	0.0	0.0	10.4	13.4
Lane LOS	A			A			B	B
Approach Delay (s)	0.8			0.2			10.4	13.4
Approach LOS							B	B

Intersection Summary				
Average Delay	5.5			
Intersection Capacity Utilization	31.6%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.950		0.106			
Satd. Flow (perm)	1789	1633	187	1575	1865	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		160				71
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.5	399.0	
Travel Time (s)	15.7			22.5	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	108	146	23	218	932	225
Future Volume (vph)	108	146	23	218	932	225
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	24.1	24.1	9.5	24.1	24.1	24.1
Total Split (s)	41.1	41.1	13.0	41.1	41.1	41.1
Total Split (%)	43.2%	43.2%	13.7%	43.2%	43.2%	43.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	9.8	9.8	43.2	37.8	37.8	37.8
Actuated g/C Ratio	0.15	0.15	0.68	0.60	0.60	0.60
v/c Ratio	0.43	0.41	0.09	0.26	0.92	0.28
Control Delay	29.2	8.4	4.1	8.5	30.1	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.4	4.1	8.5	30.1	6.7
LOS	C	A	A	A	C	A
Approach Delay	17.3			8.1	25.6	
Approach LOS	B			A	C	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 63.3	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 68.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	119	160	25	240	1024	247
v/c Ratio	0.43	0.41	0.09	0.26	0.92	0.28
Control Delay	29.2	8.4	4.1	8.5	30.1	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.4	4.1	8.5	30.1	6.7
Queue Length 50th (m)	11.1	0.0	0.6	9.1	73.2	6.5
Queue Length 95th (m)	27.2	13.6	2.7	30.6	#220.9	25.6
Internal Link Dist (m)	185.8			275.5	375.0	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	998	982	368	939	1112	874
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.16	0.07	0.26	0.92	0.28

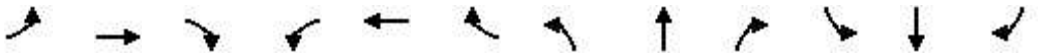
Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	108	146	23	218	932	225
Future Volume (vph)	108	146	23	218	932	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.95	1.00	0.11	1.00	1.00	1.00
Satd. Flow (perm)	1789	1633	187	1575	1865	1418
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	119	160	25	240	1024	247
RTOR Reduction (vph)	0	136	0	0	0	30
Lane Group Flow (vph)	119	24	25	240	1024	217
Heavy Vehicles (%)	2%	0%	9%	22%	3%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	9.8	9.8	40.1	37.8	37.8	37.8
Effective Green, g (s)	9.8	9.8	40.1	37.8	37.8	37.8
Actuated g/C Ratio	0.15	0.15	0.62	0.58	0.58	0.58
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	269	245	167	914	1082	823
v/s Ratio Prot			c0.01	0.15	c0.55	
v/s Ratio Perm	c0.07	0.01	0.09			0.15
v/c Ratio	0.44	0.10	0.15	0.26	0.95	0.26
Uniform Delay, d1	25.2	23.8	11.9	6.8	12.7	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2	0.4	0.7	17.2	0.8
Delay (s)	26.3	24.0	12.4	7.5	29.9	7.5
Level of Service	C	C	B	A	C	A
Approach Delay (s)	25.0			7.9	25.5	
Approach LOS	C			A	C	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	65.1	Sum of lost time (s)	15.2
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



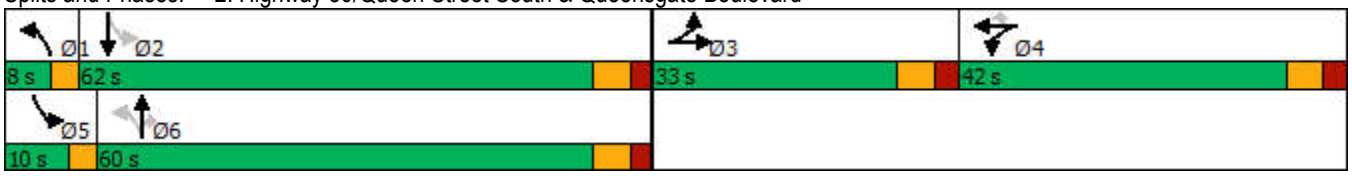
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	65.0		0.0	40.0		150.0	100.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		0.99	0.99	0.98	0.99		0.98		1.00	
Frt		0.881				0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.954		0.950			0.950		
Satd. Flow (prot)	1825	1661	0	1717	1724	1617	1825	3614	1617	1825	3540	0
Flt Permitted	0.950			0.950	0.954		0.400			0.068		
Satd. Flow (perm)	1810	1661	0	1701	1709	1582	764	3614	1582	131	3540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		114				116			542			
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		90.0			184.6			380.6			254.1	
Travel Time (s)		6.8			13.8			28.5			19.1	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	29	36	212	4	108	15	1422	504	99	611
Future Volume (vph)	29	36	212	4	108	15	1422	504	99	611
Turn Type	Split	NA	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	3	4	4		1	6		5	2
Permitted Phases					4	6		6	2	
Detector Phase	3	3	4	4	4	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	24.7	24.7	24.7	24.7	24.7	8.0	24.5	24.5	9.5	24.5
Total Split (s)	33.0	33.0	42.0	42.0	42.0	8.0	60.0	60.0	10.0	62.0
Total Split (%)	22.8%	22.8%	29.0%	29.0%	29.0%	5.5%	41.4%	41.4%	6.9%	42.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	0.0	2.5	2.5	0.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	6.7	6.7	6.7	3.0	6.5	6.5	3.0	6.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	11.2	11.2	12.8	12.8	12.8	62.3	53.8	53.8	66.9	60.8
Actuated g/C Ratio	0.10	0.10	0.12	0.12	0.12	0.58	0.50	0.50	0.62	0.56
v/c Ratio	0.16	0.68	0.57	0.57	0.40	0.03	0.85	0.51	0.55	0.33
Control Delay	46.6	32.3	56.7	56.6	12.4	10.3	30.3	3.5	25.8	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	32.3	56.7	56.6	12.4	10.3	30.3	3.5	25.8	14.9
LOS	D	C	E	E	B	B	C	A	C	B
Approach Delay		34.3		41.9			23.2			16.4
Approach LOS		C		D			C			B

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 107.8	
Natural Cycle: 115	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 83.8%	ICU Level of Service E
Analysis Period (min) 15	

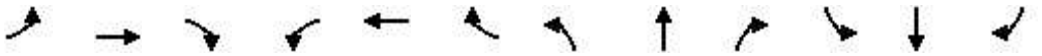
Splits and Phases: 2: Highway 50/Queen Street South & Queensgate Boulevard



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	31	186	116	116	116	16	1529	542	106	660
v/c Ratio	0.16	0.68	0.57	0.57	0.40	0.03	0.85	0.51	0.55	0.33
Control Delay	46.6	32.3	56.7	56.6	12.4	10.3	30.3	3.5	25.8	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	32.3	56.7	56.6	12.4	10.3	30.3	3.5	25.8	14.9
Queue Length 50th (m)	6.0	14.3	24.2	24.2	0.0	1.1	137.5	0.0	7.9	33.1
Queue Length 95th (m)	15.5	38.4	45.6	45.6	16.0	4.8	#229.5	18.9	#29.8	67.6
Internal Link Dist (m)		66.0		160.6			356.6			230.1
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	447	493	564	567	598	490	1802	1060	191	1996
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.38	0.21	0.20	0.19	0.03	0.85	0.51	0.55	0.33

Intersection Summary

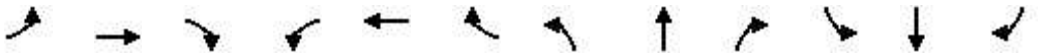
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	36	137	212	4	108	15	1422	504	99	611	3
Future Volume (vph)	29	36	137	212	4	108	15	1422	504	99	611	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	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	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1665		1717	1724	1586	1821	3614	1586	1825	3541	
Flt Permitted	0.95	1.00		0.95	0.95	1.00	0.40	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1825	1665		1717	1724	1586	767	3614	1586	131	3541	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	31	39	147	228	4	116	16	1529	542	106	657	3
RTOR Reduction (vph)	0	102	0	0	0	102	0	0	267	0	0	0
Lane Group Flow (vph)	31	84	0	116	116	14	16	1529	275	106	660	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	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases						4	6		6	2		
Actuated Green, G (s)	11.2	11.2		12.8	12.8	12.8	57.6	55.7	55.7	65.7	60.8	
Effective Green, g (s)	11.2	11.2		12.8	12.8	12.8	57.6	55.7	55.7	65.7	60.8	
Actuated g/C Ratio	0.10	0.10		0.12	0.12	0.12	0.53	0.51	0.51	0.60	0.55	
Clearance Time (s)	6.7	6.7		6.7	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)	186	170		200	201	185	421	1836	806	186	1964	
v/s Ratio Prot	0.02	c0.05		c0.07	0.07		0.00	c0.42		c0.04	0.19	
v/s Ratio Perm						0.01	0.02		0.17	0.30		
v/c Ratio	0.17	0.49		0.58	0.58	0.07	0.04	0.83	0.34	0.57	0.34	
Uniform Delay, d1	44.9	46.5		45.9	45.8	43.1	12.4	23.0	16.0	19.2	13.4	
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	0.4	2.2		4.0	4.0	0.2	0.0	4.6	1.2	4.0	0.5	
Delay (s)	45.4	48.7		49.9	49.8	43.3	12.5	27.6	17.2	23.2	13.8	
Level of Service	D	D		D	D	D	B	C	B	C	B	
Approach Delay (s)		48.3			47.7			24.8			15.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	109.6	Sum of lost time (s)	22.9
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



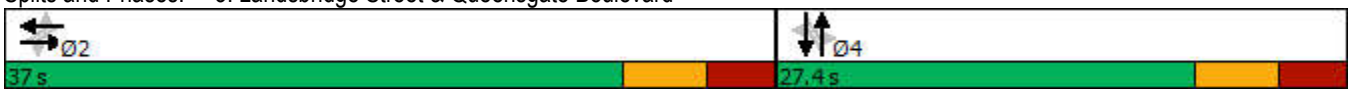
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	100.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		0.99	0.99		0.99	0.99	
Frt		0.963			0.964			0.967			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3483	0	1825	3466	0	1825	1847	0	1825	1760	0
Flt Permitted	0.616			0.362			0.664			0.706		
Satd. Flow (perm)	1173	3483	0	691	3466	0	1265	1847	0	1338	1760	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		89			52			17			72	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		184.6			440.7			367.6			159.1	
Travel Time (s)		13.8			33.1			27.6			11.9	

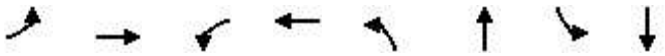
Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	91	475	24	157	115	58	67	70
Future Volume (vph)	91	475	24	157	115	58	67	70
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phase	2	2	2	2	4	4	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Total Split (s)	37.0	37.0	37.0	37.0	27.4	27.4	27.4	27.4
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39
v/c Ratio	0.20	0.45	0.09	0.15	0.25	0.11	0.14	0.20
Control Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
LOS	B	B	B	B	B	B	B	A
Approach Delay		14.5		10.9		15.0		11.0
Approach LOS		B		B		B		B

Intersection Summary	
Cycle Length: 64.4	
Actuated Cycle Length: 72.4	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

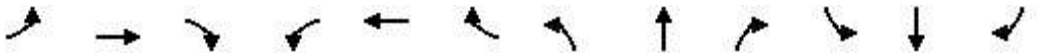
Splits and Phases: 3: Landsbridge Street & Queensgate Boulevard





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	661	25	217	121	78	71	146
v/c Ratio	0.20	0.45	0.09	0.15	0.25	0.11	0.14	0.20
Control Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
Queue Length 50th (m)	8.2	28.1	2.0	7.1	10.8	5.1	6.1	6.3
Queue Length 95th (m)	17.5	41.3	6.6	13.2	22.1	12.8	13.9	16.8
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)	479	1476	282	1447	489	724	517	724
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	0.20	0.45	0.09	0.15	0.25	0.11	0.14	0.20

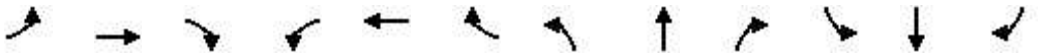
Intersection Summary



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)	7.4	7.4		7.4	7.4		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		0.98	1.00	
Frt	1.00	0.96		1.00	0.96		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	3483		1812	3465		1808	1847		1797	1758	
Flt Permitted	0.62	1.00		0.36	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	1172	3483		690	3465		1264	1847		1336	1758	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	500	161	25	165	52	121	61	17	71	74	72
RTOR Reduction (vph)	0	53	0	0	31	0	0	10	0	0	44	0
Lane Group Flow (vph)	96	608	0	25	186	0	121	68	0	71	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		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.39	0.39		0.39	0.39	
Clearance Time (s)	7.4	7.4		7.4	7.4		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)	479	1423		282	1416		488	714		516	679	
v/s Ratio Prot		c0.17			0.05			0.04			0.06	
v/s Ratio Perm	0.08			0.04			c0.10			0.05		
v/c Ratio	0.20	0.43		0.09	0.13		0.25	0.09		0.14	0.15	
Uniform Delay, d1	13.8	15.3		13.1	13.4		15.1	14.1		14.4	14.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.9		0.6	0.2		1.2	0.3		0.6	0.5	
Delay (s)	14.7	16.3		13.7	13.6		16.3	14.4		14.9	14.9	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		16.1			13.6			15.5			14.9	
Approach LOS		B			B			B			B	

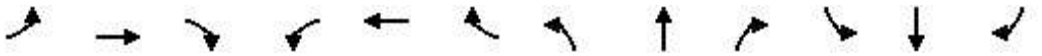
Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.8
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	85.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Flt Permitted												
Satd. Flow (perm)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		440.7			430.4			71.7			211.6	
Travel Time (s)		33.1			32.3			5.4			15.9	

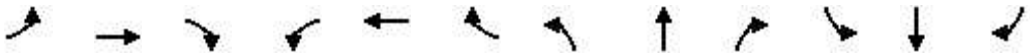
Intersection Summary	
Area Type:	Other



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

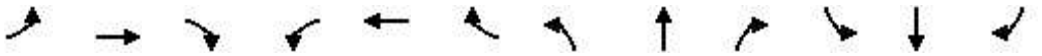
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	405	202	0	167	83	0	0
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.24	0.12	0.00	0.10	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	70.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.931			0.968			0.962	
Flt Protected	0.950			0.950				0.981			0.972	
Satd. Flow (prot)	1825	3560	0	1825	3365	0	0	1811	0	0	1776	0
Flt Permitted	0.950			0.950				0.981			0.972	
Satd. Flow (perm)	1825	3560	0	1825	3365	0	0	1811	0	0	1776	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		430.4			209.8			262.8			298.3	
Travel Time (s)		32.3			15.7			19.7			22.4	

Intersection Summary	
Area Type:	Other



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	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	302	37	16	180	155	46	45	28	71	17	35
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	335			339			614	814	170	617	754	170
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	335			339			614	814	170	617	754	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			86	85	97	77	95	96
cM capacity (veh/h)	1236			1231			332	291	851	304	319	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	63	201	138	16	120	215	119	123
Volume Left	63	0	0	16	0	0	46	71
Volume Right	0	0	37	0	0	155	28	35
cSH	1236	1700	1700	1231	1700	1700	365	375
Volume to Capacity	0.05	0.12	0.08	0.01	0.07	0.13	0.33	0.33
Queue Length 95th (m)	1.2	0.0	0.0	0.3	0.0	0.0	10.5	10.7
Control Delay (s)	8.1	0.0	0.0	8.0	0.0	0.0	19.6	19.2
Lane LOS	A			A			C	C
Approach Delay (s)	1.3			0.4			19.6	19.2
Approach LOS							C	C

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	33.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1570	1807	1883	1731	1418
Flt Permitted	0.950		0.419			
Satd. Flow (perm)	1820	1570	797	1883	1731	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		88				132
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.2	399.3	
Travel Time (s)	15.7			22.4	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	310	82	166	748	379	169
Future Volume (vph)	310	82	166	748	379	169
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	25.1	25.1	9.5	36.1	36.1	36.1
Total Split (s)	41.1	41.1	13.0	41.1	41.1	41.1
Total Split (%)	43.2%	43.2%	13.7%	43.2%	43.2%	43.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	5.1	5.1	2.0	5.1	5.1	6.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	20.4	20.4	48.7	36.2	36.2	35.2
Actuated g/C Ratio	0.26	0.26	0.62	0.46	0.46	0.45
v/c Ratio	0.70	0.19	0.29	0.92	0.51	0.26
Control Delay	34.7	6.3	7.7	40.0	19.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	6.3	7.7	40.0	19.1	6.5
LOS	C	A	A	D	B	A
Approach Delay	28.7			34.1	15.2	
Approach LOS	C			C	B	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 78.3	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 65.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

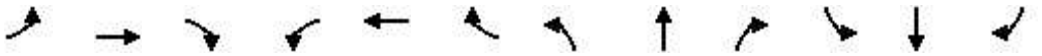
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	333	88	178	804	408	182
v/c Ratio	0.70	0.19	0.29	0.92	0.51	0.26
Control Delay	34.7	6.3	7.7	40.0	19.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	6.3	7.7	40.0	19.1	6.5
Queue Length 50th (m)	44.5	0.0	9.0	107.2	40.9	4.1
Queue Length 95th (m)	71.8	9.5	21.4	#215.3	80.1	17.9
Internal Link Dist (m)	185.8			275.2	375.3	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	842	773	651	871	801	710
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.11	0.27	0.92	0.51	0.26

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	310	82	166	748	379	169
Future Volume (vph)	310	82	166	748	379	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	5.1	5.1	2.0	5.1	5.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1821	1570	1807	1883	1731	1418
Flt Permitted	0.95	1.00	0.42	1.00	1.00	1.00
Satd. Flow (perm)	1821	1570	797	1883	1731	1418
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	333	88	178	804	408	182
RTOR Reduction (vph)	0	65	0	0	0	72
Lane Group Flow (vph)	333	23	178	804	408	110
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	19.4	19.4	43.6	35.3	35.3	35.3
Effective Green, g (s)	20.4	20.4	45.6	36.3	36.3	35.3
Actuated g/C Ratio	0.26	0.26	0.58	0.46	0.46	0.45
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	475	409	584	874	803	640
v/s Ratio Prot			c0.04	c0.43	0.24	
v/s Ratio Perm	c0.18	0.01	0.14			0.08
v/c Ratio	0.70	0.06	0.30	0.92	0.51	0.17
Uniform Delay, d1	26.1	21.7	7.9	19.6	14.7	12.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	0.3	16.3	2.3	0.6
Delay (s)	30.8	21.7	8.2	35.9	17.0	13.3
Level of Service	C	C	A	D	B	B
Approach Delay (s)	28.9			30.9	15.9	
Approach LOS	C			C	B	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	13.2
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



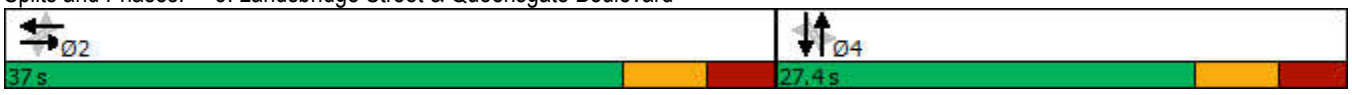
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	100.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		0.99	0.99		0.99	0.99	
Frt		0.963			0.964			0.967			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3483	0	1825	3466	0	1825	1847	0	1825	1760	0
Flt Permitted	0.616			0.362			0.664			0.706		
Satd. Flow (perm)	1173	3483	0	691	3466	0	1265	1847	0	1338	1760	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		89			52			17			72	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		184.6			440.7			367.6			159.1	
Travel Time (s)		13.8			33.1			27.6			11.9	

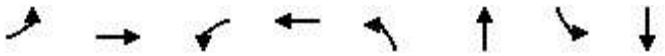
Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	91	475	24	157	115	58	67	70
Future Volume (vph)	91	475	24	157	115	58	67	70
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phase	2	2	2	2	4	4	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Total Split (s)	37.0	37.0	37.0	37.0	27.4	27.4	27.4	27.4
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39
v/c Ratio	0.20	0.45	0.09	0.15	0.25	0.11	0.14	0.20
Control Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
LOS	B	B	B	B	B	B	B	A
Approach Delay		14.5		10.9		15.0		11.0
Approach LOS		B		B		B		B

Intersection Summary	
Cycle Length: 64.4	
Actuated Cycle Length: 72.4	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

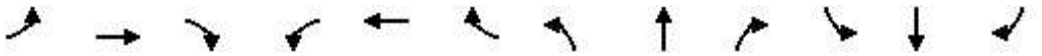
Splits and Phases: 3: Landsbridge Street & Queensgate Boulevard





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	661	25	217	121	78	71	146
v/c Ratio	0.20	0.45	0.09	0.15	0.25	0.11	0.14	0.20
Control Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	14.4	14.3	10.5	16.8	12.2	15.3	8.8
Queue Length 50th (m)	8.2	28.1	2.0	7.1	10.8	5.1	6.1	6.3
Queue Length 95th (m)	17.5	41.3	6.6	13.2	22.1	12.8	13.9	16.8
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)	479	1476	282	1447	489	724	517	724
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	0.20	0.45	0.09	0.15	0.25	0.11	0.14	0.20

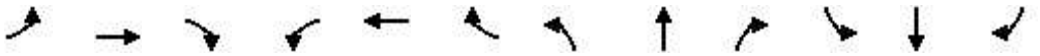
Intersection Summary



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)	7.4	7.4		7.4	7.4		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		0.98	1.00	
Frt	1.00	0.96		1.00	0.96		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	3483		1812	3465		1808	1847		1797	1758	
Flt Permitted	0.62	1.00		0.36	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	1172	3483		690	3465		1264	1847		1336	1758	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	500	161	25	165	52	121	61	17	71	74	72
RTOR Reduction (vph)	0	53	0	0	31	0	0	10	0	0	44	0
Lane Group Flow (vph)	96	608	0	25	186	0	121	68	0	71	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		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.39	0.39		0.39	0.39	
Clearance Time (s)	7.4	7.4		7.4	7.4		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)	479	1423		282	1416		488	714		516	679	
v/s Ratio Prot		c0.17			0.05			0.04			0.06	
v/s Ratio Perm	0.08			0.04			c0.10			0.05		
v/c Ratio	0.20	0.43		0.09	0.13		0.25	0.09		0.14	0.15	
Uniform Delay, d1	13.8	15.3		13.1	13.4		15.1	14.1		14.4	14.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.9		0.6	0.2		1.2	0.3		0.6	0.5	
Delay (s)	14.7	16.3		13.7	13.6		16.3	14.4		14.9	14.9	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		16.1			13.6			15.5			14.9	
Approach LOS		B			B			B			B	

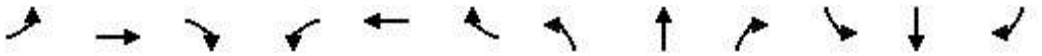
Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.8
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	85.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Flt Permitted												
Satd. Flow (perm)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		440.7			430.4			71.7			211.6	
Travel Time (s)		33.1			32.3			5.4			15.9	

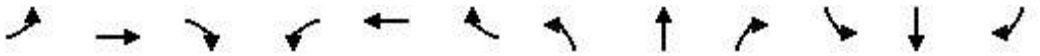
Intersection Summary	
Area Type:	Other



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

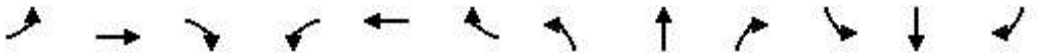
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	405	202	0	167	83	0	0
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.24	0.12	0.00	0.10	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	70.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.931			0.968			0.962	
Flt Protected	0.950			0.950				0.981			0.972	
Satd. Flow (prot)	1825	3560	0	1825	3365	0	0	1811	0	0	1776	0
Flt Permitted	0.950			0.950				0.981			0.972	
Satd. Flow (perm)	1825	3560	0	1825	3365	0	0	1811	0	0	1776	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		430.4			209.8			262.8			298.3	
Travel Time (s)		32.3			15.7			19.7			22.4	

Intersection Summary	
Area Type:	Other



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	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	302	37	16	180	155	46	45	28	71	17	35
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	335			339			614	814	170	617	754	170
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	335			339			614	814	170	617	754	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			86	85	97	77	95	96
cM capacity (veh/h)	1236			1231			332	291	851	304	319	849

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	63	201	138	16	120	215	119	123
Volume Left	63	0	0	16	0	0	46	71
Volume Right	0	0	37	0	0	155	28	35
cSH	1236	1700	1700	1231	1700	1700	365	375
Volume to Capacity	0.05	0.12	0.08	0.01	0.07	0.13	0.33	0.33
Queue Length 95th (m)	1.2	0.0	0.0	0.3	0.0	0.0	10.5	10.7
Control Delay (s)	8.1	0.0	0.0	8.0	0.0	0.0	19.6	19.2
Lane LOS	A			A			C	C
Approach Delay (s)	1.3			0.4			19.6	19.2
Approach LOS							C	C

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	33.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1570	1807	1883	1731	1418
Flt Permitted	0.950		0.419			
Satd. Flow (perm)	1820	1570	797	1883	1731	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		88				132
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.2	399.3	
Travel Time (s)	15.7			22.4	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	310	82	166	748	379	169
Future Volume (vph)	310	82	166	748	379	169
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	25.1	25.1	9.5	36.1	36.1	36.1
Total Split (s)	41.1	41.1	13.0	41.1	41.1	41.1
Total Split (%)	43.2%	43.2%	13.7%	43.2%	43.2%	43.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost Time (s)	5.1	5.1	2.0	5.1	5.1	6.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	20.4	20.4	48.7	36.2	36.2	35.2
Actuated g/C Ratio	0.26	0.26	0.62	0.46	0.46	0.45
v/c Ratio	0.70	0.19	0.29	0.92	0.51	0.26
Control Delay	34.7	6.3	7.7	40.0	19.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	6.3	7.7	40.0	19.1	6.5
LOS	C	A	A	D	B	A
Approach Delay	28.7			34.1	15.2	
Approach LOS	C			C	B	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 78.3	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 65.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	333	88	178	804	408	182
v/c Ratio	0.70	0.19	0.29	0.92	0.51	0.26
Control Delay	34.7	6.3	7.7	40.0	19.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	6.3	7.7	40.0	19.1	6.5
Queue Length 50th (m)	44.5	0.0	9.0	107.2	40.9	4.1
Queue Length 95th (m)	71.8	9.5	21.4	#215.3	80.1	17.9
Internal Link Dist (m)	185.8			275.2	375.3	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	842	773	651	871	801	710
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.11	0.27	0.92	0.51	0.26

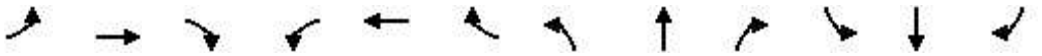
Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	310	82	166	748	379	169
Future Volume (vph)	310	82	166	748	379	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	5.1	5.1	2.0	5.1	5.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1821	1570	1807	1883	1731	1418
Flt Permitted	0.95	1.00	0.42	1.00	1.00	1.00
Satd. Flow (perm)	1821	1570	797	1883	1731	1418
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	333	88	178	804	408	182
RTOR Reduction (vph)	0	65	0	0	0	72
Lane Group Flow (vph)	333	23	178	804	408	110
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	19.4	19.4	43.6	35.3	35.3	35.3
Effective Green, g (s)	20.4	20.4	45.6	36.3	36.3	35.3
Actuated g/C Ratio	0.26	0.26	0.58	0.46	0.46	0.45
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	475	409	584	874	803	640
v/s Ratio Prot			c0.04	c0.43	0.24	
v/s Ratio Perm	c0.18	0.01	0.14			0.08
v/c Ratio	0.70	0.06	0.30	0.92	0.51	0.17
Uniform Delay, d1	26.1	21.7	7.9	19.6	14.7	12.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	0.3	16.3	2.3	0.6
Delay (s)	30.8	21.7	8.2	35.9	17.0	13.3
Level of Service	C	C	A	D	B	B
Approach Delay (s)	28.9			30.9	15.9	
Approach LOS	C			C	B	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	13.2
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E – Future Background level of Service Calculations



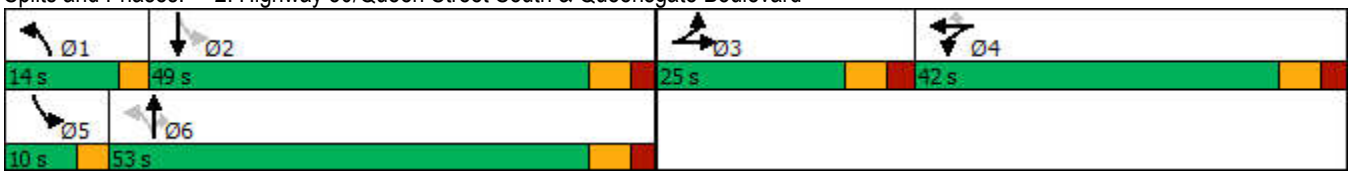
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	65.0		0.0	40.0		150.0	100.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	0.99		1.00	1.00	0.99					1.00	
Frt		0.850				0.850			0.850		0.995	
Flt Protected	0.950			0.950	0.963		0.950			0.950		
Satd. Flow (prot)	1825	1609	0	1734	1758	1601	1825	3411	1555	1690	3560	0
Flt Permitted	0.950			0.950	0.963		0.085			0.497		
Satd. Flow (perm)	1823	1609	0	1729	1754	1580	163	3411	1555	884	3560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		136				136			112		3	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		90.0			184.6			380.6			254.9	
Travel Time (s)		6.8			13.8			28.5			19.1	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	1	0	517	66	99	181	405	99	88	1099
Future Volume (vph)	1	0	517	66	99	181	405	99	88	1099
Turn Type	Split	NA	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	3	4	4		1	6		5	2
Permitted Phases					4	6		6	2	
Detector Phase	3	3	4	4	4	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	34.7	34.7	34.7	34.7	34.7	9.5	36.5	36.5	9.5	36.5
Total Split (s)	25.0	25.0	42.0	42.0	42.0	14.0	53.0	53.0	10.0	49.0
Total Split (%)	19.2%	19.2%	32.3%	32.3%	32.3%	10.8%	40.8%	40.8%	7.7%	37.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	0.0	2.5	2.5	0.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	6.7	6.7	6.7	3.0	6.5	6.5	3.0	6.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	8.2	8.2	24.4	24.4	24.4	61.0	49.7	49.7	53.9	43.4
Actuated g/C Ratio	0.08	0.08	0.24	0.24	0.24	0.61	0.50	0.50	0.54	0.43
v/c Ratio	0.01	0.05	0.75	0.75	0.22	0.70	0.26	0.13	0.18	0.80
Control Delay	51.0	0.4	47.3	47.1	3.8	35.1	18.7	4.5	12.9	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	0.4	47.3	47.1	3.8	35.1	18.7	4.5	12.9	32.3
LOS	D	A	D	D	A	D	B	A	B	C
Approach Delay		3.8		40.9			21.0			30.9
Approach LOS		A		D			C			C

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 100.3	
Natural Cycle: 140	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 30.7	Intersection LOS: C
Intersection Capacity Utilization 78.7%	ICU Level of Service D
Analysis Period (min) 15	

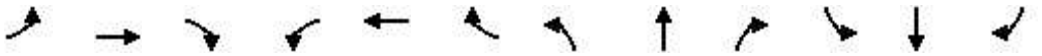
Splits and Phases: 2: Highway 50/Queen Street South & Queensgate Boulevard



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	14	315	319	108	197	440	108	96	1235
v/c Ratio	0.01	0.05	0.75	0.75	0.22	0.70	0.26	0.13	0.18	0.80
Control Delay	51.0	0.4	47.3	47.1	3.8	35.1	18.7	4.5	12.9	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	0.4	47.3	47.1	3.8	35.1	18.7	4.5	12.9	32.3
Queue Length 50th (m)	0.2	0.0	54.5	55.1	0.0	16.7	22.8	0.0	5.9	93.7
Queue Length 95th (m)	2.0	0.0	98.9	99.7	7.9	#69.0	50.6	10.4	20.9	#196.8
Internal Link Dist (m)		66.0		160.6			356.6			230.9
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	340	410	623	631	654	285	1688	826	534	1542
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	0.00	0.03	0.51	0.51	0.17	0.69	0.26	0.13	0.18	0.80

Intersection Summary

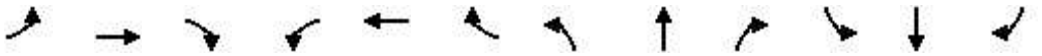
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	13	517	66	99	181	405	99	88	1099	37
Future Volume (vph)	1	0	13	517	66	99	181	405	99	88	1099	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	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)	1825	1610		1734	1757	1580	1825	3411	1555	1690	3561	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.08	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	1825	1610		1734	1757	1580	163	3411	1555	884	3561	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	14	562	72	108	197	440	108	96	1195	40
RTOR Reduction (vph)	0	14	0	0	0	83	0	0	57	0	2	0
Lane Group Flow (vph)	1	0	0	315	319	25	197	440	51	96	1233	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	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases						4	6		6	2		
Actuated Green, G (s)	2.7	2.7		24.4	24.4	24.4	58.0	49.6	49.6	49.5	44.1	
Effective Green, g (s)	2.7	2.7		24.4	24.4	24.4	58.0	49.6	49.6	49.5	44.1	
Actuated g/C Ratio	0.03	0.03		0.23	0.23	0.23	0.55	0.47	0.47	0.47	0.42	
Clearance Time (s)	6.7	6.7		6.7	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)	46	41		402	408	367	262	1611	734	458	1495	
v/s Ratio Prot	c0.00	0.00		c0.18	0.18		c0.08	0.13		0.01	c0.35	
v/s Ratio Perm						0.02	0.34		0.03	0.09		
v/c Ratio	0.02	0.01		0.78	0.78	0.07	0.75	0.27	0.07	0.21	0.82	
Uniform Delay, d1	49.9	49.8		37.8	37.8	31.4	23.4	16.8	15.1	15.6	27.0	
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	0.2	0.1		9.6	9.4	0.1	11.5	0.4	0.2	0.2	5.3	
Delay (s)	50.1	49.9		47.4	47.2	31.5	35.0	17.2	15.3	15.8	32.3	
Level of Service	D	D		D	D	C	C	B	B	B	C	
Approach Delay (s)		49.9			45.0			21.6			31.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.9
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



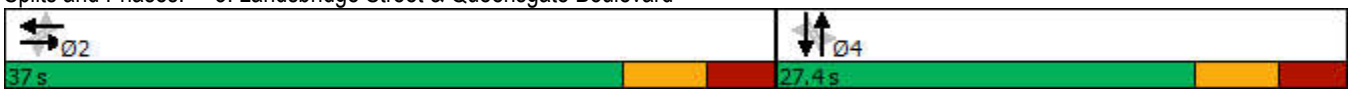
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	100.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		1.00				0.99		1.00		
Frt		0.955			0.994			0.938			0.883	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1644	3324	0	1644	3560	0	1772	1748	0	1615	1571	0
Flt Permitted	0.483			0.652			0.689			0.692		
Satd. Flow (perm)	836	3324	0	1127	3560	0	1285	1748	0	1172	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			8			41			82	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		184.6			440.7			367.6			159.1	
Travel Time (s)		13.8			33.1			27.6			11.9	

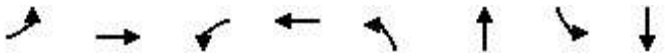
Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	18	97	9	397	179	52	15	20
Future Volume (vph)	18	97	9	397	179	52	15	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phase	2	2	2	2	4	4	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Total Split (s)	37.0	37.0	37.0	37.0	27.4	27.4	27.4	27.4
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39
v/c Ratio	0.06	0.11	0.02	0.32	0.41	0.14	0.04	0.16
Control Delay	13.7	9.5	13.1	15.1	19.3	9.9	14.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	9.5	13.1	15.1	19.3	9.9	14.3	6.0
LOS	B	A	B	B	B	A	B	A
Approach Delay		10.0		15.0		16.2		7.2
Approach LOS		B		B		B		A

Intersection Summary	
Cycle Length: 64.4	
Actuated Cycle Length: 72.4	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

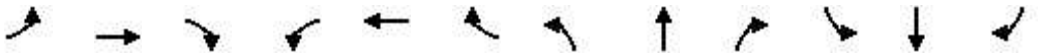
Splits and Phases: 3: Landsbridge Street & Queensgate Boulevard





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	157	10	469	203	100	17	105
v/c Ratio	0.06	0.11	0.02	0.32	0.41	0.14	0.04	0.16
Control Delay	13.7	9.5	13.1	15.1	19.3	9.9	14.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	9.5	13.1	15.1	19.3	9.9	14.3	6.0
Queue Length 50th (m)	1.6	4.6	0.8	21.6	19.6	5.0	1.4	1.9
Queue Length 95th (m)	5.3	9.5	3.3	31.0	35.1	13.2	4.9	10.1
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)	341	1386	460	1460	496	701	453	657
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	0.11	0.02	0.32	0.41	0.14	0.04	0.16

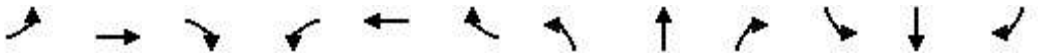
Intersection Summary



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)	7.4	7.4		7.4	7.4		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	3324		1642	3561		1772	1748		1607	1571	
Flt Permitted	0.48	1.00		0.65	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	836	3324		1128	3561		1285	1748		1171	1571	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	20	110	47	10	451	18	203	59	41	17	23	82
RTOR Reduction (vph)	0	28	0	0	5	0	0	25	0	0	50	0
Lane Group Flow (vph)	20	129	0	10	464	0	203	75	0	17	55	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		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.39	0.39		0.39	0.39	
Clearance Time (s)	7.4	7.4		7.4	7.4		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)	341	1358		461	1455		496	676		452	607	
v/s Ratio Prot		0.04			c0.13			0.04			0.03	
v/s Ratio Perm	0.02			0.01			c0.16			0.01		
v/c Ratio	0.06	0.10		0.02	0.32		0.41	0.11		0.04	0.09	
Uniform Delay, d1	13.0	13.2		12.8	14.5		16.2	14.2		13.8	14.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.1	0.6		2.5	0.3		0.2	0.3	
Delay (s)	13.3	13.3		12.9	15.1		18.7	14.6		14.0	14.4	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		13.3			15.1			17.3			14.3	
Approach LOS		B			B			B			B	

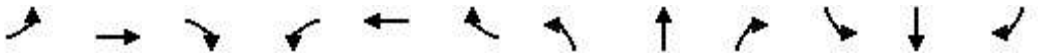
Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.8
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	85.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Flt Permitted												
Satd. Flow (perm)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		440.7			430.4			71.7			211.6	
Travel Time (s)		33.1			32.3			5.4			15.9	

Intersection Summary	
Area Type:	Other



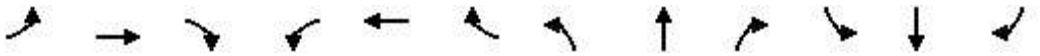
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	148	0	0	422	0	0	0	0	0	0	0
Future Volume (Veh/h)	0	148	0	0	422	0	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	161	0	0	459	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	459			161			390	620	80	540	620	230
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459			161			390	620	80	540	620	230
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)	1098			1416			543	402	963	425	402	773

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	107	54	0	306	153	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	0.18	0.09	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			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	70.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.987			0.935			0.968	
Flt Protected	0.950			0.950				0.977			0.965	
Satd. Flow (prot)	1521	3522	0	1825	3538	0	0	1699	0	0	1782	0
Flt Permitted	0.950			0.950				0.977			0.965	
Satd. Flow (perm)	1521	3522	0	1825	3538	0	0	1699	0	0	1782	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		430.4			209.8			262.8			298.3	
Travel Time (s)		32.3			15.7			19.7			22.4	

Intersection Summary	
Area Type:	Other



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	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	88	11	8	244	23	28	3	29	138	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	267			100			308	398	52	368	392	140
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	267			100			308	398	52	368	392	140
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	74	99	95
cM capacity (veh/h)	1173			1504			561	535	1008	540	539	882

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	10	59	40	8	163	104	60	190
Volume Left	10	0	0	8	0	0	28	138
Volume Right	0	0	11	0	0	23	29	45
cSH	1173	1700	1700	1504	1700	1700	712	595
Volume to Capacity	0.01	0.03	0.02	0.01	0.10	0.06	0.08	0.32
Queue Length 95th (m)	0.2	0.0	0.0	0.1	0.0	0.0	2.1	10.4
Control Delay (s)	8.1	0.0	0.0	7.4	0.0	0.0	10.5	13.9
Lane LOS	A			A			B	B
Approach Delay (s)	0.7			0.2			10.5	13.9
Approach LOS							B	B

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	31.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.950		0.108			
Satd. Flow (perm)	1789	1633	190	1575	1865	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		178				71
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.0	399.1	
Travel Time (s)	15.7			22.4	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	120	162	26	241	1029	248
Future Volume (vph)	120	162	26	241	1029	248
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	24.1	24.1	9.5	24.1	24.1	24.1
Total Split (s)	41.1	41.1	13.0	41.1	41.1	41.1
Total Split (%)	43.2%	43.2%	13.7%	43.2%	43.2%	43.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	10.3	10.3	42.3	36.9	36.9	36.9
Actuated g/C Ratio	0.16	0.16	0.67	0.59	0.59	0.59
v/c Ratio	0.45	0.43	0.11	0.29	1.03	0.32
Control Delay	29.2	8.0	4.5	9.1	54.5	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.0	4.5	9.1	54.5	7.4
LOS	C	A	A	A	D	A
Approach Delay	17.1			8.7	45.3	
Approach LOS	B			A	D	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 62.9	
Natural Cycle: 100	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 35.6	Intersection LOS: D
Intersection Capacity Utilization 74.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	132	178	29	265	1131	273
v/c Ratio	0.45	0.43	0.11	0.29	1.03	0.32
Control Delay	29.2	8.0	4.5	9.1	54.5	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.0	4.5	9.1	54.5	7.4
Queue Length 50th (m)	12.4	0.0	0.8	11.0	99.2	8.1
Queue Length 95th (m)	29.7	14.4	3.2	34.8	#256.9	29.8
Internal Link Dist (m)	185.8			275.0	375.1	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	1004	994	369	924	1094	861
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.18	0.08	0.29	1.03	0.32

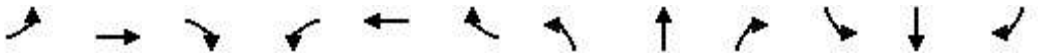
Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	120	162	26	241	1029	248
Future Volume (vph)	120	162	26	241	1029	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.95	1.00	0.11	1.00	1.00	1.00
Satd. Flow (perm)	1789	1633	191	1575	1865	1418
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	132	178	29	265	1131	273
RTOR Reduction (vph)	0	150	0	0	0	31
Lane Group Flow (vph)	132	28	29	265	1131	242
Heavy Vehicles (%)	2%	0%	9%	22%	3%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	10.3	10.3	39.2	36.9	36.9	36.9
Effective Green, g (s)	10.3	10.3	39.2	36.9	36.9	36.9
Actuated g/C Ratio	0.16	0.16	0.61	0.57	0.57	0.57
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	284	259	168	898	1063	808
v/s Ratio Prot			c0.01	0.17	c0.61	
v/s Ratio Perm	c0.07	0.02	0.10			0.17
v/c Ratio	0.46	0.11	0.17	0.30	1.06	0.30
Uniform Delay, d1	24.7	23.3	13.6	7.2	13.9	7.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2	0.5	0.8	46.3	1.0
Delay (s)	25.9	23.5	14.1	8.0	60.2	8.2
Level of Service	C	C	B	A	E	A
Approach Delay (s)	24.5			8.6	50.1	
Approach LOS	C			A	D	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	15.2
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



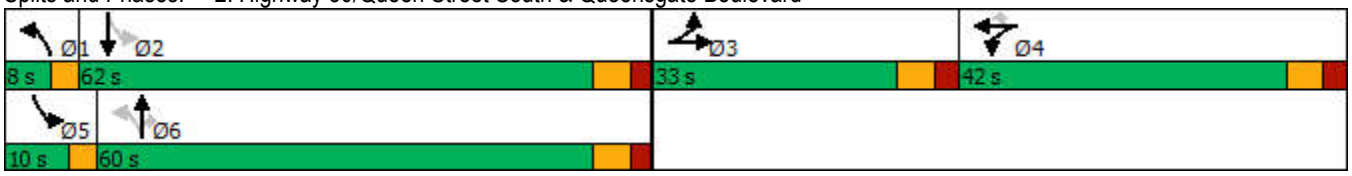
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	65.0		0.0	40.0		150.0	100.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		0.99	0.99	0.98	1.00		0.98		1.00	
Frt		0.884				0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.954		0.950			0.950		
Satd. Flow (prot)	1825	1667	0	1717	1724	1617	1825	3614	1617	1825	3540	0
Flt Permitted	0.950			0.950	0.954		0.360			0.068		
Satd. Flow (perm)	1810	1667	0	1701	1709	1582	689	3614	1582	131	3540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		104				128			549			
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		90.0			184.6			380.6			254.1	
Travel Time (s)		6.8			13.8			28.5			19.1	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	29	40	234	4	119	15	1570	556	109	675
Future Volume (vph)	29	40	234	4	119	15	1570	556	109	675
Turn Type	Split	NA	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	3	4	4		1	6		5	2
Permitted Phases					4	6		6	2	
Detector Phase	3	3	4	4	4	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	24.7	24.7	24.7	24.7	24.7	8.0	24.5	24.5	9.5	24.5
Total Split (s)	33.0	33.0	42.0	42.0	42.0	8.0	60.0	60.0	10.0	62.0
Total Split (%)	22.8%	22.8%	29.0%	29.0%	29.0%	5.5%	41.4%	41.4%	6.9%	42.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	0.0	2.5	2.5	0.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	6.7	6.7	6.7	3.0	6.5	6.5	3.0	6.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	12.0	12.0	13.9	13.9	13.9	62.3	53.8	53.8	67.0	60.9
Actuated g/C Ratio	0.11	0.11	0.13	0.13	0.13	0.57	0.49	0.49	0.61	0.55
v/c Ratio	0.16	0.69	0.59	0.58	0.41	0.04	0.95	0.57	0.62	0.37
Control Delay	46.7	35.8	57.3	56.7	11.8	11.2	41.2	5.0	31.6	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	35.8	57.3	56.7	11.8	11.2	41.2	5.0	31.6	16.4
LOS	D	D	E	E	B	B	D	A	C	B
Approach Delay		37.3		41.9			31.6			18.5
Approach LOS		D		D			C			B

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 109.8	
Natural Cycle: 115	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 30.0	Intersection LOS: C
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	

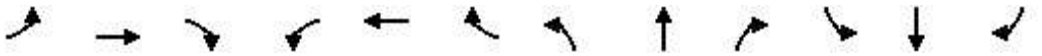
Splits and Phases: 2: Highway 50/Queen Street South & Queensgate Boulevard



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	31	190	129	127	128	16	1688	598	117	729
v/c Ratio	0.16	0.69	0.59	0.58	0.41	0.04	0.95	0.57	0.62	0.37
Control Delay	46.7	35.8	57.3	56.7	11.8	11.2	41.2	5.0	31.6	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.7	35.8	57.3	56.7	11.8	11.2	41.2	5.0	31.6	16.4
Queue Length 50th (m)	6.1	17.4	27.4	27.0	0.0	1.2	171.1	5.2	9.3	39.4
Queue Length 95th (m)	15.8	42.8	50.4	49.5	16.7	5.1	#281.2	33.4	#38.5	79.1
Internal Link Dist (m)		66.0		160.6			356.6			230.1
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	439	480	555	557	598	443	1770	1055	188	1963
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.40	0.23	0.23	0.21	0.04	0.95	0.57	0.62	0.37

Intersection Summary

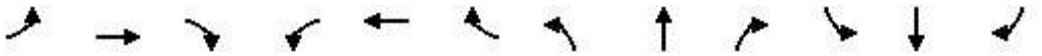
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	40	137	234	4	119	15	1570	556	109	675	3
Future Volume (vph)	29	40	137	234	4	119	15	1570	556	109	675	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	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	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1670		1717	1724	1586	1822	3614	1586	1825	3542	
Flt Permitted	0.95	1.00		0.95	0.95	1.00	0.36	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1825	1670		1717	1724	1586	691	3614	1586	131	3542	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	31	43	147	252	4	128	16	1688	598	117	726	3
RTOR Reduction (vph)	0	93	0	0	0	112	0	0	275	0	0	0
Lane Group Flow (vph)	31	97	0	129	127	16	16	1688	324	117	729	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	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases						4	6		6	2		
Actuated Green, G (s)	12.0	12.0		13.9	13.9	13.9	57.7	55.8	55.8	65.8	60.9	
Effective Green, g (s)	12.0	12.0		13.9	13.9	13.9	57.7	55.8	55.8	65.8	60.9	
Actuated g/C Ratio	0.11	0.11		0.12	0.12	0.12	0.52	0.50	0.50	0.59	0.55	
Clearance Time (s)	6.7	6.7		6.7	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)	196	179		213	214	197	376	1807	793	183	1932	
v/s Ratio Prot	0.02	c0.06		c0.08	0.07		0.00	c0.47		c0.04	0.21	
v/s Ratio Perm						0.01	0.02		0.20	0.34		
v/c Ratio	0.16	0.54		0.61	0.59	0.08	0.04	0.93	0.41	0.64	0.38	
Uniform Delay, d1	45.2	47.2		46.3	46.2	43.2	13.2	26.2	17.5	23.2	14.5	
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	0.4	3.3		4.8	4.4	0.2	0.0	10.4	1.6	7.1	0.6	
Delay (s)	45.6	50.5		51.1	50.5	43.4	13.2	36.6	19.1	30.4	15.1	
Level of Service	D	D		D	D	D	B	D	B	C	B	
Approach Delay (s)		49.8			48.3			31.9			17.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	111.6	Sum of lost time (s)	22.9
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



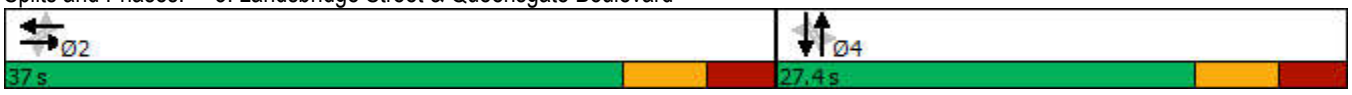
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	100.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		0.99	0.99		0.99	0.99	
Frt		0.966			0.967			0.967			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3497	0	1825	3478	0	1825	1847	0	1825	1760	0
Flt Permitted	0.606			0.331			0.664			0.706		
Satd. Flow (perm)	1155	3497	0	632	3478	0	1265	1847	0	1338	1760	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		78			52			17			72	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		184.6			440.7			367.6			159.1	
Travel Time (s)		13.8			33.1			27.6			11.9	

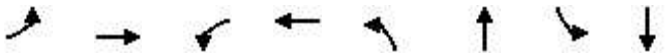
Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	91	524	24	173	115	58	67	70
Future Volume (vph)	91	524	24	173	115	58	67	70
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phase	2	2	2	2	4	4	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Total Split (s)	37.0	37.0	37.0	37.0	27.4	27.4	27.4	27.4
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39
v/c Ratio	0.20	0.48	0.10	0.16	0.25	0.11	0.14	0.20
Control Delay	15.3	15.2	14.5	10.8	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	15.2	14.5	10.8	16.8	12.2	15.3	8.8
LOS	B	B	B	B	B	B	B	A
Approach Delay		15.2		11.2		15.0		11.0
Approach LOS		B		B		B		B

Intersection Summary	
Cycle Length: 64.4	
Actuated Cycle Length: 72.4	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

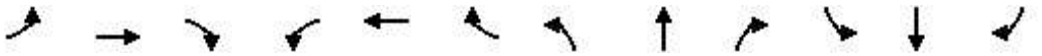
Splits and Phases: 3: Landsbridge Street & Queensgate Boulevard





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	713	25	234	121	78	71	146
v/c Ratio	0.20	0.48	0.10	0.16	0.25	0.11	0.14	0.20
Control Delay	15.3	15.2	14.5	10.8	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	15.2	14.5	10.8	16.8	12.2	15.3	8.8
Queue Length 50th (m)	8.2	32.0	2.0	7.8	10.8	5.1	6.1	6.3
Queue Length 95th (m)	17.5	46.1	6.6	14.3	22.1	12.8	13.9	16.8
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)	472	1475	258	1452	489	724	517	724
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	0.20	0.48	0.10	0.16	0.25	0.11	0.14	0.20

Intersection Summary



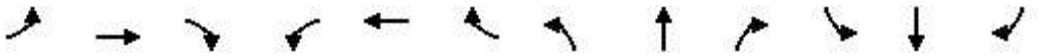
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	524	153	24	173	49	115	58	16	67	70	68
Future Volume (vph)	91	524	153	24	173	49	115	58	16	67	70	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.4	7.4		7.4	7.4		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		0.98	1.00	
Frt	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	3495		1813	3476		1808	1847		1797	1758	
Flt Permitted	0.61	1.00		0.33	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	1153	3495		631	3476		1264	1847		1336	1758	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	552	161	25	182	52	121	61	17	71	74	72
RTOR Reduction (vph)	0	46	0	0	31	0	0	10	0	0	44	0
Lane Group Flow (vph)	96	667	0	25	203	0	121	68	0	71	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		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.39	0.39		0.39	0.39	
Clearance Time (s)	7.4	7.4		7.4	7.4		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)	471	1428		257	1421		488	714		516	679	
v/s Ratio Prot		c0.19			0.06			0.04			0.06	
v/s Ratio Perm	0.08			0.04			c0.10			0.05		
v/c Ratio	0.20	0.47		0.10	0.14		0.25	0.09		0.14	0.15	
Uniform Delay, d1	13.8	15.6		13.2	13.4		15.1	14.1		14.4	14.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.1		0.8	0.2		1.2	0.3		0.6	0.5	
Delay (s)	14.8	16.7		13.9	13.6		16.3	14.4		14.9	14.9	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		16.5			13.7			15.5			14.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.8
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	85.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt												
Flt Protected												
Satd. Flow (prot)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Flt Permitted												
Satd. Flow (perm)	1883	3579	0	1883	3579	0	0	1883	0	0	1883	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		440.7			430.4			71.7			211.6	
Travel Time (s)		33.1			32.3			5.4			15.9	

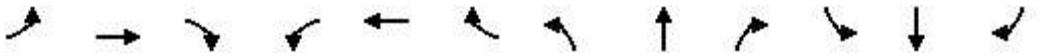
Intersection Summary	
Area Type:	Other



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	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	660	0	0	267	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	267			660			794	927	330	597	927	134
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	267			660			794	927	330	597	927	134
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)	1294			924			279	267	666	387	267	891

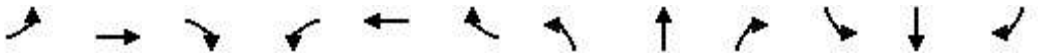
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	440	220	0	178	89	0	0
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.26	0.13	0.00	0.10	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	70.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.934			0.968			0.962	
Flt Protected	0.950			0.950				0.981			0.972	
Satd. Flow (prot)	1825	3563	0	1825	3375	0	0	1811	0	0	1776	0
Flt Permitted	0.950			0.950				0.981			0.972	
Satd. Flow (perm)	1825	3563	0	1825	3375	0	0	1811	0	0	1776	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		430.4			209.8			262.8			298.3	
Travel Time (s)		32.3			15.7			19.7			22.4	

Intersection Summary	
Area Type:	Other



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	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	334	37	16	199	155	46	45	28	71	17	35
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	354			371			656	864	186	652	806	179
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354			371			656	864	186	652	806	179
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			85	83	97	75	94	96
cM capacity (veh/h)	1216			1199			309	272	831	283	298	838

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	63	223	148	16	133	221	119	123
Volume Left	63	0	0	16	0	0	46	71
Volume Right	0	0	37	0	0	155	28	35
cSH	1216	1700	1700	1199	1700	1700	342	352
Volume to Capacity	0.05	0.13	0.09	0.01	0.08	0.13	0.35	0.35
Queue Length 95th (m)	1.2	0.0	0.0	0.3	0.0	0.0	11.6	11.6
Control Delay (s)	8.1	0.0	0.0	8.0	0.0	0.0	21.1	20.6
Lane LOS	A			A			C	C
Approach Delay (s)	1.2			0.3			21.1	20.6
Approach LOS							C	C

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	33.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1570	1807	1883	1731	1418
Flt Permitted	0.950		0.376			
Satd. Flow (perm)	1820	1570	715	1883	1731	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		97				132
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.7	398.9	
Travel Time (s)	15.7			22.5	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	342	90	183	826	418	186
Future Volume (vph)	342	90	183	826	418	186
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	25.1	25.1	9.5	36.1	36.1	36.1
Total Split (s)	41.1	41.1	13.0	41.1	41.1	41.1
Total Split (%)	43.2%	43.2%	13.7%	43.2%	43.2%	43.2%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	21.3	21.3	47.1	35.3	35.3	35.3
Actuated g/C Ratio	0.26	0.26	0.58	0.44	0.44	0.44
v/c Ratio	0.77	0.20	0.37	1.08	0.59	0.29
Control Delay	38.4	6.1	9.7	80.3	22.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	6.1	9.7	80.3	22.9	7.8
LOS	D	A	A	F	C	A
Approach Delay	31.7			67.5	18.2	
Approach LOS	C			E	B	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 80.6	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 45.4	Intersection LOS: D
Intersection Capacity Utilization 72.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	368	97	197	888	449	200
v/c Ratio	0.77	0.20	0.37	1.08	0.59	0.29
Control Delay	38.4	6.1	9.7	80.3	22.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	6.1	9.7	80.3	22.9	7.8
Queue Length 50th (m)	52.0	0.0	11.4	~155.5	50.9	6.0
Queue Length 95th (m)	81.1	9.9	26.4	#261.4	96.9	22.1
Internal Link Dist (m)	185.8			275.7	374.9	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	796	741	565	824	757	694
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.13	0.35	1.08	0.59	0.29

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.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	342	90	183	826	418	186
Future Volume (vph)	342	90	183	826	418	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1821	1570	1807	1883	1731	1418
Flt Permitted	0.95	1.00	0.38	1.00	1.00	1.00
Satd. Flow (perm)	1821	1570	715	1883	1731	1418
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	368	97	197	888	449	200
RTOR Reduction (vph)	0	71	0	0	0	74
Lane Group Flow (vph)	368	26	197	888	449	126
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	21.3	21.3	44.0	35.3	35.3	35.3
Effective Green, g (s)	21.3	21.3	44.0	35.3	35.3	35.3
Actuated g/C Ratio	0.26	0.26	0.55	0.44	0.44	0.44
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	481	415	508	825	759	621
v/s Ratio Prot			c0.04	c0.47	0.26	
v/s Ratio Perm	c0.20	0.02	0.17			0.09
v/c Ratio	0.77	0.06	0.39	1.08	0.59	0.20
Uniform Delay, d1	27.3	22.1	9.9	22.6	17.1	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.1	0.5	54.0	3.4	0.7
Delay (s)	34.4	22.2	10.4	76.6	20.5	14.7
Level of Service	C	C	B	E	C	B
Approach Delay (s)	31.9			64.5	18.7	
Approach LOS	C			E	B	

Intersection Summary			
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.5	Sum of lost time (s)	15.2
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Appendix F – Future Background level of Service Calculations (Optimized)

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.950		0.075			
Satd. Flow (perm)	1789	1633	132	1575	1865	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		153				93
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.0	399.1	
Travel Time (s)	15.7			22.4	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	120	162	26	241	1029	248
Future Volume (vph)	120	162	26	241	1029	248
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	23.1	23.1	10.1	24.1	24.1	24.1
Total Split (s)	31.2	31.2	10.1	56.0	56.0	56.0
Total Split (%)	32.1%	32.1%	10.4%	57.6%	57.6%	57.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.1	5.1	5.1	5.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	11.4	11.4	54.9	53.1	53.1	53.1
Actuated g/C Ratio	0.15	0.15	0.70	0.68	0.68	0.68
v/c Ratio	0.51	0.49	0.15	0.25	0.90	0.28
Control Delay	38.4	12.7	5.5	7.1	24.9	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	12.7	5.5	7.1	24.9	5.2
LOS	D	B	A	A	C	A
Approach Delay	23.6			6.9	21.0	
Approach LOS	C			A	C	

Intersection Summary	
Cycle Length: 97.3	
Actuated Cycle Length: 78.4	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 19.4	Intersection LOS: B
Intersection Capacity Utilization 72.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	132	178	29	265	1131	273
v/c Ratio	0.51	0.49	0.15	0.25	0.90	0.28
Control Delay	38.4	12.7	5.5	7.1	24.9	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	12.7	5.5	7.1	24.9	5.2
Queue Length 50th (m)	16.6	3.0	1.0	10.4	94.4	6.8
Queue Length 95th (m)	36.2	20.1	3.4	33.4	#278.4	26.0
Internal Link Dist (m)	185.8			275.0	375.1	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	600	649	191	1065	1262	989
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.27	0.15	0.25	0.90	0.28

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	120	162	26	241	1029	248
Future Volume (vph)	120	162	26	241	1029	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	5.1	5.1	5.1	5.1	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.95	1.00	0.08	1.00	1.00	1.00
Satd. Flow (perm)	1789	1633	133	1575	1865	1418
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	132	178	29	265	1131	273
RTOR Reduction (vph)	0	132	0	0	0	33
Lane Group Flow (vph)	132	46	29	265	1131	240
Heavy Vehicles (%)	2%	0%	9%	22%	3%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	11.4	11.4	54.8	53.0	53.0	53.0
Effective Green, g (s)	11.4	11.4	54.8	53.0	53.0	53.0
Actuated g/C Ratio	0.14	0.14	0.67	0.65	0.65	0.65
Clearance Time (s)	5.1	5.1	5.1	5.1	5.1	5.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	250	228	123	1024	1212	922
v/s Ratio Prot			c0.01	0.17	c0.61	
v/s Ratio Perm	c0.07	0.03	0.15			0.17
v/c Ratio	0.53	0.20	0.24	0.26	0.93	0.26
Uniform Delay, d1	32.6	31.0	16.3	6.0	12.7	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.4	1.0	0.6	14.1	0.7
Delay (s)	34.6	31.5	17.3	6.6	26.8	6.7
Level of Service	C	C	B	A	C	A
Approach Delay (s)	32.8			7.7	22.9	
Approach LOS	C			A	C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	15.3
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1570	1807	1883	1731	1418
Flt Permitted	0.950		0.400			
Satd. Flow (perm)	1820	1570	761	1883	1731	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		97				158
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.7	398.9	
Travel Time (s)	15.7			22.5	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	342	90	183	826	418	186
Future Volume (vph)	342	90	183	826	418	186
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	25.1	25.1	9.5	36.1	36.1	36.1
Total Split (s)	31.2	31.2	13.0	51.0	51.0	51.0
Total Split (%)	32.8%	32.8%	13.7%	53.6%	53.6%	53.6%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	22.0	22.0	57.0	45.0	45.0	45.0
Actuated g/C Ratio	0.24	0.24	0.63	0.49	0.49	0.49
v/c Ratio	0.84	0.21	0.34	0.95	0.53	0.26
Control Delay	51.0	7.3	8.3	45.0	19.4	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	7.3	8.3	45.0	19.4	5.0
LOS	D	A	A	D	B	A
Approach Delay	41.9			38.3	15.0	
Approach LOS	D			D	B	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 91.1	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 32.2	Intersection LOS: C
Intersection Capacity Utilization 72.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	368	97	197	888	449	200
v/c Ratio	0.84	0.21	0.34	0.95	0.53	0.26
Control Delay	51.0	7.3	8.3	45.0	19.4	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	7.3	8.3	45.0	19.4	5.0
Queue Length 50th (m)	62.0	0.0	12.9	153.5	55.3	4.0
Queue Length 95th (m)	#102.5	11.4	21.9	#241.2	85.3	15.8
Internal Link Dist (m)	185.8			275.7	374.9	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	502	504	600	931	855	781
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.19	0.33	0.95	0.53	0.26

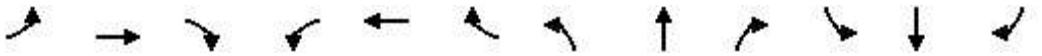
Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	342	90	183	826	418	186
Future Volume (vph)	342	90	183	826	418	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1820	1570	1807	1883	1731	1418
Flt Permitted	0.95	1.00	0.40	1.00	1.00	1.00
Satd. Flow (perm)	1820	1570	761	1883	1731	1418
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	368	97	197	888	449	200
RTOR Reduction (vph)	0	74	0	0	0	80
Lane Group Flow (vph)	368	23	197	888	449	120
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	22.0	22.0	53.9	45.0	45.0	45.0
Effective Green, g (s)	22.0	22.0	53.9	45.0	45.0	45.0
Actuated g/C Ratio	0.24	0.24	0.59	0.49	0.49	0.49
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	439	379	552	930	855	700
v/s Ratio Prot			c0.03	c0.47	0.26	
v/s Ratio Perm	c0.20	0.01	0.18			0.08
v/c Ratio	0.84	0.06	0.36	0.95	0.53	0.17
Uniform Delay, d1	32.9	26.6	9.1	22.1	15.7	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.1	0.1	0.4	20.4	2.3	0.5
Delay (s)	46.0	26.7	9.5	42.5	18.1	13.3
Level of Service	D	C	A	D	B	B
Approach Delay (s)	41.9			36.5	16.6	
Approach LOS	D			D	B	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	91.1	Sum of lost time (s)	15.2
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Appendix G – Future Total level of Service Calculations (Optimized)



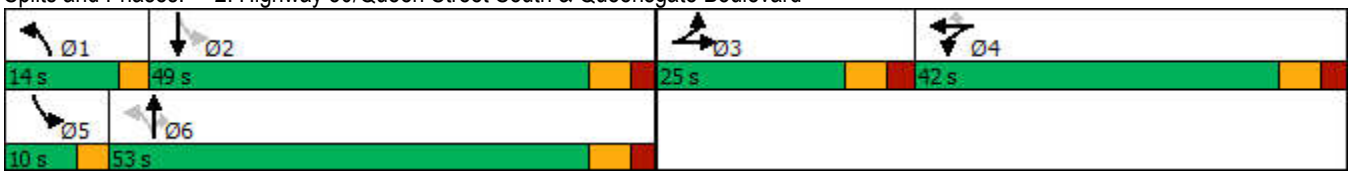
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	65.0		0.0	40.0		150.0	100.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	1.00	0.99		1.00	1.00	0.99					1.00	
Frt		0.850				0.850			0.850		0.995	
Flt Protected	0.950			0.950	0.963		0.950			0.950		
Satd. Flow (prot)	1825	1609	0	1734	1758	1601	1825	3411	1555	1690	3560	0
Flt Permitted	0.950			0.950	0.963		0.086			0.497		
Satd. Flow (perm)	1823	1609	0	1729	1754	1580	165	3411	1555	884	3560	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		136				136			112		3	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		90.0			184.6			380.6			254.7	
Travel Time (s)		6.8			13.8			28.5			19.1	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	1	0	532	66	104	181	405	100	94	1099
Future Volume (vph)	1	0	532	66	104	181	405	100	94	1099
Turn Type	Split	NA	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	3	4	4		1	6		5	2
Permitted Phases					4	6		6	2	
Detector Phase	3	3	4	4	4	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	34.7	34.7	34.7	34.7	34.7	9.5	36.5	36.5	9.5	36.5
Total Split (s)	25.0	25.0	42.0	42.0	42.0	14.0	53.0	53.0	10.0	49.0
Total Split (%)	19.2%	19.2%	32.3%	32.3%	32.3%	10.8%	40.8%	40.8%	7.7%	37.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	0.0	2.5	2.5	0.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	6.7	6.7	6.7	3.0	6.5	6.5	3.0	6.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	8.2	8.2	25.0	25.0	25.0	61.0	47.5	47.5	53.9	43.4
Actuated g/C Ratio	0.08	0.08	0.25	0.25	0.25	0.60	0.47	0.47	0.53	0.43
v/c Ratio	0.01	0.06	0.76	0.75	0.23	0.71	0.27	0.14	0.19	0.81
Control Delay	51.0	0.4	47.5	46.9	4.5	35.3	19.4	4.6	13.1	32.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	0.4	47.5	46.9	4.5	35.3	19.4	4.6	13.1	32.8
LOS	D	A	D	D	A	D	B	A	B	C
Approach Delay		3.8		40.9			21.4			31.3
Approach LOS		A		D			C			C

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 100.9	
Natural Cycle: 140	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 31.1	Intersection LOS: C
Intersection Capacity Utilization 79.1%	ICU Level of Service D
Analysis Period (min) 15	

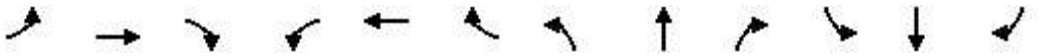
Splits and Phases: 2: Highway 50/Queen Street South & Queensgate Boulevard



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	14	324	326	113	197	440	109	102	1235
v/c Ratio	0.01	0.06	0.76	0.75	0.23	0.71	0.27	0.14	0.19	0.81
Control Delay	51.0	0.4	47.5	46.9	4.5	35.3	19.4	4.6	13.1	32.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	0.4	47.5	46.9	4.5	35.3	19.4	4.6	13.1	32.8
Queue Length 50th (m)	0.2	0.0	56.4	56.7	0.0	16.7	23.1	0.0	6.4	94.8
Queue Length 95th (m)	2.0	0.0	101.7	102.2	8.9	#68.6	50.6	10.6	22.0	#196.8
Internal Link Dist (m)		66.0		160.6			356.6			230.7
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	338	408	619	627	651	284	1604	790	531	1533
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	0.00	0.03	0.52	0.52	0.17	0.69	0.27	0.14	0.19	0.81

Intersection Summary

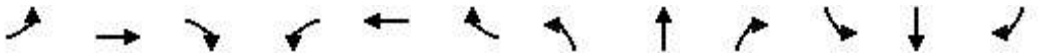
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	13	532	66	104	181	405	100	94	1099	37
Future Volume (vph)	1	0	13	532	66	104	181	405	100	94	1099	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	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)	1825	1610		1734	1757	1580	1825	3411	1555	1690	3561	
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.09	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	1825	1610		1734	1757	1580	165	3411	1555	884	3561	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	14	578	72	113	197	440	109	102	1195	40
RTOR Reduction (vph)	0	14	0	0	0	86	0	0	60	0	2	0
Lane Group Flow (vph)	1	0	0	324	326	27	197	440	49	102	1233	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	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases						4	6		6	2		
Actuated Green, G (s)	2.7	2.7		25.0	25.0	25.0	57.4	47.5	47.5	50.4	43.5	
Effective Green, g (s)	2.7	2.7		25.0	25.0	25.0	57.4	47.5	47.5	50.4	43.5	
Actuated g/C Ratio	0.03	0.03		0.24	0.24	0.24	0.55	0.45	0.45	0.48	0.41	
Clearance Time (s)	6.7	6.7		6.7	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)	46	41		412	418	376	262	1543	703	477	1475	
v/s Ratio Prot	c0.00	0.00		c0.19	0.19		c0.08	0.13		0.01	c0.35	
v/s Ratio Perm						0.02	0.33		0.03	0.09		
v/c Ratio	0.02	0.01		0.79	0.78	0.07	0.75	0.29	0.07	0.21	0.84	
Uniform Delay, d1	49.9	49.8		37.5	37.4	31.0	23.4	18.1	16.3	15.1	27.6	
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	0.1		9.5	8.9	0.1	11.5	0.5	0.2	0.2	5.8	
Delay (s)	50.1	49.9		47.0	46.4	31.1	34.9	18.5	16.5	15.3	33.3	
Level of Service	D	D		D	D	C	C	B	B	B	C	
Approach Delay (s)		49.9			44.4			22.6			32.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	22.9
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



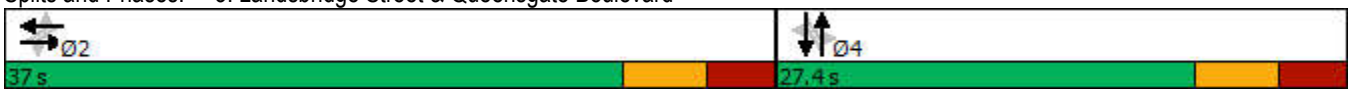
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	100.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99		1.00				0.99		1.00		
Frt		0.957			0.995			0.938			0.883	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1644	3334	0	1644	3563	0	1772	1748	0	1615	1571	0
Flt Permitted	0.472			0.648			0.689			0.692		
Satd. Flow (perm)	817	3334	0	1120	3563	0	1285	1748	0	1172	1571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			8			41			82	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		184.6			440.7			367.6			159.1	
Travel Time (s)		13.8			33.1			27.6			11.9	

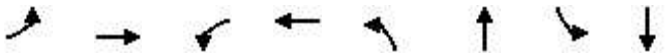
Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	18	104	9	417	179	52	15	20
Future Volume (vph)	18	104	9	417	179	52	15	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phase	2	2	2	2	4	4	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Total Split (s)	37.0	37.0	37.0	37.0	27.4	27.4	27.4	27.4
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39
v/c Ratio	0.07	0.12	0.02	0.34	0.41	0.14	0.04	0.16
Control Delay	13.8	9.7	13.1	15.2	19.3	9.9	14.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	9.7	13.1	15.2	19.3	9.9	14.3	6.0
LOS	B	A	B	B	B	A	B	A
Approach Delay		10.2		15.2		16.2		7.2
Approach LOS		B		B		B		A

Intersection Summary	
Cycle Length: 64.4	
Actuated Cycle Length: 72.4	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

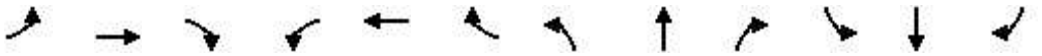
Splits and Phases: 3: Landsbridge Street & Queensgate Boulevard





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	23	165	10	492	203	100	17	105
v/c Ratio	0.07	0.12	0.02	0.34	0.41	0.14	0.04	0.16
Control Delay	13.8	9.7	13.1	15.2	19.3	9.9	14.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	9.7	13.1	15.2	19.3	9.9	14.3	6.0
Queue Length 50th (m)	1.8	5.0	0.8	22.9	19.6	5.0	1.4	1.9
Queue Length 95th (m)	5.3	10.0	3.3	32.6	35.1	13.2	4.9	10.1
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)	334	1390	457	1461	496	701	453	657
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	0.07	0.12	0.02	0.34	0.41	0.14	0.04	0.16

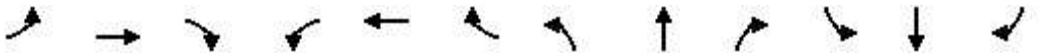
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	104	41	9	417	16	179	52	36	15	20	72
Future Volume (vph)	18	104	41	9	417	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)	7.4	7.4		7.4	7.4		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	3335		1643	3561		1772	1748		1607	1571	
Flt Permitted	0.47	1.00		0.65	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	817	3335		1120	3561		1285	1748		1171	1571	
Peak-hour factor, PHF	0.80	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	22	118	47	10	474	18	203	59	41	17	23	82
RTOR Reduction (vph)	0	28	0	0	5	0	0	25	0	0	50	0
Lane Group Flow (vph)	23	137	0	10	487	0	203	75	0	17	55	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		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.39	0.39		0.39	0.39	
Clearance Time (s)	7.4	7.4		7.4	7.4		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)	334	1363		457	1455		496	676		452	607	
v/s Ratio Prot		0.04			c0.14			0.04			0.03	
v/s Ratio Perm	0.03			0.01			c0.16			0.01		
v/c Ratio	0.07	0.10		0.02	0.33		0.41	0.11		0.04	0.09	
Uniform Delay, d1	13.0	13.2		12.8	14.7		16.2	14.2		13.8	14.1	
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	0.6		2.5	0.3		0.2	0.3	
Delay (s)	13.4	13.3		12.9	15.3		18.7	14.6		14.0	14.4	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		13.4			15.2			17.3			14.3	
Approach LOS		B			B			B			B	

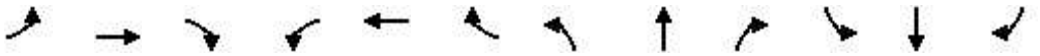
Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.8
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	85.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993						0.922				
Flt Protected				0.950				0.979				
Satd. Flow (prot)	1883	3553	0	1789	3579	0	0	1700	0	0	1883	0
Flt Permitted				0.950				0.979				
Satd. Flow (perm)	1883	3553	0	1789	3579	0	0	1700	0	0	1883	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		440.7			430.4			71.7			211.6	
Travel Time (s)		33.1			32.3			5.4			15.9	

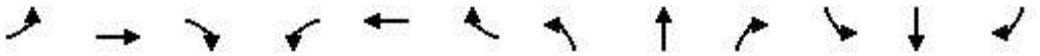
Intersection Summary	
Area Type:	Other



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	148	7	9	422	0	20	0	28	0	0	0
Future Volume (Veh/h)	0	148	7	9	422	0	20	0	28	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	161	8	10	459	0	22	0	30	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	459			169			414	644	84	590	648	230
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459			169			414	644	84	590	648	230
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			99			96	100	97	100	100	100
cM capacity (veh/h)	1098			1406			519	387	958	377	385	773

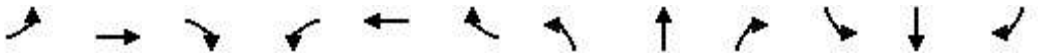
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	107	62	10	306	153	52	0
Volume Left	0	0	0	10	0	0	22	0
Volume Right	0	0	8	0	0	0	30	0
cSH	1700	1700	1700	1406	1700	1700	706	1700
Volume to Capacity	0.00	0.06	0.04	0.01	0.18	0.09	0.07	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.2	0.0	0.0	1.8	0.0
Control Delay (s)	0.0	0.0	0.0	7.6	0.0	0.0	10.5	0.0
Lane LOS				A			B	A
Approach Delay (s)	0.0			0.2			10.5	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			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	70.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.988			0.935			0.968	
Flt Protected	0.950			0.950				0.977			0.965	
Satd. Flow (prot)	1521	3543	0	1825	3541	0	0	1699	0	0	1782	0
Flt Permitted	0.950			0.950				0.977			0.965	
Satd. Flow (perm)	1521	3543	0	1825	3541	0	0	1699	0	0	1782	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		430.4			209.8			262.8			298.3	
Travel Time (s)		32.3			15.7			19.7			22.4	

Intersection Summary	
Area Type:	Other



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	113	11	8	246	22	27	3	28	134	7	44
Future Volume (Veh/h)	10	113	11	8	246	22	27	3	28	134	7	44
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	116	11	8	254	23	28	3	29	138	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	277			128			341	436	66	392	430	146
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	277			128			341	436	66	392	430	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			95	99	97	73	99	95
cM capacity (veh/h)	1162			1469			531	509	987	519	513	876

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	10	77	50	8	169	108	60	190
Volume Left	10	0	0	8	0	0	28	138
Volume Right	0	0	11	0	0	23	29	45
cSH	1162	1700	1700	1469	1700	1700	682	574
Volume to Capacity	0.01	0.05	0.03	0.01	0.10	0.06	0.09	0.33
Queue Length 95th (m)	0.2	0.0	0.0	0.1	0.0	0.0	2.2	11.0
Control Delay (s)	8.1	0.0	0.0	7.5	0.0	0.0	10.8	14.3
Lane LOS	A			A			B	B
Approach Delay (s)	0.6			0.2			10.8	14.3
Approach LOS							B	B

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	31.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.950		0.076			
Satd. Flow (perm)	1789	1633	134	1575	1865	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		156				99
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			299.9	399.3	
Travel Time (s)	15.7			22.5	29.9	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	129	180	29	241	1029	254
Future Volume (vph)	129	180	29	241	1029	254
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	23.1	23.1	8.0	24.1	24.1	24.1
Total Split (s)	31.2	31.2	8.0	56.0	56.0	56.0
Total Split (%)	32.8%	32.8%	8.4%	58.8%	58.8%	58.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	3.0	5.1	5.1	5.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	11.6	11.6	56.3	52.4	52.4	52.4
Actuated g/C Ratio	0.15	0.15	0.73	0.68	0.68	0.68
v/c Ratio	0.53	0.52	0.16	0.25	0.89	0.28
Control Delay	37.9	14.2	5.0	6.8	24.2	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	14.2	5.0	6.8	24.2	4.9
LOS	D	B	A	A	C	A
Approach Delay	24.1			6.6	20.4	
Approach LOS	C			A	C	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 77.2	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	142	198	32	265	1131	279
v/c Ratio	0.53	0.52	0.16	0.25	0.89	0.28
Control Delay	37.9	14.2	5.0	6.8	24.2	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	14.2	5.0	6.8	24.2	4.9
Queue Length 50th (m)	18.0	5.0	0.9	10.7	96.1	6.9
Queue Length 95th (m)	37.3	23.5	3.4	31.7	#270.0	24.7
Internal Link Dist (m)	185.8			275.9	375.3	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	608	657	198	1068	1264	993
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.30	0.16	0.25	0.89	0.28

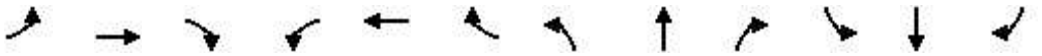
Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	129	180	29	241	1029	254
Future Volume (vph)	129	180	29	241	1029	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	5.1	5.1	3.0	5.1	5.1	5.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1789	1633	1674	1575	1865	1418
Flt Permitted	0.95	1.00	0.08	1.00	1.00	1.00
Satd. Flow (perm)	1789	1633	135	1575	1865	1418
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	142	198	32	265	1131	279
RTOR Reduction (vph)	0	133	0	0	0	33
Lane Group Flow (vph)	142	65	32	265	1131	246
Heavy Vehicles (%)	2%	0%	9%	22%	3%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	11.6	11.6	54.2	52.4	52.4	52.4
Effective Green, g (s)	11.6	11.6	54.2	52.4	52.4	52.4
Actuated g/C Ratio	0.15	0.15	0.69	0.66	0.66	0.66
Clearance Time (s)	5.1	5.1	3.0	5.1	5.1	5.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	262	239	127	1044	1237	940
v/s Ratio Prot			c0.01	0.17	c0.61	
v/s Ratio Perm	c0.08	0.04	0.17			0.17
v/c Ratio	0.54	0.27	0.25	0.25	0.91	0.26
Uniform Delay, d1	31.2	29.9	14.6	5.4	11.4	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.6	1.0	0.6	11.9	0.7
Delay (s)	33.5	30.6	15.7	6.0	23.3	6.1
Level of Service	C	C	B	A	C	A
Approach Delay (s)	31.8			7.0	19.9	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



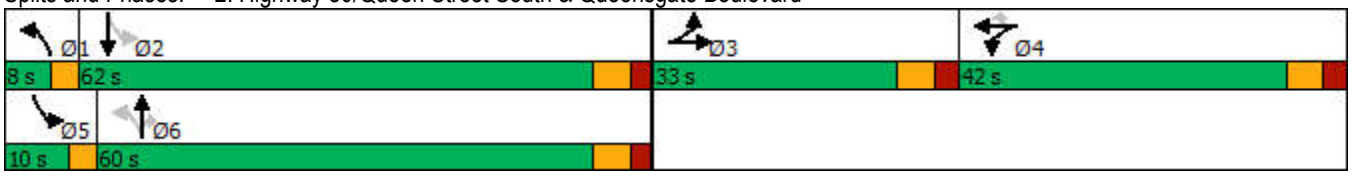
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	0.0		0.0	65.0		0.0	40.0		150.0	100.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.98		0.99	0.99	0.98	1.00		0.98		1.00	
Frt		0.885				0.850			0.850		0.999	
Flt Protected	0.950			0.950	0.954		0.950			0.950		
Satd. Flow (prot)	1825	1669	0	1717	1724	1617	1825	3614	1617	1825	3540	0
Flt Permitted	0.950			0.950	0.954		0.360			0.068		
Satd. Flow (perm)	1810	1669	0	1701	1709	1582	689	3614	1582	131	3540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101				140			564			
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		90.0			184.6			380.6			255.0	
Travel Time (s)		6.8			13.8			28.5			19.1	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	29	41	236	4	130	15	1570	571	115	675
Future Volume (vph)	29	41	236	4	130	15	1570	571	115	675
Turn Type	Split	NA	Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	3	3	4	4		1	6		5	2
Permitted Phases					4	6		6	2	
Detector Phase	3	3	4	4	4	1	6	6	5	2
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0
Minimum Split (s)	24.7	24.7	24.7	24.7	24.7	8.0	24.5	24.5	9.5	24.5
Total Split (s)	33.0	33.0	42.0	42.0	42.0	8.0	60.0	60.0	10.0	62.0
Total Split (%)	22.8%	22.8%	29.0%	29.0%	29.0%	5.5%	41.4%	41.4%	6.9%	42.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	0.0	2.5	2.5	0.0	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	6.7	6.7	6.7	3.0	6.5	6.5	3.0	6.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max
Act Effct Green (s)	12.2	12.2	14.0	14.0	14.0	62.3	53.8	53.8	67.0	60.9
Actuated g/C Ratio	0.11	0.11	0.13	0.13	0.13	0.57	0.49	0.49	0.61	0.55
v/c Ratio	0.15	0.69	0.60	0.58	0.43	0.04	0.96	0.58	0.66	0.37
Control Delay	46.6	36.7	57.5	56.9	11.7	11.3	41.9	5.1	34.9	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	36.7	57.5	56.9	11.7	11.3	41.9	5.1	34.9	16.5
LOS	D	D	E	E	B	B	D	A	C	B
Approach Delay		38.1		41.2			31.9			19.2
Approach LOS		D		D			C			B

Intersection Summary	
Cycle Length: 145	
Actuated Cycle Length: 110.1	
Natural Cycle: 115	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 30.4	Intersection LOS: C
Intersection Capacity Utilization 89.0%	ICU Level of Service E
Analysis Period (min) 15	

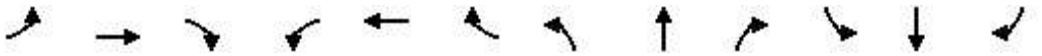
Splits and Phases: 2: Highway 50/Queen Street South & Queensgate Boulevard



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	31	191	130	128	140	16	1688	614	124	729
v/c Ratio	0.15	0.69	0.60	0.58	0.43	0.04	0.96	0.58	0.66	0.37
Control Delay	46.6	36.7	57.5	56.9	11.7	11.3	41.9	5.1	34.9	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	36.7	57.5	56.9	11.7	11.3	41.9	5.1	34.9	16.5
Queue Length 50th (m)	6.1	18.3	27.7	27.3	0.0	1.2	172.6	5.4	10.0	39.7
Queue Length 95th (m)	15.5	43.9	50.8	50.2	17.4	5.1	#282.5	34.7	#43.5	79.5
Internal Link Dist (m)		66.0		160.6			356.6			231.0
Turn Bay Length (m)			65.0			40.0		150.0	100.0	
Base Capacity (vph)	438	477	553	555	604	442	1765	1061	188	1957
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.40	0.24	0.23	0.23	0.04	0.96	0.58	0.66	0.37

Intersection Summary

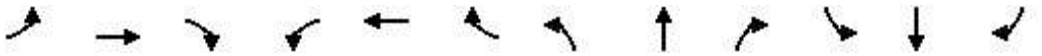
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	41	137	236	4	130	15	1570	571	115	675	3
Future Volume (vph)	29	41	137	236	4	130	15	1570	571	115	675	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	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	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	1672		1717	1724	1586	1822	3614	1586	1825	3542	
Flt Permitted	0.95	1.00		0.95	0.95	1.00	0.36	1.00	1.00	0.07	1.00	
Satd. Flow (perm)	1825	1672		1717	1724	1586	690	3614	1586	131	3542	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	31	44	147	254	4	140	16	1688	614	124	726	3
RTOR Reduction (vph)	0	90	0	0	0	122	0	0	283	0	0	0
Lane Group Flow (vph)	31	101	0	130	128	18	16	1688	331	124	729	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	Split	NA		Split	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases						4	6		6	2		
Actuated Green, G (s)	12.2	12.2		14.0	14.0	14.0	57.7	55.8	55.8	65.8	60.9	
Effective Green, g (s)	12.2	12.2		14.0	14.0	14.0	57.7	55.8	55.8	65.8	60.9	
Actuated g/C Ratio	0.11	0.11		0.13	0.13	0.13	0.52	0.50	0.50	0.59	0.54	
Clearance Time (s)	6.7	6.7		6.7	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)	198	182		214	215	198	375	1802	790	183	1927	
v/s Ratio Prot	0.02	c0.06		c0.08	0.07		0.00	c0.47		c0.04	0.21	
v/s Ratio Perm						0.01	0.02		0.21	0.36		
v/c Ratio	0.16	0.56		0.61	0.60	0.09	0.04	0.94	0.42	0.68	0.38	
Uniform Delay, d1	45.2	47.3		46.3	46.3	43.3	13.3	26.4	17.8	23.5	14.6	
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	0.4	3.6		4.8	4.4	0.2	0.0	10.7	1.6	9.5	0.6	
Delay (s)	45.6	50.9		51.2	50.7	43.5	13.3	37.1	19.4	33.1	15.2	
Level of Service	D	D		D	D	D	B	D	B	C	B	
Approach Delay (s)		50.2			48.3			32.3			17.8	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	111.9	Sum of lost time (s)	22.9
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



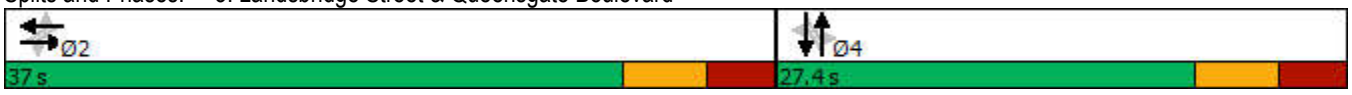
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	40.0		0.0	100.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.99		0.99	0.99		0.99	0.99	
Frt		0.967			0.968			0.967			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3501	0	1825	3483	0	1825	1847	0	1825	1760	0
Flt Permitted	0.599			0.316			0.664			0.706		
Satd. Flow (perm)	1141	3501	0	603	3483	0	1265	1847	0	1338	1760	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			52			17			72	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		184.6			440.7			367.6			159.1	
Travel Time (s)		13.8			33.1			27.6			11.9	

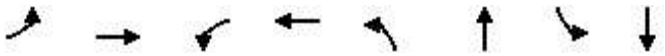
Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	91	548	24	185	115	58	67	70
Future Volume (vph)	91	548	24	185	115	58	67	70
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		2		4		4
Permitted Phases	2		2		4		4	
Detector Phase	2	2	2	2	4	4	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Total Split (s)	37.0	37.0	37.0	37.0	27.4	27.4	27.4	27.4
Total Split (%)	57.5%	57.5%	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.6	29.6	29.6	29.6	28.0	28.0	28.0	28.0
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.39
v/c Ratio	0.21	0.50	0.10	0.17	0.25	0.11	0.14	0.20
Control Delay	15.4	15.6	14.7	11.0	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	15.6	14.7	11.0	16.8	12.2	15.3	8.8
LOS	B	B	B	B	B	B	B	A
Approach Delay		15.6		11.3		15.0		11.0
Approach LOS		B		B		B		B

Intersection Summary	
Cycle Length: 64.4	
Actuated Cycle Length: 72.4	
Natural Cycle: 75	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

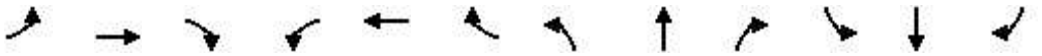
Splits and Phases: 3: Landsbridge Street & Queensgate Boulevard





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	738	25	247	121	78	71	146
v/c Ratio	0.21	0.50	0.10	0.17	0.25	0.11	0.14	0.20
Control Delay	15.4	15.6	14.7	11.0	16.8	12.2	15.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	15.6	14.7	11.0	16.8	12.2	15.3	8.8
Queue Length 50th (m)	8.2	33.8	2.0	8.4	10.8	5.1	6.1	6.3
Queue Length 95th (m)	17.6	48.4	6.7	15.1	22.1	12.8	13.9	16.8
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)	466	1474	246	1454	489	724	517	724
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	0.21	0.50	0.10	0.17	0.25	0.11	0.14	0.20

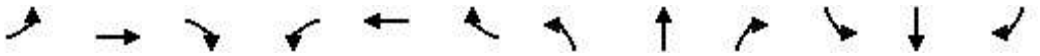
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	548	153	24	185	49	115	58	16	67	70	68
Future Volume (vph)	91	548	153	24	185	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)	7.4	7.4		7.4	7.4		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		0.98	1.00	
Frt	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	3501		1813	3483		1808	1847		1797	1758	
Flt Permitted	0.60	1.00		0.32	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	1139	3501		604	3483		1264	1847		1336	1758	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	96	577	161	25	195	52	121	61	17	71	74	72
RTOR Reduction (vph)	0	43	0	0	31	0	0	10	0	0	44	0
Lane Group Flow (vph)	96	695	0	25	216	0	121	68	0	71	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		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Effective Green, g (s)	29.6	29.6		29.6	29.6		28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.39	0.39		0.39	0.39	
Clearance Time (s)	7.4	7.4		7.4	7.4		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)	465	1431		246	1423		488	714		516	679	
v/s Ratio Prot		c0.20			0.06			0.04			0.06	
v/s Ratio Perm	0.08			0.04			c0.10			0.05		
v/c Ratio	0.21	0.49		0.10	0.15		0.25	0.09		0.14	0.15	
Uniform Delay, d1	13.8	15.8		13.2	13.5		15.1	14.1		14.4	14.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.2		0.8	0.2		1.2	0.3		0.6	0.5	
Delay (s)	14.8	17.0		14.0	13.7		16.3	14.4		14.9	14.9	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		16.7			13.7			15.5			14.9	
Approach LOS		B			B			B			B	

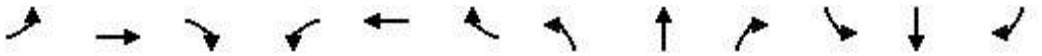
Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	14.8
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	85.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995						0.915				
Flt Protected				0.950				0.982				
Satd. Flow (prot)	1883	3561	0	1789	3579	0	0	1692	0	0	1883	0
Flt Permitted				0.950				0.982				
Satd. Flow (perm)	1883	3561	0	1789	3579	0	0	1692	0	0	1883	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		440.7			430.4			71.7			211.6	
Travel Time (s)		33.1			32.3			5.4			15.9	

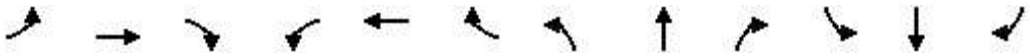
Intersection Summary	
Area Type:	Other



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	607	21	33	246	0	12	0	20	0	0	0
Future Volume (Veh/h)	0	607	21	33	246	0	12	0	20	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	660	23	36	267	0	13	0	22	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	267			683			877	1010	342	691	1022	134
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	267			683			877	1010	342	691	1022	134
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			94	100	97	100	100	100
cM capacity (veh/h)	1294			906			235	229	654	310	225	891

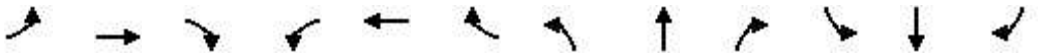
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	0	440	243	36	178	89	35	0
Volume Left	0	0	0	36	0	0	13	0
Volume Right	0	0	23	0	0	0	22	0
cSH	1700	1700	1700	906	1700	1700	394	1700
Volume to Capacity	0.00	0.26	0.14	0.04	0.10	0.05	0.09	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.9	0.0	0.0	2.2	0.0
Control Delay (s)	0.0	0.0	0.0	9.1	0.0	0.0	15.0	0.0
Lane LOS				A			C	A
Approach Delay (s)	0.0			1.1			15.0	0.0
Approach LOS							C	A

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	34.1%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Grade (%)		0%			0%			0%			0%	
Storage Length (m)	90.0		0.0	70.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.986			0.940			0.968			0.962	
Flt Protected	0.950			0.950				0.981			0.972	
Satd. Flow (prot)	1825	3567	0	1825	3397	0	0	1811	0	0	1776	0
Flt Permitted	0.950			0.950				0.981			0.972	
Satd. Flow (perm)	1825	3567	0	1825	3397	0	0	1811	0	0	1776	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		430.4			209.8			262.8			298.3	
Travel Time (s)		32.3			15.7			19.7			22.4	

Intersection Summary	
Area Type:	Other



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	337	35	15	222	147	44	43	27	67	16	33
Future Volume (Veh/h)	60	337	35	15	222	147	44	43	27	67	16	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	355	37	16	234	155	46	45	28	71	17	35
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	389			392			694	920	196	698	862	196
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			392			694	920	196	698	862	196
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			84	82	97	73	94	96
cM capacity (veh/h)	1181			1178			288	251	819	259	276	816

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	63	237	155	16	156	233	119	123
Volume Left	63	0	0	16	0	0	46	71
Volume Right	0	0	37	0	0	155	28	35
cSH	1181	1700	1700	1178	1700	1700	319	325
Volume to Capacity	0.05	0.14	0.09	0.01	0.09	0.14	0.37	0.38
Queue Length 95th (m)	1.3	0.0	0.0	0.3	0.0	0.0	12.7	13.0
Control Delay (s)	8.2	0.0	0.0	8.1	0.0	0.0	22.8	22.7
Lane LOS	A			A			C	C
Approach Delay (s)	1.1			0.3			22.8	22.7
Approach LOS							C	C

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	34.7%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.7	2.5
Grade (%)	0%			0%	0%	
Storage Length (m)	0.0	0.0	55.0			30.0
Storage Lanes	1	1	1			1
Taper Length (m)	2.5		2.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1570	1807	1883	1731	1418
Flt Permitted	0.950		0.398			
Satd. Flow (perm)	1820	1570	757	1883	1731	1418
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		110				166
Link Speed (k/h)	48			48	48	
Link Distance (m)	209.8			298.2	399.8	
Travel Time (s)	15.7			22.4	30.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	350	102	206	826	418	196
Future Volume (vph)	350	102	206	826	418	196
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Detector Phase	4	4	1	2	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	8.0	8.0	8.0
Minimum Split (s)	25.1	25.1	9.5	36.1	36.1	36.1
Total Split (s)	31.2	31.2	13.0	51.0	51.0	51.0
Total Split (%)	32.8%	32.8%	13.7%	53.6%	53.6%	53.6%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lead/Lag			Lead	Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Act Effct Green (s)	22.3	22.3	57.2	45.0	45.0	45.0
Actuated g/C Ratio	0.24	0.24	0.62	0.49	0.49	0.49
v/c Ratio	0.85	0.24	0.39	0.96	0.53	0.27
Control Delay	52.0	7.0	8.8	46.5	19.7	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	7.0	8.8	46.5	19.7	5.0
LOS	D	A	A	D	B	A
Approach Delay	41.8			39.0	15.0	
Approach LOS	D			D	B	

Intersection Summary	
Cycle Length: 95.2	
Actuated Cycle Length: 91.7	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 32.6	Intersection LOS: C
Intersection Capacity Utilization 73.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Albion Vaughan Road & Queensgate Boulevard

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	376	110	222	888	449	211
v/c Ratio	0.85	0.24	0.39	0.96	0.53	0.27
Control Delay	52.0	7.0	8.8	46.5	19.7	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	7.0	8.8	46.5	19.7	5.0
Queue Length 50th (m)	64.2	0.0	15.1	157.2	56.7	4.4
Queue Length 95th (m)	#106.0	12.0	24.6	#241.2	85.3	16.4
Internal Link Dist (m)	185.8			274.2	375.8	
Turn Bay Length (m)			55.0			30.0
Base Capacity (vph)	499	510	594	924	849	780
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.22	0.37	0.96	0.53	0.27

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	350	102	206	826	418	196
Future Volume (vph)	350	102	206	826	418	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.7	3.7	3.7	3.7	3.7	2.5
Total Lost time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1820	1570	1807	1883	1731	1418
Flt Permitted	0.95	1.00	0.40	1.00	1.00	1.00
Satd. Flow (perm)	1820	1570	758	1883	1731	1418
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	376	110	222	888	449	211
RTOR Reduction (vph)	0	83	0	0	0	84
Lane Group Flow (vph)	376	27	222	888	449	127
Confl. Peds. (#/hr)	1					
Heavy Vehicles (%)	0%	4%	1%	2%	11%	0%
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	2	2	
Permitted Phases	4	4	2			2
Actuated Green, G (s)	22.3	22.3	54.1	45.0	45.0	45.0
Effective Green, g (s)	22.3	22.3	54.1	45.0	45.0	45.0
Actuated g/C Ratio	0.24	0.24	0.59	0.49	0.49	0.49
Clearance Time (s)	6.1	6.1	3.0	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	443	382	551	925	850	696
v/s Ratio Prot			c0.04	c0.47	0.26	
v/s Ratio Perm	c0.21	0.02	0.20			0.09
v/c Ratio	0.85	0.07	0.40	0.96	0.53	0.18
Uniform Delay, d1	33.0	26.7	9.4	22.4	16.0	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.1	0.1	0.5	21.4	2.3	0.6
Delay (s)	47.1	26.7	9.9	43.8	18.4	13.6
Level of Service	D	C	A	D	B	B
Approach Delay (s)	42.5			37.0	16.8	
Approach LOS	D			D	B	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	15.2
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Appendix H – Town of Caledon and Region of Peel Transportation Comments

TOWN OF CALEDON

August 27, 2021

Comments sent via email

Christine Halis
KLM Planning Partners Inc.
64 Jardin Drive, Unit 1B
Concord, ON L4K 3P3

Dear Ms. Halis,

Re: **Draft Plan of Subdivision and Zoning By-law Amendment Applications**
KLM Planning Partners Ltd. on behalf of Carantania Investments (BT) Inc.
9229 5th Sideroad
Part Lot 5, Concession 7 (ALB), designated as Part of Part 1 of Plan 43R-23827
File No.: 21T-21001C and RZ 2021-0005

Further to your submission received February 24, 2021, the following comments have been received and are outlined below for you review.

Proposal

The applicant is proposing to develop a 4.49 hectare site which is currently vacant. The proposed Draft Plan of Subdivision seeks to facilitate the development of 84 single detached dwellings, a park block, and internal streets.

The subject lands are located within a Rural Service Centre on Schedule 'A1' Town Structure and are designated Mixed Low/Medium Density Residential, Medium Density Residential and Open Space Policy Area on Schedule 'C-2' Bolton South Hill Land Use Plan in the Town of Caledon Official Plan. The lands are currently zoned Residential One (R1) with exceptions, Mixed Density Residential (RMD) and Open Space (OS) by the Town of Caledon Zoning By-law 2006-50, as amended.

The proposed Zoning By-law Amendment seeks to rezone the lands municipally known as 9229 5th Sideroad from various Residential One Exception zones, including R1-69, R1-97, R1-103, R1-104 and R1-107, Mixed Density Residential (RMD) and Open Space (OS) to Residential One Exception XXX (R1-XXX), to permit site specific uses and standards and Open Space (OS) to implement the proposed residential development.

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The Draft Plan of Subdivision Application proposes to facilitate the development of 84 single detached dwellings, a park block, and establish a public street network which is integrated with the existing street network. The Draft Plan also delineates the proposed property boundaries for each new lot and the location of a new park block.

Executive Summary of Comments

At this time staff are unable to support the proposed Draft Plan of Subdivision and Zoning By-law Amendment applications, for reasons detailed within this letter and summarized briefly below:

- The submitted planning justification report requires further analysis of the existing zoning and land use designation to property justify the proposed rezoning.
- The submitted Traffic Impact Study requires further analysis to support the proposed development.
- Further analysis relating to servicing is required through updates to the Functional Servicing and Stormwater Management Report in order to support the proposed scale of development on the subject lands.
- Amendments are required to various material to address comments contained in this letter.

This comment letter has been formatted to identify those comments to be addressed in each milestone as follows:

- General (Advisory) Comments
- Comments to be Addressed Prior to the Draft Plan of Subdivision Approval
- Comments to be Addressed as Conditions of Draft Plan of Subdivision Approval
- Comments to be Addressed Prior to the Zoning By-law Amendment

General (Advisory) Comments

1. For property tax purposes, the property is currently assessed as Residential ($1.47 million CVA). The Town's share of taxes levied, based on the current value assessment is approximately $7,700. As at May 21, 2021, the property tax account is determined to be current. *(Town of Caledon, Finance Services Department, Finance)*

2. If the proposed development were to proceed as planned (includes a residential subdivision with 84 single detached units), the taxable assessment value of the property may change to reflect any development that would have taken place. *(Town of Caledon, Finance Services Department, Finance)*

3. The related rezoning application RZ 2021-0005 was deemed complete on April 22, 2021. Under current by-laws, Development Charges for the proposed project will be fixed at the rates in effect on that date. Interest charges will then apply for the period April 23, 2021 through to the date on which Development Charges will be received. *(Town of Caledon, Finance Services Department, Finance)*

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4. Those fixed Development Charges rates will be:
   a. Town of Caledon: $31,656.69 per single, or semi-detached dwelling.
   b. Region of Peel: $60,093.31 per single or semi-detached dwelling. If the proposed development has limited access to the Region's water or sanitary services, those rates would be discounted.
   c. Starting on February 1, 2016, the Region began collecting directly for hard service Development Charges (i.e. water, wastewater and roads) for all residential subdivisions, except for apartments, at the time of subdivision agreement execution.
   d. School Boards: $4,572 per any residential dwelling; and
   e. Go-transit: $587.64 per single or semi-detached residential dwelling.

   (Town of Caledon, Finance Services Department, Finance)

5. The Development Charges comments and estimates above are as at May 21, 2021 and are based upon information provided to the Town by the applicant, current By-laws in effect and current rates, which are indexed twice a year. For site plan or rezoning applications dated on or after January 1, 2020, Development Charges are calculated at rates applicable on the date when an application is determined to be complete; and are payable at the time of building permit issuance. Interest charges will apply for affected applications. For site plan or rezoning applications dated prior to January 1, 2020, Development Charges are calculated and payable at building permit issuance date. Development Charge by-laws and rates are subject to change. Further, proposed developments may change from the current proposal to the building permit stage. Any estimates provided will be updated based on changes in actual information related to the construction as provided in the building permit application. *(Town of Caledon, Finance Services Department, Finance)*

6. No objection to the proposed application at this time. The applicant shall contact Enbridge Gas Inc.'s Customer Connections department by emailing SalesArea20@Enbridge.com to determine gas availability, service and meter installation details and to ensure all gas piping is installed prior to the commencement of site landscaping (including, but not limited to: tree planting, silva cells, and/or soil trenches) and/or asphalt paving. In the event that easement(s) are required to service this development, and any future adjacent developments, the applicant will provide the easement(s) to Enbridge Gas Inc. at no cost. *(Enbridge Gas Inc.)*

7. Please refer to the attached Peel District School Board letter. *(Peel District School Board)*

8. Please refer to the attached Dufferin-Peel Catholic District School Board letter. *(Dufferin-Peel Catholic District School Board)*

<u>Comments to be Addressed prior to Draft Plan of Subdivision Approval</u>

1. Various letters, emails and telephone calls have been received from members of the public raising their concerns with the proposed applications. Attached to this letter are comments that have been received, please prepare a document with your resubmission that addresses these comments. There may be additional comments received in the future at a Public Meeting or otherwise which will also require a response. Those future comments will be

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provided under separate cover and will require responses prior to a staff report being brought forward for consideration by Planning and Development Committee and Council. *(Town of Caledon, Planning Department, Development Review Services)*

2. Planning Justification Report ("PJR") and Zoning By-law Amendment ("ZBA") Comments:

   a. The Official Plan designates a portion of the southernmost lots on Pembrook Street as Open Space Policy Area. The PJR should include analysis of section 7.2.6.4 of the Official Plan relating to minor adjustments to park locations.

   b. The Units per hectare calculation in Section 3.2 identifies that the development will reach the maximum permitted density through the Official Plan Section 7.2.5.3.1(24.8 units per hectare). Please identify if the units per hectare calculation included the Open Space policy area.

      i. The density must be calculated in accordance with Section 7.2.5.3.1 and Open Space Policy Area does not count towards the site area for the calculation.

      ii. If the density will exceed 24.8 units per hectare, an Official Plan Amendment will be required.

   c. Please include additional information in Section 3.1 regarding how the proposed built form will be sympathetic to the surrounding community.

   d. Section 4.2 of the PJR should be revised to reflect that a portion of the subject lands are zoned Open Space (OS).

   e. Section 5.2 should be corrected as the subject lands are not located in an Urban Growth Centre. Section 5.2 should be updated with the proper Figure Number for the A Place to Grow Figure on page 18. The schedule of A Place to Grow that is included in the PJR is not Schedule 2, and should be updated to reflect the proper schedule number.

   f. Section 5.2 should be updated to include discussion of Section 2.2.1.4 of A Place to Grow, regarding Complete Communities.

   g. Section 5.3 should include analysis of how the proposed development is consistent with the objectives of section 5.4.3.1 of the Regional Official Plan.

   h. Section 5.3 should include a discussion of how the proposed development meets the objectives and policies of section 5.5, specifically 5.5.1 and 5.5.2, of the Region of Peel Official Plan.

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i. Section 5.3 should include discussion of how the proposed development meets the objectives of Section 5.8, specifically 5.8.1, of the Region of Peel Official Plan.

j. Section 5.4.1 of the PJR should include discussion relating to section 7.2.6 of the Town's Official Plan, specifically, as a small section of Open Space Policy Area is proposed to be converted to Mixed Low/Medium Density Residential

k. Section 5.4.1 should include analysis of how the proposed development meets the housing mix goals of section 7.2.5.3.4 of the Official Plan.

l. The proposed plan of subdivision does not conform to the boundary of the Open Space Policy Area on the southernmost lots fronting Pembrook Street, as identified on Schedule C-2 of the Official Plan.

    i. Analysis of how the proposed residential uses located within the Open Space Policy Area conform to the Town's Official Plan policies, as well as regional and provincial policy is needed.

m. The limits of the OS zone do not match the limits of the proposed R1-XXX and OS Zones.

    i. The Zoning By-law Amendment should include wording, specifying that the OS Zone is being amended to the R1-XXX Zone.

    ii. Mapping should be provided which identifies the rezoning of OS zoned lands to R1-XXX

    iii. Section 5.5 of the PJR should include justification for the proposed rezoning.

n. Section 5.5 should include a complete zoning matrix including how the proposed development will satisfy the following provisions:

    i. Building area (maximum)

    ii. Backyard Amenity Area (Minimum)

    iii. Interior Side Yard (Minimum), Main Building on Driveway side and opposite side

    iv. Building Height (maximum)

    v. Landscape Area (minimum)

    vi. Driveway Setback (minimum)

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o. Please include all proposed zoning by-law amendment provisions included in the Draft Zoning By-law Document, in Section 5.5 of the PJR

p. Section 5.5 of the PJR requires further analysis for why the proposed amendments to the zoning by-law are appropriate, in relation to each amended provision, on the subject lands.

q. Please confirm if an amendment is required to Section 4.3.4 of the Zoning By-law.

    i. If an amendment is required, provide justification for the amendment

r. Please confirm if the proposed building area will allow sufficient space for future adjustments on each lot, for example, the construction of an accessory building.

(Town of Caledon, Planning Department, Development Review Services)

3. A Digital submission is required from the applicant in accordance with the Town's Digital Submission Standards. *(Town of Caledon, Information Technology, GIS and Planning Departments, Development Review Services)*

4. Please find attached comments from the Region of Peel. *(Region of Peel)*

5. Please find attached comments from the Toronto and Region Conservation Authority. *(Toronto and Region Conservation Authority).*

6. The proponent submitted a Stage 1 Archaeological Assessment that confirmed the requirement for further archaeological assessment of the subject lands. Please provide the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) acceptance letter associated with this assessment. *(Town of Caledon, Planning Department, Heritage)*

7. The development proponent shall retain an archaeologist, licensed by the MHSTCI under the provisions of the Ontario Heritage Act (R.S.O 2005 as amended), to carry out and submit a Stage 2 archaeological assessment for the entirety of the subject lands. *(Town of Caledon, Planning Department, Heritage)*

8. The development proponent shall follow through on MHSTCI and Town of Caledon Heritage staff recommendations to mitigate, through preservation or resource removal and documentation, adverse impacts to any significant archaeological resources found (Stages 3-4) to the satisfaction of the MHSTCI and the Town of Caledon Heritage staff prior to development approval. The archaeological assessment(s) must be completed in accordance with the most current Standards and Guidelines for Consultant Archaeologists. *(Town of Caledon, Planning Department, Heritage)*

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9. No demolition, construction, grading or other soil disturbances shall take place on the subject lands prior to the Town of Caledon Heritage staff receiving, to their satisfaction, all completed archaeological assessment(s), in both hard copy and PDF format, and the MHSTCI compliance letter(s) indicating that all archaeological licensing and technical review requirements have been satisfied and the report(s) has been entered into the Public Registry. *(Town of Caledon, Planning Department, Heritage)*

10. Significant archaeological resources will be incorporated into the proposed development through either in situ preservation or interpretation where feasible or may be commemorated and interpreted through exhibition development on site including, but not limited to, commemorative plaquing. *(Town of Caledon, Planning Department, Heritage)*

11. If the subject lands were previously assessed, the development proponent must provide a copy of the archaeological assessment(s) and the associated MHSTCI compliance letter(s) indicating that all archaeological licensing and technical review requirements have been satisfied and the report(s) has been entered into the Public Registry. *(Town of Caledon, Planning Department, Heritage)*

12. The Town of Caledon Development Engineering, Engineering Services Department has the following comments relating to the Functional Servicing Report and Storm Water Management:

    a. Albeit the subject site was a part of the original STM sewer design and was included in the tributary plans for SWM ponds 2, 3 and 17, it is recommended that a 100-year Hydraulic Grade Line analysis must be undertaken from the pond to the subject site to identify any potential flooding concerns in the downstream.

    b. A STM design chart including existing downstream pipes is not included in the FSR. Ponds may have been sized properly to accommodate the drainage from the subject site but the FSR must confirm that the downstream pipes can convey additional flows from the subject site.

    c. The depth of topsoil on the lots shown in the FSR (200mm) does not match the topsoil depth used for water balance calculation (300mm) in the Hydrogeological Assessment and Water Balance report. Please note that the Town of Caledon standard depth of topsoil is 300mm.

    d. The drainage areas (3.75 Ha & 0.74 Ha) listed in Section 4.1 do not match the tributary areas shown on Figure 3 (3.66 Ha & 0.83 Ha).

    e. According to Section 5.2, the residential units located along the Southbury Manor Drive extension will be serviced via a proposed 375mm diameter sewer. However, the Servicing Plan show 450mm diameter pipes. Please confirm.

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f. As mentioned in the FSR, SWM Ponds 2, 3 and 17 have been in operation for over two decades. While the Town's Public Works department is responsible for operation and maintenance of these ponds, the applicant must complete a bathymetric survey of Pond 2, 3 and 17 to ensure sufficient permanent pool storage is currently available to accommodate drainage from the subject site. Please confirm the sediment capacity of the sediment forebays compared to the original design.

(Town of Caledon, Engineering Services Department, Development Engineering)

13. The Town of Caledon Engineering Services Department, Development Engineering, had the following comments relating to the Servicing/Layout:

    a. According to the FSR, seven pre-installed STM services connections are proposed to be used for the residential units fronting Autumn Oak Court. Please confirm the locations of these service connections and discuss whether these connections can still meet the Town's latest standard given that they were installed in the late 90's.

    b. The future sidewalk shown along the west side of Autumn Oak Court is to be built as a part of this development to ensure continuous pedestrian traffic. The sidewalk width should be 1.5m as per the Town's Design Guideline.

    c. The sidewalk on the west side of Pembrook Street extension must be connected to the existing sidewalk at the intersection of Pembrook Street and Sheardown Trail. Similarly, the sidewalk on the north side of Southbury Manor Drive extension must be extended to the Autumn Oak Court intersection and align with the existing sidewalk on Southbury Manor Drive.

    d. The Servicing Plan proposes to connection a 450mm diameter pipe to the existing STM MH at the intersection of Southbury Manor Drive and Autumn Oak Court. Given the difference in pipe inverts (450mm @ 249.51m vs 375mm @ 249.00m), the stormwater from the subject site pipe will be conveyed by the 375mm pipes that flows easterly. This does not match Section 5.2 of the FSR. As per the Town Design Guideline, no decrease of pipe size from a larger upstream to a smaller size downstream is allowed regardless of the increase in grade.

    e. Sanitary and water servicing are the responsibility of the Region of Peel, and therefore Town Engineering defers to the Region of Peel for review and approval of the proposed watermain and sanitary servicing design.

    (Town of Caledon, Engineering Services Department, Development Engineering)

14. The Town of Caledon Engineering Services Department, Development Engineering, had the following comments relating to the Road Network and the Draft Plan:

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a. The proposed road network consists of two 20m ROW local roads that are extension of existing Pembrook Street and Southbury Manor Drive. The subject site includes part of the existing right-of-way for the 5th Sideroad and other slivers of remnant lands in adjacent plans of subdivision which are currently owned by the Town of Caledon. It is intended that the Town of Caledon will close the road allowance for 5th Sideroad and declare it and the remnant slivers surplus to be purchased by the applicant.

b. The proposed curb radii (R=20.15) does not match the existing curb lines on Queensgate Boulevard. Please consider keeping the existing curb radii (R=12.0).

(Town of Caledon, Engineering Services Department, Development Engineering)

15. The Town of Caledon Engineering Services Department, Development Engineering, had the following comments relating to the Hydrogeological Assessment and Water Balance:

    a. A Hydrogeological Assessment and Water Balance prepared by Burnside, dated February 2021, was submitted for the development which included a drilling program consisted of 5 boreholes across the subject site. The investigation revealed that the grainsize samples consist primarily of clay or silt and the hydraulic conductivity values of the native soil are estimated to be less than 1.0×10^{-6} cm/sec which does not meet the TRCA/CVC requirement for LID measures. Groundwater levels are generally in the range from 2.0m to 3.3m below ground according to the monitoring well observation.

    b. Section 7.6 of the Report notes that "At the time of report preparation, the limited groundwater data available does not provide suitable date to evaluate whether additional LIDs such as subsurface infiltration can be implemented at this time. As additional groundwater data is gathered, it will be further evaluated to determine if subsurface infiltration can be implemented as part of the SWM strategy." As per the recommendation, further review and revisions to the engineering recommendations in the report are required once the design details are finalized.

    c. The Hydrogeological Assessment and Water Balance Report will require a peer review, at the sole cost of the Owner.

    (Town of Caledon, Engineering Services Department, Development Engineering)

16. The Town of Caledon Engineering Services Department, Development Engineering, had the following comments relating to environmental noise:

    a. The Environmental Noise Assessment prepared by Valcoustics, dated January 22, 2021 will require a peer review, at the sole cost of the Owner. All noise requirements must meet MECP and Town criteria.

    (Town of Caledon, Engineering Services Department, Development Engineering)

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17. Town of Caledon Transportation staff provide the following comments relating to the Transportation Impact Study prepared by Nextrans Consulting Engineers:

    a. The 2% growth rate to determine 2020 traffic volumes should be applied to the turning movements at a T-intersection as they are the primary movements, such as the westbound approach at Highway 50/Queensgate Boulevard and the eastbound approach at Albion Vaughan Road/Queensgate Boulevard. Likewise for applying corridor growth for future background traffic volumes.

    b. Figure 2-3 - Existing Traffic Volumes illustrates the eastbound approach at Albion Vaughan Road/Queensgate Boulevard as a shared right-left turn lane when it should be an exclusive turn lanes. The southbound approach is illustrated as a shared through-right. Although there is no line painting to delineate an exclusive right-turn lane, there is sufficient width for vehicles to turn right if a through vehicle is stopped at the light. The existing operations of this approach should be confirmed and modelling revised to reflect existing operations.

    c. Please include the available storage lengths and link distances in all the LOS tables. Average queue lengths should also be identified in the table if the 95th percentile queue lengths are expected to exceed the available storage lengths or link distances.

    d. Signal optimization under existing conditions should not be used as a calibration method for Synchro models. Instead the peak hour factors, lost time adjustment, lane utilization, lane widths, etc. should be adjusted with adequate justification.

    e. Peak hour factors were adjusted for individual movements under existing conditions but at the intersection level under future conditions. Methodology should be consistent throughout all horizons. Given that these are hourly volumes, the peak hour factors should be adjusted at the intersection level to avoid inflating existing volumes.

    f. The signal timing plan (STP) for Highway 50/Queensgate Boulevard provided in Appendix C does not include a protected phase for the eastbound and westbound left-turn movements; the STP indicates split phasing for the east and west approaches. Since the second westbound left-turn lane is a shared through-left, the east and west phases cannot have a green phase simultaneously. Please revise the signal timing plan used to model this intersection accordingly.

    g. Provide detailed signal timing plan and other parameter inputs in the Synchro reports.

    h. Please provide justification for adjusting the peak hour factors to 1.00 only under future conditions.

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i. Trip distribution for residential developments should be determined using TTS data as it illustrates where trips in this zone are coming from and going to in the respective periods. Trip assignment can be determined at the intersection level and adjusted using engineering judgement. Please revise the trip distribution.

j. The trip assignment presented in Figure 4-1 - Site Generated Traffic Assignments needs further justification. Drivers heading eastbound are more likely to use the 5th Sideroad/Queensgate Boulevard intersection rather than travelling around Landsbridge Street to make a right turn to head east to Albion Vaughan Road. Likewise for people heading westbound using the Sant Farm Drive/Queensgate Boulevard intersection. Additionally, trips are assigned to Sant Farm Drive when it's primarily a residential street with no direct connection to Albion Vaughan Road. Please either provide further justification for the proposed trip assignment or revise trip assignment to present a more realistic travel path to the boundary intersections.

k. A Traffic Control Plan should be prepared showing the location of all signs and markings to be installed in the subdivision as part of the engineering drawings for the Town's review; the Traffic Control Plan should be dated, signed and stamped by a professional engineer. Please refer to the Town's Development Standards Manual in preparation of the Traffic Control Plan.

l. Section 8.1 - Parking Management notes "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." However, Section 6.0 - Parking Assessment concludes that "the subject site has a surplus of 168 parking spaces." The two statements contradict each other; please revise the report accordingly.

m. Please include a figure in the Transportation Impact Study illustrating the proposed active transportation facilities within the subdivision and how they will connect to the existing surrounding active transportation network.

n. The Town will require a revised Transportation Impact Study report for review and approval.

(Town of Caledon, Engineering Services Department, Transportation Engineering)

18. Please refer to the attached marked-up PDF copy of the Urban Design Brief, Architectural Design Guidelines and Arborist Report for detailed Landscape comments. *(Town of Caledon, Planning Department, Landscape)*

19. Please refer to the attached Urban Design comments letter and marked-up PDF copy of the Urban Design Brief and Architectural Design Guidelines documents for detailed Urban Design comments. *(John G. Williams Ltd., Urban Design)*

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20. A Hydrogeological study to the satisfaction of the Region of Peel must be submitted prior to issuance of draft plan conditions. *(Region of Peel)*

21. A Functional Servicing Report (FSR) showing proposed sanitary sewer servicing plans and water servicing plans for the development and provision for the adjacent land, if any, is required for review and approval by the Region prior to the engineering submission. *(Region of Peel)*

22. The Region of Peel has received the Hydrogeological Assessment dated February 2021, and prepared by R.J. Burnside and Associates Limited and assigned it for review. Comments will be provided under separate cover. *(Region of Peel)*

23. The Region of Peel had the following comments relating to the Healthy Development Assessment:

    a. The HDA submitted in support of the residential development meets a bronze threshold, with a sore of 70%. There are still opportunities to enhance the site further into a healthy built environment, and we offer the following recommendations:

    b. Street Connectivity:

        i. To promote physical activity, we encourage opportunities for active transportation through the creation of a permeable and well connected pedestrian and cycling networks. We encourage the inclusion of pedestrian connections from the street network to the neighbouring school, if not already considered.

    c. Streetscape Characteristics:

        i. Consideration should be given to including sidewalks on both sides of the street which are a minimum of 1.8m in width. If it is not possible to meet this width, we encourage widths to be a minimum 1.5m.

        ii. Public outdoor areas such as pedestrian walkways should include pedestrian-scaled lighting, shading and benches.

        iii. Please consider a variety of street trees that are hardy, resilient and low maintenance, planted at equal intervals adjacent to the streets.

    (Region of Peel)

Comments to be Addressed as Conditions of Draft Plan Approval

1. Please note that the Town will require as a condition of draft approval, that prior to offering units for sale and in a place readily available to the public, the owner will display information

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regarding universal design options that may be available for purchase within the development *(Town of Caledon, Corporate Services Department, Accessibility).*

2. Where a path of travel has any opening, such as a sewer grate, the opening must not allow passage of an object that has a diameter of more than 20 mm and such opening must be oriented perpendicular to the direction of travel *(Town of Caledon, Corporate Services Department, Accessibility).*

3. If a community mail box is installed, the area shall be well lit via a light standard and a curb depression, complying with Section 80.27 of the IAS within the AODA, shall be provided from the sidewalk and/or roadway to the mail box landing area. *(Town of Caledon, Corporate Services Department, Accessibility).*

4. Any lighting on exterior routes of travel shall comply with the Town's lighting standard. *(Town of Caledon, Corporate Services Department, Accessibility).*

5. Where a park includes an outdoor play space, the design shall incorporate accessibility features such as sensory and active play components for children and caregivers with various disabilities. Such outdoor play space shall have a ground surface that is firm, stable and has impact attenuating properties for injury prevention and sufficient clearance to provide children and caregivers with various disabilities the ability to move through, in and around the outdoor play space. *(Town of Caledon, Corporate Services Department, Accessibility).*

6. Exterior paths of travel, including outdoor sidewalks and walkways, shall have a minimum clear width of 1.5 metres, a surface which is firm, stable and slip resistant and otherwise comply with the Integrated Accessibility Standards (IAS) within the Accessibility for Ontarians with Disabilities Act (AODA) *(Town of Caledon, Corporate Services Department, Accessibility).*

   All exterior paths of travel shall be accessible, such as when crossing over from one street to another street, by inclusion of features such as a curb ramp with a minimum clear width of 1,200 mm exclusive of any flared sides. Curb ramps shall have raised profile tactile walking surface indicators located at the bottom of the curb ramp and extending the full width of the ramp. Curb ramps shall comply fully with Section 80.26 of the IAS within the AODA. *(Town of Caledon, Corporate Services Department, Accessibility)*

7. The Town of Caledon, Information Technology, GIS and Planning Departments, Development Review Services note that an AutoCAD file is required as part of the digital submission requirements. *(Town of Caledon, Information Technology, GIS and Planning Departments, Development Review Services)*

8. Prior to assumption, the Owner shall provide: a chart outlining all the terms and conditions of the Subdivision Agreement that must be fulfilled prior to assumption; and evidence of

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compliance with all terms and conditions of the subdivision agreement and any other applicable agreement, at its sole cost and expense *(Town of Caledon, Planning Department)*

9. Bell Canada requires the following paragraphs to be included as a condition of approval:
   a. “The Owner acknowledges and agrees to convey any easement(s) as deemed necessary by Bell Canada to service this new development. The Owner further agrees and acknowledges to convey such easements at no cost to Bell Canada.”

   b. “The Owner agrees that should any conflict arise with existing Bell Canada facilities where a current and valid easement exists within the subject area, the Owner shall be responsible for the relocation of any such facilities or easements at their own cost.”

   (Bell Canada)

9. That the applicant shall agree to include the following warning clauses in all offers of purchase and sale of residential lots.
   a. "Whereas, despite the best efforts of the Dufferin-Peel Catholic District School Board, sufficient accommodation may not be available for all anticipated students from the area, you are hereby notified that students may be accommodated in temporary facilities and/or bussed to a school outside of the neighbourhood, and further, that students may later be transferred to the neighbourhood school."

   b. "That the purchasers agree that for the purpose of transportation to school, the residents of the subdivision shall agree that children will meet the bus on roads presently in existence or at another place designated by the Board."

   (Dufferin-Peel Catholic District School Board)

10. The Peel District School Board requests that the following conditions be included in the Development Agreement:

    a. Prior to final approval, the Town of Caledon shall be advised by the School Board(s) that satisfactory arrangements regarding the provision and distribution of educational facilities have been made between the developer/applicant and the School Board(s) for this plan.

    b. The Peel District School Board requires the following clause be placed in any agreement of purchase and sale entered into with respect to any units on this plan, within a period of five years from the date of registration of the development agreement:
       i. “Whereas, despite the efforts of the Peel District School Board, sufficient accommodation may not be available for all anticipated students in the neighbourhood schools, you are hereby notified that some students may be accommodated in temporary facilities or bused to schools outside of the area, according to the Board’s Transportation Policy. You are advised to contact the School Accommodation department of the Peel District School Board to determine the exact schools.”

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ii. “The purchaser agrees that for the purposes of transportation to school the residents of the development shall agree that the children will meet the school bus on roads presently in existence or at another designated place convenient to the Peel District School Board."

c. The developer shall agree to erect and maintain signs at the entrances to this development which shall advise prospective purchases that due to present school facilities, some of the children from this development may have to be accommodated in temporary facilities or bused to schools, according to the Peel District School Board’s Transportation Policy.

(Peel District School Board)

11. A Phase One Environmental Site Assessment for the subject land was conducted by EXP Services Inc., dated October 8, 2020 and they have concluded that no Phase II ESA is warranted at this time. However, as per the recommendation of the ESA Phase I report, additional testing, confirmation of the soil and groundwater quality at the location of the AST and a Designated Substances Survey (DSS) are required to filing Record of Site Condition. The Town will require a Record of Site Condition for all future Town owned lands for the proposed subdivision as a part of draft plan conditions. *(Town of Caledon, Engineering Services Department, Development Engineering)*

12. Street lighting will be required throughout the development. Street lighting design is to confirm to the Town of Caledon Outdoor Lighting Standard Manual dated September 19, 2019. Submission of detail design and photometric drawings for the street lighting system shall form a condition of draft approval of the subdivision. *(Town of Caledon, Engineering Services Department, Development Engineering)*

13. Prior to the initiation of grading or stripping of topsoil, the Owner shall submit an Erosion and Sedimentation Control Plan including a topsoil storage plan detailing the location, size, side slopes, stabilization methods and time period, for approval by the Town and TRCA. Topsoil storage shall be limited to the amount required for final grading, with excess removed from site. *(Town of Caledon, Engineering Services Department, Development Engineering)*

14. Park Block 85 will be accepted as parkland. If parkland is under 5% of total developable lands, cash-in-lieu of parkland will be required in accordance with the Town of Caledon By-law 2013-104. An appraisal will be required by an AAIC certified appraiser. Any over dedicated parkland shall be given gratuitously to the Town. If the appraisal is required to be peer reviewed, it shall be at the applicant’s cost. The appraisal should reflect the value of the land the day prior to Draft Plan Approval. *(Town of Caledon, Planning Department, Landscape)*

15. Detailed landscape drawings and cost estimates will be required as part of the Conditions of draft plan Approval. *(Town of Caledon, Planning Department, Landscape)*

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16. The Town of Caledon, Engineering Services Department, Development Engineering, had the following comments relating to warning clauses:

    a. A clause shall be included in the subdivision agreement stating that all lots or blocks to be left vacant, for a period of time as determined by the Town, shall be graded, seeded, maintained, signed and fenced by the Owner, if required, to prohibit dumping and trespassing.

    b. Prior to grading, the Owner shall obtain an encroachment agreement with affected landowners where proposed grading is required outside the limits of the plan, if required.

    c. A clause shall be included in the Subdivision Agreement that the Developer will be 100% responsible for all costs associated with the relocation of existing services (i.e. gas, hydro, telecommunications, etc.) to accommodate this development.

    d. A clause shall be included in the Subdivision Agreement stating that the Owner shall, prior to assumption, undertake a bathymetric survey of the stormwater management pond to which the lands drain to, and remove any accumulated sediment attributed to the development, to the satisfaction of the Town.

    (Town of Caledon, Engineering Services Department, Development Engineering)

17. The Town of Caledon Legal Services Department requires that the following condition be included as a condition of draft approval:

    a. The Owner shall enter into a Town of Caledon Subdivision Agreement or any other necessary agreements executed by the Owner, the Town and the Region or any other appropriate authority prior to any development within the plan to satisfy all financial, legal and engineering matters including land dedications, grading, easements, fencing, landscaping, provision of roads, stormwater management facilities, installation of municipal services, securities, parkland and cash contributions, and other matters of the Town and the Region respecting the development of these lands in accordance with the latest standards, including the payment of Town and Regional development charges in accordance with their applicable Development Charges By-laws.

    b. Prior to the preparation of any agreement, the Owner shall pay to the Town all fees and costs set out in the Fees By-law for the preparation and registration of the agreement and all documents necessary to give effect to the approval of the Plan of Subdivision.

    c. The Owner shall convey/dedicate, gratuitously and free and clear of all encumbrances, any required parks, open space, trails, road or highway widenings, 0.3m (1 ft.) reserves, walkways, daylight triangles, buffer blocks, stormwater management facilities,

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maintenance blocks and utility or drainage easements or any other easements as required to the satisfaction of the Town, the Region or other authority.

d. The Owner shall provide the Town with postponements for any and all encumbrances of the subject lands postponing such encumbrance(s) and subordinating it in all respects, to any and all agreements entered into between the Owner and the Town, or, the Owner, the Town and the Region, as required by the Town.

(Town of Caledon, Legal Services)

18. In the event that an agreement is required, postponements of this mortgage will be required *(Town of Caledon, Legal Services).*

19. The Region of Peel provides the following comments with respect to Waste Management:

    a. This site is not within the vicinity of a landfill.

    b. For the residential units: The Region of Peel will provide curbside collection of garbage, recyclable materials, household organics and yard waste subject to the following conditions being met:

        i. The Waste Collection Vehicle access route throughout the complex indicating turning radii and turning movements is to be clearly labelled on the drawing.

        ii. Internal roadways must be constructed of a hard surface material, such as asphalt, concrete or lockstone, and designed to support a minimum of 35 tonnes, the weight of a fully loaded waste collection vehicle.

        iii. Road layouts shall be designed to permit a waste collection vehicle to drive forward without reversing for waste collection. Where the requirements for a road layout permitting forward movement of a waste collection vehicle cannot be met, a cul-de-sac or a T-turnaround shall be provided in accordance with the specifications shown in Appendices 2 and 3, respectively (Waste Collection Design Standards Manual).

        iv. All roads shall be designed to have a minimum width of 6 metres.

        v. The Turning Radius from the centre line must be a minimum of 13 metres on all turns. This includes the turning radii to the entrance and exit of the site.

        vi. The maximum grade permitted along the waste collection vehicle access route is 8 percent.

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vii. In a situation where a waste collection vehicle must reverse the maximum straight back-up distance is 15 metres. The waste collection vehicle shall not be permitted to back-up onto a municipal road allowance.

viii. For more information, please consult the Waste Collection Design Standards Manual available at: https://peelregion.ca/public-works/design-standards/pdf/waste-collection-design-standards-manual.pdf

(Region of Peel)

20. The Toronto and Region Conservation Authority has requested conditions of draft approval as per the attached letter. *(Toronto and Region Conservation Authority*

Comments to be Addressed Prior to Zoning By-law Amendment Approval

The following Comments are to be addressed prior to the Zoning By-law Amendment.

24. A Digital submission is required from the applicant in accordance with the Town's Digital Submission Standards. *(Town of Caledon, Information Technology, GIS and Planning Departments, Development Review Services)*

25. Please revise Schedule A. The proposed R1-XXX zone appears to not include parts of proposed lots. Please also consider Section 2.0 (Establishment of Zones). Should lots have multiple zones, they will be subject to the provisions of Section 4.19. Schedule A should show the extent of the proposed zone(s) in their entirety. *(Town of Caledon, Planning Department, Zoning)*

26. Staff require a Certificate of Lot Area and Lot Frontage signed by an Ontario Land Surveyor, along with a Draft M-Plan prepared by an Ontario Land Surveyor to the satisfaction of the Town in order to determine zoning compliance with lot frontage. The certificate must include the setbacks where the lot frontages were measured (i.e. required minimum front yard). *(Town of Caledon, Planning Department, Zoning)*

27. Please verify that all lot frontages for corner lots were calculated as per the definition of Lot Frontage. *(Town of Caledon, Planning Department, Zoning)*

28. Please note as there are no proposed exceptions to the OS zone, it shall comply with the parent zone requirements. *(Town of Caledon, Planning Department, Zoning)*

29. No detailed site plans or elevations were reviewed for individual lots. Staff acknowledge that this may be premature to provide. Further zoning comments will be provided if such plans are provided in future submissions (setbacks, height, building area, landscaping area, parking, driveways, etc.). As such, compliance with such zoning standards cannot be determined at this stage. *(Town of Caledon, Planning Department, Zoning)*

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30. Please note the comments on the draft zoning by-law regarding the walk-up entrance, permitted encroachments, concerns regarding the proposed interior yard setbacks and the fence by-law. *(Town of Caledon, Planning Department, Zoning)*

31. A draft zoning by-law template (word document) has been provided for review. Once comments have been addressed for the next submission, please add all amendments required with tracked changes enabled for review. *(Town of Caledon, Planning Department, Zoning)*

32. Please refer to the attached Urban Design comments letter and marked-up PDF copy of the Urban Design Brief and Architectural Design Guidelines documents for detailed Urban Design comments. *(John G. Williams Ltd., Urban Design)*

The following agencies and departments have no concerns:

- OPP (Caledon Detachment)
- HONI (Hydro One)
- Rogers Communications

Comments from the following agencies and departments are attached for your review:

- Region of Peel – July 12, 2021
- Enbridge - May 23, 2021
- Ministry of Heritage, Sport, Tourism, and Culture Industries – May 25, 2021
- Dufferin-Peel Catholic District School Board Letter – May 14, 2021
- Peel District School Board Letter – May 25, 2021
- Town of Caledon, Urban Design Peer Review Letter – May 19, 2021
- Toronto and Region Conservation Authority – July 21, 2021

Comments from the following agencies remain outstanding and will be forwarded to you upon receipt:

- Canada Post
- Ministry of Municipal Affairs and Housing
- Municipal Property Assessment Corporation (MPAC)
- Town of Caledon, Planning Department, Street Naming
- Town of Caledon, Planning Department, Municipal Numbers
- Town of Caledon, Fire and Emergency Services

In preparing your resubmission, please provide the following with your next submission:

1. Cover Letter Addressing All Comments Contained in this Letter and Attachments
2. Response Matrix to Members of the Public comments, questions, concerns etc.
3. Draft Plan of Subdivision (Full size, to scale and in metric)
4. Revised Draft Zoning By-law Amendment (.pdf and Microsoft Word)

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5. Planning Justification Report
6. Urban Design Brief
7. Architectural Design Guidelines
8. Arborist Report
9. Letter from Landscape Architect addressing all Landscape Comments
10. Zoning By-law Matrix
11. Letter from Engineer addressing all Engineering Comments
12. Engineering Letter of Conformance
13. Geotechnical Report
14. Functional Servicing and Stormwater Management Report
15. Site Grading Plan
16. Site Servicing Plan
17. Noise Impact Study
18. Waste Management Plan
19. Hydrogeological Report and Assessment
20. Transportation Impact Study
21. Stage 2 Archaeological Assessment and associated Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) compliance letter
22. Revised digital drawings in accordance with Town of Caledon Digital submission standards
23. Erosion and Sedimentation Control Plan including a topsoil storage plan

Note, an Appraisal for Cash in Lieu of Parkland is required. However, this is only valid for 6 months, please submit the appraisal at an appropriate time in the process.

The Town is only accepting electronic submissions. To assist, the Town has created a document which identifies how material is to be submitted. Please click here to access the Town's website for details and ensure that any submission material you are preparing will meet the attached requirements.

To submit a revised submission, please visit the Town's website and complete the additional information form online at www.caledon.ca/development, under the heading "For Existing Applications" and click on either Draft Plan of Subdivision or Zoning By-law Amendments. All of these links will bring you to the same form to complete. As the resubmission will be of a substantial file size, all supporting documents will be required to be uploaded to a secure Planning FTP site. Should you not have access to the folder, please let me know. Once a submission has been made as per above, please advise me for efficient processing.

The Town's Fees By-law requires a fee for a resubmission of a proposed Draft Plan of Subdivision application in the amount of $5,623.26. To submit this payment, please contact Planning Services at planning@caledon.ca.

Please note:

1. The latest Town of Caledon's Development Standard Policies and Guidelines (Version 5) have been released. An electronic copy is available on the Town of Caledon website for

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viewing as per the following link: https://www.caledon.ca/en/townhall/development-standards-policies-guidelines.asp. Please ensure all future engineering drawings are designed in accordance with the latest Town's engineering standard.

2. The Town's Fees By-law requires recirculation fees for the Zoning By-law Amendment (fees subject to change) for any resubmission after the 3rd submission. **You are encouraged to address all comments in the next submission**.

I trust this information is of assistance to you. Please do not hesitate to contact me at aclarke@mhbcplan.com should you have any questions.

Aleah Clarke, MHBC
On Behalf Of
Development Review Services, Planning Department,
Town of Caledon

c.

Adam Wendland, Community Planner
Tiffany McClain, Law Clerk
Daniel Oh, Senior Coordinator, Development Engineering
Jillian Britto, Coordinator, Transportation Engineering
Patrick Trafford, Deputy Clerk
Kyle Pool, Landscape Architect
Simon Latam, Landscape Architect
Cassandra Jasinski, Heritage Planner
Dave Pelayo, Chief Fire Prevention Officer
Drew Haines, Acting Team Lead, Development Engineering
Arash Olia, Manager, Transportation Engineering
Glendon Turner, Senior Financial Analyst
Kyle Munro, Community Policy Planner (Street Naming)
Alison Morris, Intermediate Planner, Development Review (Street Naming and Municipal Numbers)
Brandon Bell, Senior Planner, Zoning
Bailey Loverock, Community Planner
Caledon GIS
Municipal Numbers, Town of Caledon
Dylan Prowse, Region of Peel
David Stewart, John G. Williams Architect Ltd.
Andrea Terella, Toronto and Region Conservation Authority
Ryan Courville, Bell Canada
Joseph Orleni, Hydro One
Corey Caple, Ministry of Transportation
Christopher Fearon, Canada Post
Krystina Koops, Dufferin-Peel District School Board
Marcus Sanderson, Ontario Provincial Police

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Kathy Barbuto, Rogers Communications Canada Inc.
Alice Coleman, Enbridge Gas Distribution Inc.
Nicole Hanson, Peel District School Board
Planning (planning@caledon.ca)

Attachments:

1. Draft Zoning By-law Amendment Track Change Document
2. Mark-up Urban Design Brief (Urban Design Comments)
3. Mark-up Architectural Design Guidelines (Urban Design Comments)
4. Mark-up Arborist Report (Landscape Comments)
5. Mark-up Architectural Design Guidelines (Landscape Comments)
6. Mark-up Urban Design Brief (Landscape Comments)
7. Summary of Public Comments and Responses Summary Document

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Region of Peel
working with you

Public Works

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tel: 905-791-7800

peelregion.ca

December 16, 2021

Aleah Clarke, MHBC
On Behalf Of,
Development Review Services, Planning Department,
Town of Caledon
6311 Old Church Road
Caledon ON L7C 1J6

Re: Application for Site Plan Approval
9229 5th Sideroad
2nd Submission
21T-21001C & RZ-21-005C

Region of Peel Requirements:
Region of Peel staff have had the opportunity to review the application for Rezoning & Draft Plan of Subdivision. The following must be completed prior to issuance of draft plan conditions and clearance of the zoning bylaw amendment.

Waste Management Requirements:
Prior to approval of the Zoning Bylaw Amendment and Draft Plan approval, the submitted Auto Turn Assessment must be revised to address the Waste management comments below.

Region of Peel Comments:
Region of Peel staff have had the opportunity to review the application for Rezoning & Draft Plan of Subdivision and offer the following comments:

Waste Management Comments:
Auto Turn Assessment Comments

- A revised Auto Turn Assessment must be submitted to address the below comments:
- The auto turn assessment used a waste collection vehicle width of 2.60m. Please refer to WCDSM Appendix 1, the width of the collection vehicle must be min. 2.77m width. The 13m turning radius requirement is from the centreline of the road and must be labelled on all turns.
    - The submitted auto turn assessment measures the turning radius from the outside of the road.

General Waste Management Comments

- This site is not within the vicinity of a landfill.

- **<u>For the residential units:</u>** The Region of Peel will provide **curbside collection** of garbage, recyclable materials, household organics and yard waste subject to the following conditions being met:
    - The **Waste Collection Vehicle access route throughout the complex** indicating turning radii and turning movements is to be clearly labelled on the drawing.
    - Internal roadways must be constructed of a hard surface material, such as asphalt, concrete or lockstone, and designed to support a minimum of 35 tonnes, the weight of a fully loaded waste collection vehicle.
    - Road layouts shall be designed to permit a waste collection vehicle to drive forward without reversing for waste collection. Where the requirements for a road layout permitting forward movement of a waste collection vehicle cannot be met, a cul-de-sac or a T-turnaround shall be provided in accordance with the specifications shown in Appendices 2 and 3, respectively (Waste Collection Design Standards Manual).
    - All roads shall be designed to have a minimum width of 6 metres.
    - The Turning Radius from the centre line must be a minimum of 13 metres on all turns. This includes the turning radii to the entrance and exit of the site.
    - The maximum grade permitted along the waste collection vehicle access route is 8 percent.
    - In a situation where a waste collection vehicle must reverse the maximum straight back-up distance is 15 metres. The waste collection vehicle shall not be permitted to back-up onto a municipal road allowance.
    - For more information, please consult the Waste Collection Design Standards Manual available at: https://peelregion.ca/public-works/design-standards/pdf/waste-collection-design-standards-manual.pdf

Health Planning Comments:

- It is acknowledged that comments regarding the pedestrian design features will be addressed through the future engineering design.
- Please confirm if sidewalks are proposed on both sides of the street

Draft Plan Conditions

Development Charges

1. Prior to execution of the Subdivision Agreement by the Region, the Owner shall:
   a. Obtain and submit to the Region a Residential Development Charges Payment Form completed to the best of the Owner's knowledge at the time of the submission and to the satisfaction of the Region in accordance with the engineering drawings and final draft M-plan; and
   b. Pay to the Region the appropriate hard service residential development charges (water, wastewater and road service components), pursuant to the Region's Development Charges By-law, as amended from time to time, calculated based on the information provided in the Residential Development Charges Payment Form.

2. Provision shall be made in the Subdivision Agreement with respect to:
   a) Payment to the Region of appropriate soft service development charges and any outstanding hard service development charges; and
   b) Collection of development charges for future residential development blocks (non-freehold townhouses or apartment blocks);
   pursuant to the Region's Development Charges By-law, as amended from time to time.

Water Meter Fees

3. In respect of the water meter fees:
   a. Prior to registration of the plan of subdivision, the Owner shall pay to the Region the appropriate water meter fees, in accordance with the Region's Fees By-law, as amended from time to time for residential building lots (singles, semi-detached and freehold townhomes) to the satisfaction of the Region in accordance with the engineering drawings and final draft M-plan for the Lands;

   b. A clause shall be included in the Subdivision Agreement that water meter fees for future residential development (non–freehold townhouses or apartment blocks) and commercial blocks shall be payable to the Region prior to issuance of building permits, in accordance with the Region's Fees By-law, as amended from time to time; and

   c. A clause shall be included in the Subdivision Agreement that in the event of an underpayment of water meter fees, the Owner shall be responsible for payment thereof forthwith upon request.

Easements

4. As a condition of registration of this Plan or any phase thereof, the Owner shall gratuitously transfer, free and clear of all encumbrances and to the satisfaction of the Region all necessary easements for proposed and existing Regional infrastructures as required by the Region to service the proposed plan and external lands. All costs associated with land transfers and easements shall be 100% the responsibility of the Owner.
   A clause shall be included in the Subdivision Agreement in respect of same.

5. The Owner shall acknowledge and agree that landscaping, signs, fences, gateway features, and any other encroachments will not be permitted within the Region's easements and right-of-way limits. A clause shall be included in the Subdivision Agreement in respect of same

Drawings – Servicing and "As Constructed"

6. Prior to servicing, the Owner's engineer shall submit all engineering drawings in the digital format to the latest Region's Digital Format Guidelines.

7. Within (60) days of preliminary acceptance of the underground services, the Owner's engineer shall submit "As Constructed" drawings in digital format, pursuant to the latest Region's Digital Format Guidelines. The Owner's engineer shall also provide ties to all main line valves, ties to individual water service boxes, linear ties to sanitary sewer services and GPS coordinates of all watermain and sanitary sewer appurtenances in accordance with the latest requirements of the Region "Development Procedure Manual".

   A clause shall be included in the Subdivision Agreement in respect of same.

General Conditions

8. Prior to registration of the subdivision, the Owner shall execute a Subdivision Agreement with the local municipality and Region for the construction of municipal sanitary sewer, water and regional roads associated with the lands. The Owner shall construct and design these services in accordance with the latest Region standards and requirements.

9. The Owner shall acknowledge and agree that financing and construction of all temporary/permanent infrastructures not covered by the Current Development Charges By-law (watermains, sanitary sewers) shall be 100% financial responsibility of the Owner. A clause shall be included in the Subdivision Agreement in respect of same.

10. Prior to servicing, the Owner shall submit a satisfactory engineering submission to the Region for review and approval.

11. Prior to servicing the Region may require the Owner to construct a sampling hydrant (at the Owners cost) within the proposed plan. Location and the requirement for sampling hydrant will be determined at the engineering review stage.

12. The Owner agrees that the Region shall hold back a portion of the Letter of Credit to cover the costs of services completed by the Region on a time and material basis pursuant to the current Region's User Fee By-Law. A clause shall be included in the Subdivision Agreement in respect of same.

13. The Owner shall maintain adequate chlorine residuals in the watermains within the plan from the time the watermains are connected to the municipal system until such time as the Region issues Final Acceptance. To maintain adequate chlorine residuals, the Owner shall either install automatic flushing devices or retain Regional staff to carry out manual flushing. Regional staff shall conduct the monitoring and testing for chlorine residuals. All costs associated with the monitoring and flushing shall be the responsibility of the Owner pursuant to the current Region's User Fee By-Law. A clause shall be included in the Subdivision Agreement in respect of same.

14. Provision will be required in the Subdivision Agreement for the following clauses in respect of servicing existing properties within the zone of influence in the event that existing private services (wells) deteriorate due to the servicing of the proposed plan of subdivision;

    a. Until the issuance of Final Acceptance, a portion of the Letter of Credit shall be held back to serve as protection for the private wells in the zone of influence of the plan of subdivision. This amount shall be based on the anticipated cost of replacing water supplies within the zone of influence as shown in the schedules of the agreement. The minimum amount shall be $20,000.00. If the private well systems in the zone of influence deteriorate due to the servicing of the plan of subdivision the Owner shall provide temporary water supply to the residents upon notice by the Region and the Owner shall continue supplying the water to the effected residents until the issue is resolved to the satisfaction of involved parties. If the quantity of water in the existing wells is not restored to its original condition within a month after first identification of the problem, the Owner shall engage the services of a recognized hydrogeologist to evaluate the wells and recommend solutions including deepening the wells or providing a permanent water service connection from the watermain to the dwelling unit.

    b. The Owner shall inspect, evaluate and monitor all wells within the zone of influence prior to, during and after the construction has been completed. Progress Reports should be submitted to the Region as follows:

        i. Base line well condition and monitoring report shall be submitted to the Region prior to the pre-servicing or registration of the plan (whichever occurs first) and shall include as a minimum requirement the following tests:
            a) Bacteriological Analysis - Total coliform and E-coli counts
            b) Chemical Analysis - Nitrate Test
            c) Water level measurement below existing grade

ii. In the event that the test results are not within the Ontario Drinking Water Standards, the Owner shall notify in writing the Homeowner, the Region of Peel's Health Department (Manager - Environmental Health) and Public Works Department (Development Supervisor) within 24 Hours of the test results.

iii. Well monitoring shall continue during construction and an interim report shall be submitted to the Region for records. Well monitoring shall continue for one year after the completion of construction and a summary report shall be submitted to the Region prior to Final Acceptance.

15. The Owner shall agree that neither the Owner nor any Builder will apply for building permits for any lots or blocks within the plan of subdivision until the Region's Public Works Department has issued Preliminary Acceptance and provided notice to the local municipality stating that internal and external sanitary sewers and watermains, including fire protection, have been completed to the Region's satisfaction. The Owner's Consulting Engineer shall certify in writing that the internal and external sanitary sewers and watermains, including fire protection, have been constructed, inspected and shall function in accordance with the detailed design as approved by the Region. A clause shall be included in the Subdivision Agreement in respect of same.

16. The Owner shall indemnify and hold the Region harmless from and against any and all actions, suites, claims, demands, and damages which may arise either directly or indirectly by reason of the development of the subject lands and/or construction of works, save and except for any actions, causes of action, claims, demands and damages arising out of the negligence of the Region or those for whom it is in law responsible. A clause shall be included in the Subdivision Agreement in respect of same.

17. Prior to registration of the plan of subdivision, the Owner shall submit draft reference plan(s) for the Region's review and approval prior to such plans being deposited. All costs associated with preparation and depositing of the plans and transfer of lands shall be at the sole expense of the Owner

18. The Owner agrees that prior to the Region granting clearance of the draft plan conditions of subdivision approval, the following shall require to be forwarded to the Region's Legal Services Division:
    a. A copy of the final signed M-Plan
    b. A copy of the final draft R-Plan(s); and
    c. The documents required pursuant to Schedule of the Subdivision Agreement and all associated documents.

    A clause shall be included in the Subdivision Agreement in respect of same.

Concluding Comments:

If you have any questions about the above comments, requirements or conditions of draft plan approval please do not hesitate to reach out at: dylan.prowse@peelregion.ca.

Sincerely,

Dylan Prowse
Development Services

Public Works

10 Peel Centre Dr., Suite A, Brampton, ON L6T 4B9
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