



Final Report

1161-1167 North Shore Boulevard Transportation Impact and Parking Study



Prepared for Amico Properties Inc.
by IBI Group
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1 Introduction

IBI Group was retained by Amico Properties Inc. (“Amico”) and Spruce Partners Inc. to undertake a transportation impact study and a parking study for a proposed seniors living campus located in the City of Burlington, Ontario.

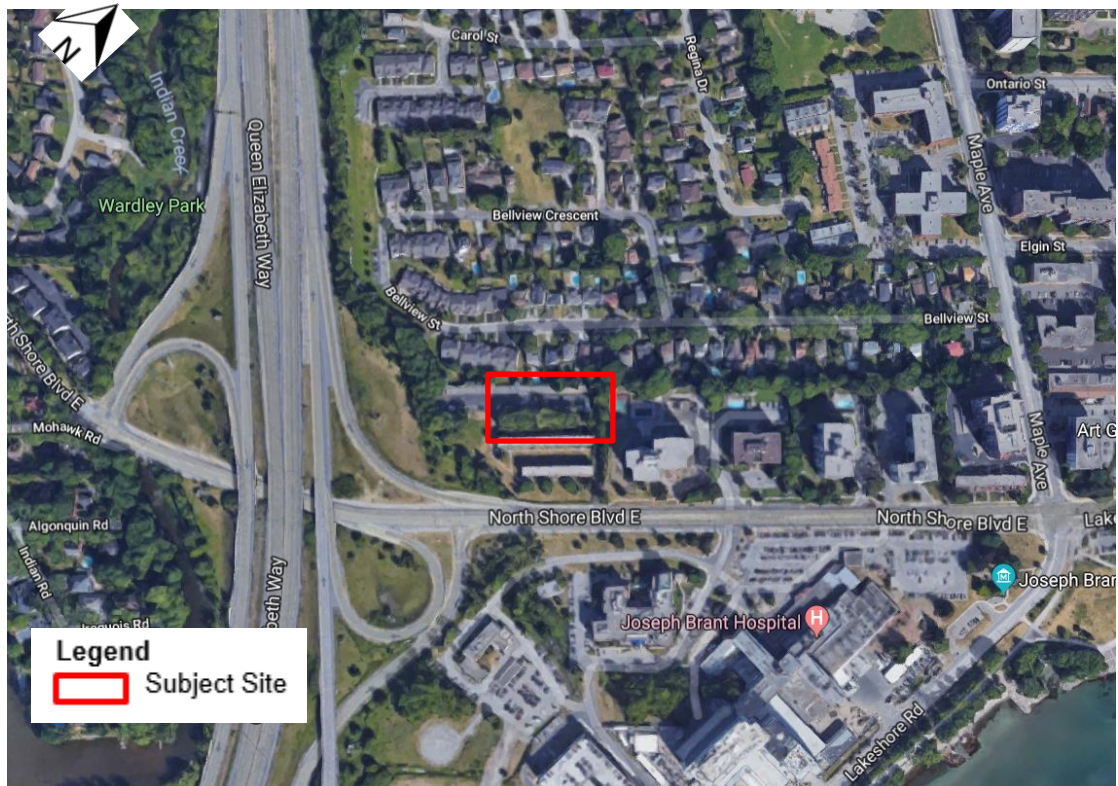
1.1 Background

The proposed development (hereinafter referred to as the “subject site”) will require the demolition of the existing buildings at 1161-1167 North Shore Boulevard (Brant Park Co-Op). The seniors living campus is proposed to consist of four buildings of varying heights up to 17 storeys. These include 55 memory care units, 155 assisted living units, and 209 independent living units, totalling 419 units. Vehicle access to the subject site will be provided from the existing private driveway located on North Shore Boulevard, approximately 170 metres east of the Queen Elizabeth Way (QEW).

A total of 244 parking spaces are proposed via underground parking facilities, consistent with the Burlington City-Wide Parking Standards Review requirements. The most recent site plan is shown in **Exhibit 8-1**.

The subject site is located northeast of the North Shore Boulevard / QEW intersection in the City of Burlington. The study area is illustrated in **Exhibit 1-1**. The subject site is located approximately 1.2 km southwest of the Burlington City Centre.

Exhibit 1-1: Study Area



1.2 Study Scope

The report is divided into a transportation impact study (TIS) and a parking assessment. The TIS examines the subject site's anticipated impact on the study area's traffic operations, and identifies improvements that would improve study area operations. The parking assessment reviews the subject site's projected parking demand, and proposes a Zoning By-law (City of Brantford Zoning By-law 2020) parking requirement variance, if warranted.

This report adheres to the scope of work developed by IBI Group and agreed upon by the City of Burlington ("City") and the Ontario Ministry of Transportation ("MTO"). The correspondence and confirmed scope of work is presented in **Appendix A**. To support the study scope, the following tasks are completed:

Transportation Impact Study

- **Development Study Area and Analysis Details:** Examines the existing transportation facilities and discusses analysis details, such as signal timing plans, turning movement counts, analysis periods, and study intersections.
- **Existing Conditions Assessment:** Examines current traffic operations and identifies existing operational issues.
- **Future Background Assessment:** Projects future traffic operations under the full build out (2024), full build out +5 years, and full build out +10 years conditions without the subject site. Anticipated future operational issues are identified.
- **Site Traffic Generation and Assignment:** Estimates the number of trips generated by the subject site and assigns them to the study area road network.
- **Future Total Assessment:** Projects future traffic operations under the full build out (2024), full build out +5 years, and full build out +10 years conditions with the subject site, and compares the traffic operational results to the corresponding future background scenario results. Any operational issues resulting from the additional site generated trips are identified. Road improvements aimed at mitigating the identified operational issues are proposed, if necessary.
- **Traffic Signal Warrant and Road Improvement Assessment:** Determines if the installation of a traffic signal at the subject site access fronting North Shore Boulevard is warranted. Additionally, an eastbound left turn lane assessment is completed to assess whether a dedicated turning lane is feasible.

Parking Study

- **City of Burlington Zoning By-law review:** The subject site's parking requirements as per City of Burlington Zoning By-law 2020 are determined and used as a baseline for comparison with the parking demand observed during the parking utilization survey.
- **Parking Utilization Survey:** To estimate the subject site's peak parking demand, parking utilization surveys were conducted at one proxy site of similar nature to the subject site.
- **Parking Demand Review:** Using the observed parking demand obtained from the proxy site survey data, a parking rate is recommended that is deemed applicable to the senior living centre land use. The recommended rate is then applied to the subject site to estimate the number of parking spaces needed to meet the projected parking demand.

2 Existing Traffic Conditions

2.1 Existing Road Network

Residential developments are located to the north, east, and west of the subject site. To the south, there is an Ontario Provincial Police detachment, the Halton McMaster Family Health Centre, and the Joseph Brant Hospital (JBH). These developments front directly onto North Shore Boulevard East, which runs adjacent to Lake Ontario.

The study area intersections were determined through consultation with the City and the MTO:

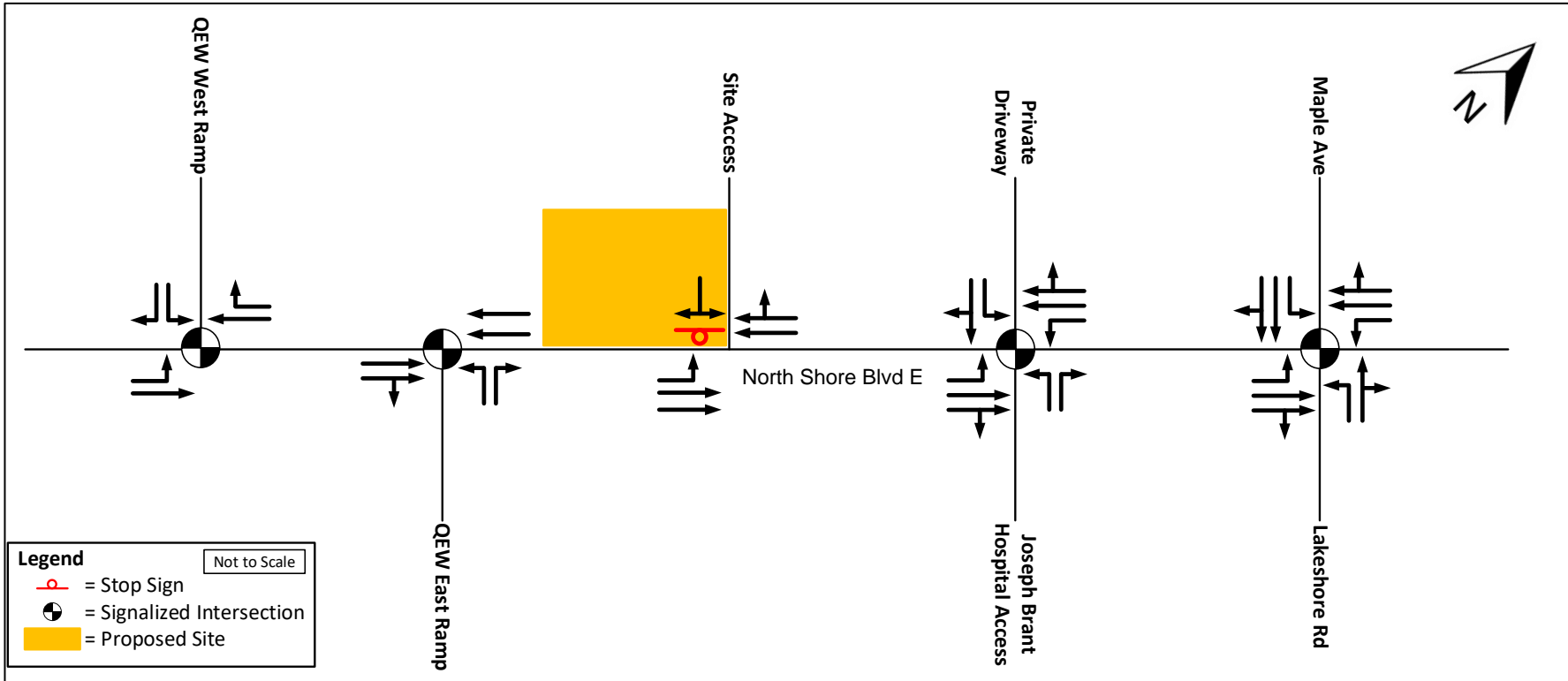
- North Shore Boulevard East / QEW West Ramp Terminal;
- North Shore Boulevard East / QEW East Ramp Terminal;
- North Shore Boulevard East / Existing Site Driveway;
- North Shore Boulevard East / Joseph Brant Hospital; and
- North Shore Boulevard East / Lakeshore Road and Maple Avenue.

In detail, the study area roadways contain the following characteristics:

- **North Shore Boulevard** is a four-lane, east-west minor arterial road. There are four signalized intersections within the study area on North Shore Boulevard. Dedicated cycling lanes are provided on this corridor with sidewalks on both sides of the street. Burlington Transit bus stops are provided within the study area. The posted speed limit is 60 km/h.
- **The Queen Elizabeth Way** is a 400-series provincial freeway that runs north-south within this section of the City of Burlington. The QEW ties in with Highway 403 to the west and Highway 407 to the north. The posted speed limit is 100 km/h.
- **Joseph Brant Hospital Access Road** (JBH Access) is a two-lane, north-south local road which serves as the access road to the Ontario Provincial Police's Burlington detachment, Joseph Brant Hospital, Halton McMaster Family Health Centre, and the Chartwell Brant Long Term Care residence.
- **Maple Avenue / Lakeshore Road** is a north-south minor arterial road with a four lane cross section north of the intersection and a two lane cross section to the south. Painted cycling lanes are provided on both sides of the road. On the south leg, sidewalks are provided on the west side while Waterfront Trail exists on the east side. The posted speed limit is 50 km/h.

The study area intersections and lane configurations are illustrated in **Exhibit 2-1**.

Exhibit 2-1: Existing Condition Lane Configurations



2.2 Existing Transit / Active Transportation Network

Burlington Transit Route #5 operates along North Shore Boulevard within walking distance of the subject site. **Exhibit 2-2** illustrates the bus stop locations.

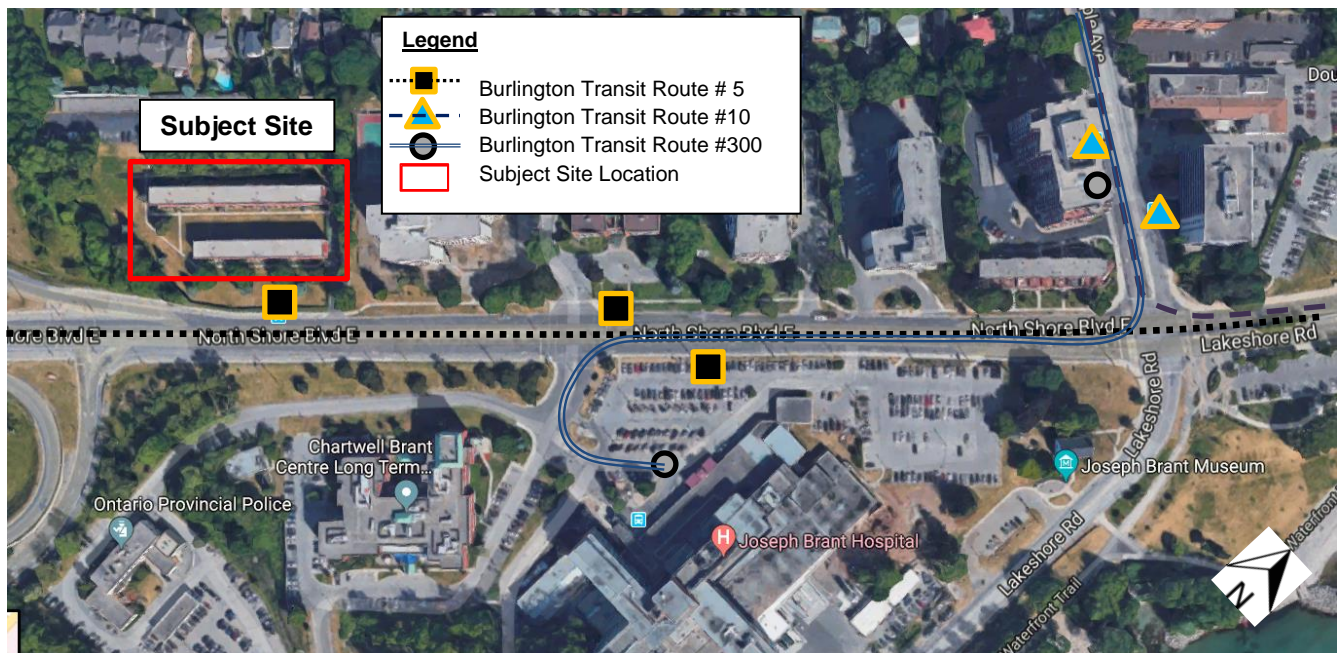
Burlington Transit Route 5 operates with 30 minute headways during the weekday AM peak, PM peak, and weekend peak periods. The route terminates at the Burlington GO station, which offers connections to Toronto and other major cities across Southwestern Ontario.

Burlington Transit Route #10 operates along Maple Avenue with 20 minute headways during the weekday AM and PM peak periods, and 30 minute headways during the weekend peak periods.

Burlington Transit Route #300 operates as a seniors oriented transit service, providing transportation to popular destination spots in the City, such as malls and community centres. Operating only on weekdays, 60 minute headways are scheduled from morning to mid-day (i.e. ending before 3:00 pm).

Cycling facilities are provided along North Shore Boulevard in the form of curbside painted lanes. The Waterfront Trail exists along Lakeshore Road, which facilitates both pedestrian and cyclist traffic via a multi-use path.

Exhibit 2-2: Existing Transit Network

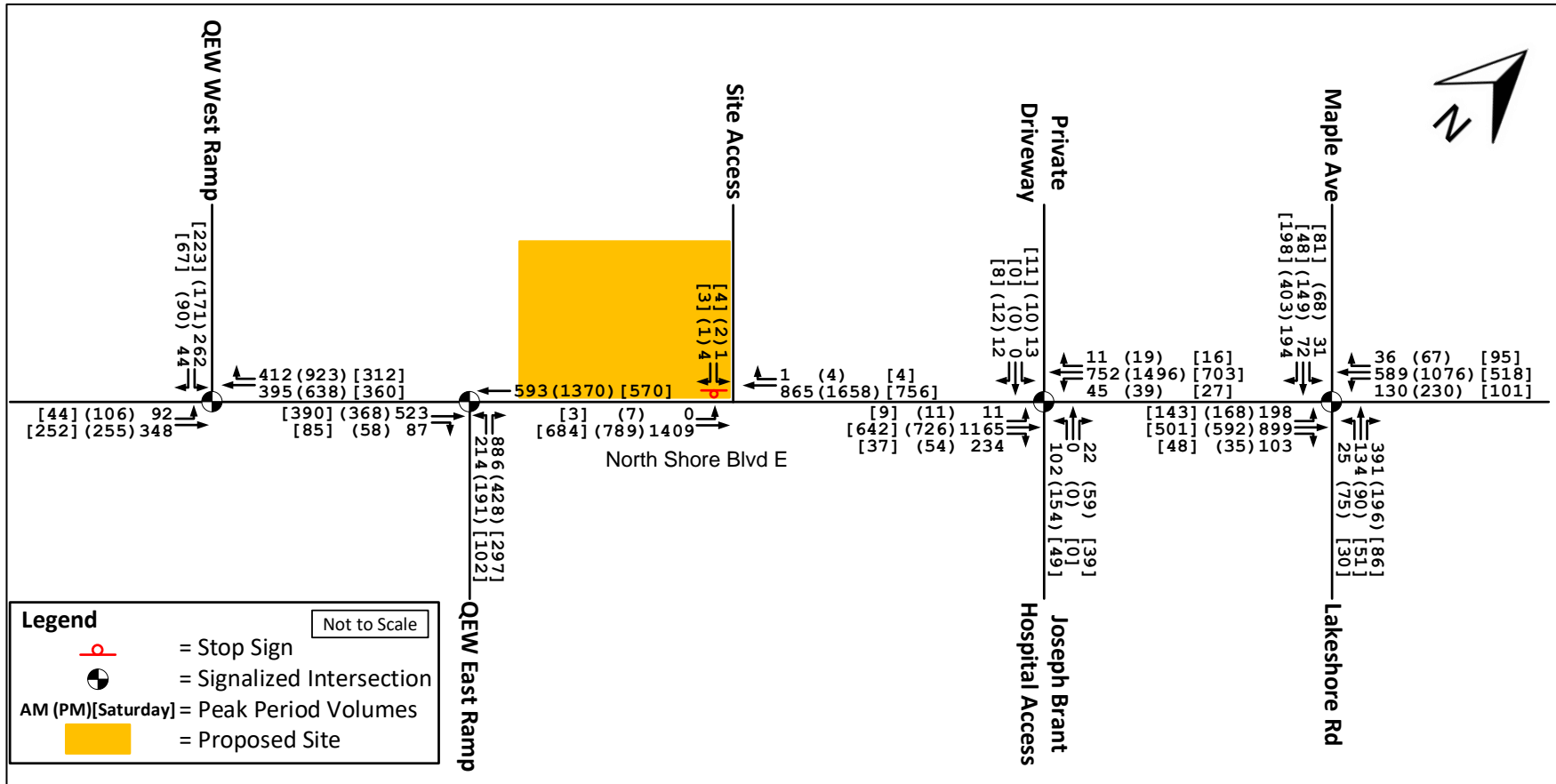


2.3 Turning Movement Counts

Turning movement counts (TMCs) for the study area intersections were collected by Ontario Traffic Inc. (OTI) on February 26, 2019 (for weekday AM and PM peak periods) and March 2, 2019 (for the Saturday peak period). Existing traffic volumes collected at the subject site driveway will be removed from the road network to account for the redevelopment of the site for the proposed changes in land use. Additionally, AM and PM peak period TMCs for the two QEW terminal intersections were provided by MTO. Full TMC data is provided in **Appendix B**.

The provided and collected TMCs were used to establish the 2019 existing traffic conditions Synchro model. **Exhibit 2-3** illustrates the weekday (AM and PM), and Saturday peak hour traffic volumes.

Exhibit 2-3: Existing Conditions Traffic Volumes (Weekday AM, PM and Saturday Peak Hours)



2.4 Signal Timing Plans

Signal timing plans for the signalized study area intersections were provided by the City, and are located in **Appendix C**. All intersections operate using an eight-phase semi-actuated and coordinated mode of control during all three peak periods. The subject site access is currently stop controlled and is proposed to remain under these operations.

2.5 Start-Up Lost Time Adjustment

It was requested by MTO that the start-up lost time adjustment values for use in the Synchro analysis be calculated via field collected data. The methodology was developed by IBI based on Highway Capacity Manual 2010 (HCM) methodologies and approved by MTO (as per correspondence in **Appendix A**). The start-up lost time data is provided in **Appendix D** and is incorporated into all Synchro existing and future scenario analysis.

2.6 Saturation Flow Rate

It was requested by MTO that the roadway saturation flow rates be calculated for the two QEW terminal ramp intersections via field collected data. The methodology was developed by IBI based on HCM methodologies and approved by MTO (as per correspondence in **Appendix A**). The data is provided in **Appendix E** and is incorporated into all Synchro existing and future scenario analysis.

3 2019 Existing Conditions Analysis

The study area intersections were analyzed using the software package Synchro 9.2, which uses HCM methodology. From the Halton Region Traffic Impact Study (TIS) Guidelines (January 2015), the criteria for identifying critical signalized intersections or movements are:

- Volume to capacity (v/c) ratio of 0.85 for overall intersections operations, through movements, or shared through / turning movements;
- V/c ratio exceeds 0.95 for exclusive movements; and
- 95th percentile queues which exceed available storage.

For unsignalized intersections, the Halton Region TIS Guidelines also states the following criteria for critical movements:

- Level of service (LOS) E for individual movements; and
- 95th percentile queues which exceed available storage.

Based on the MTO's Traffic Impact Study Guidelines (December 2009), ramp terminal approaches with a v/c ratio exceeding 0.75 are considered critical.

The weekday (AM and PM) and Saturday peak hour traffic operations at the signalized and unsignalized intersections are respectively summarized in **Exhibit 3-1** and **Exhibit 3-2**. Synchro 95th percentile queues are summarized in the subsequent operation tables in this TIS report and are then compared to the lane storage capacity.

It should be noted that 95th percentile queues are regarded as a conservative "worst case" queue length, whereas 50th percentile queues represent typical average queue lengths. SimTraffic queues are derived from microscopic simulation and is not based on the HCM capacity based intersection analysis methodology (i.e. Synchro based outputs and the

requirements as per Halton Region TIS Guidelines). Full Synchro and SimTraffic output reports are both found in **Appendix F**.

Exhibit 3-1: Existing Traffic Operations – Signalized Intersections

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
JBH (Joseph Brant Hospital) Access	A	0.57	NBL	D	0.53	37.7	30
Lakeshore Rd & Maple Ave	C	0.68	WBL	C	0.56	35.1	30
			NBT/R	D	0.89	145.7	-
PM Peak Hour							
JBH Access	A	0.64	NBL	D	0.59	54.2	30
Lakeshore Rd & Maple Ave	C	0.56	WBL	A	0.44	38.8	30
Saturday Peak Hour							
No Critical Movements							

Exhibit 3-2: Existing Traffic Operations – Unsignalized Intersection

North Shore Blvd Intersection	Movement	LOS	Delay (s)	V/C Ratio	Lane 95th Percentile Queue (m)
AM Peak Period					
Site Driveway	SBL/R	C	15.4	0.01	0.3
PM Peak Period					
Site Driveway	SBL/R	F	55.6	0.04	0.9
Saturday Peak Period					
Site Driveway	SBL/R	C	16.2	0.02	0.5

During the weekday AM peak hour:

- The Joseph Brant Hospital (JBH) Access operations are acceptable with regards to delays, with some minor internal queue spillover within the site (approximately one car length).
- At the Lakeshore Road & Maple Avenue / North Shore Boulevard intersection operations are acceptable, the westbound left turn movement's 95th percentile queue length exceeds the storage capacity by approximately one car length.
- The existing Site Driveway access is presently operating within capacity without any congestion issues during the weekday afternoon peak hour as a result of North Shore Boulevard traffic.

During the weekday PM peak hour:

- The Joseph Brant Hospital (JBH) Access operations are acceptable with regards to delays, with some internal queue spillover within the site.
- At the Lakeshore Road & Maple Avenue / North Shore Boulevard intersection operations are acceptable, the westbound left turn movement's 95th percentile queue length exceeds the storage capacity by approximately one car length.
- The existing Site Driveway access is presently operating at a LOS 'F' as a result of North Shore Boulevard traffic.

During the Saturday peak hour:

- All study area intersections are presently operating within acceptable conditions with regards to delays, v/c ratios, and queues as determined from the 95th percentile queuing results from Synchro.

4 Future Background Traffic Conditions

This section discusses the growth rate, future road network improvements, other background developments, and future traffic conditions under the 2024, 2029, and 2034 horizon years.

4.1 Future Road Network Improvements

During the correspondence with MTO and City staff (as per **Appendix A**), no future road network improvements were identified. A further review of the City's Roadway Capital Projects schedule has not indicated any planned improvements within the study area.

4.2 Growth Rates

Upon consultation with MTO staff, a 2% growth rate was required by MTO for ramp terminals unless otherwise justified. City staff also stipulated a 1.1% growth rate for the North Shore Boulevard and Maple Avenue-Lakeshore Boulevard corridors. This correspondence is documented in **Appendix A**. To include both rates into the traffic analysis, traffic volumes entering and exiting the QEW ramps via the study area corridors were grown 2% annually, while the remaining corridor through-traffic was grown 1.1% annually.

4.3 Background Developments

City staff identified two background residential developments with the potential for generating additional traffic within the study area. The identified background developments are located at 1159 Bellview Crescent and 490-492 Brock Avenue / 1298 Ontario Street.

The trips generated by the development located at 1159 Bellview Crescent were not considered, since there would be negligible volumes generated (i.e. less than typical daily traffic fluctuation), as demonstrated in **Exhibit 4-1**.

Exhibit 4-1: Background Development Trip Generation

Land Use	AM Peak Period			PM Peak Period		
	In	Out	Total	In	Out	Total
1159 Bellview Crescent Single Family Detached, 5 units (LUC 210)	1	3	4	4	1	5

Land Use	AM Peak Period			PM Peak Period		
	In	Out	Total	In	Out	Total
490-492 Brock Avenue / 1298 Ontario Street High-Rise Condominium (LUC 232) Pharmacy/Drugstore (LUC 880)	19	65	84	55	35	90

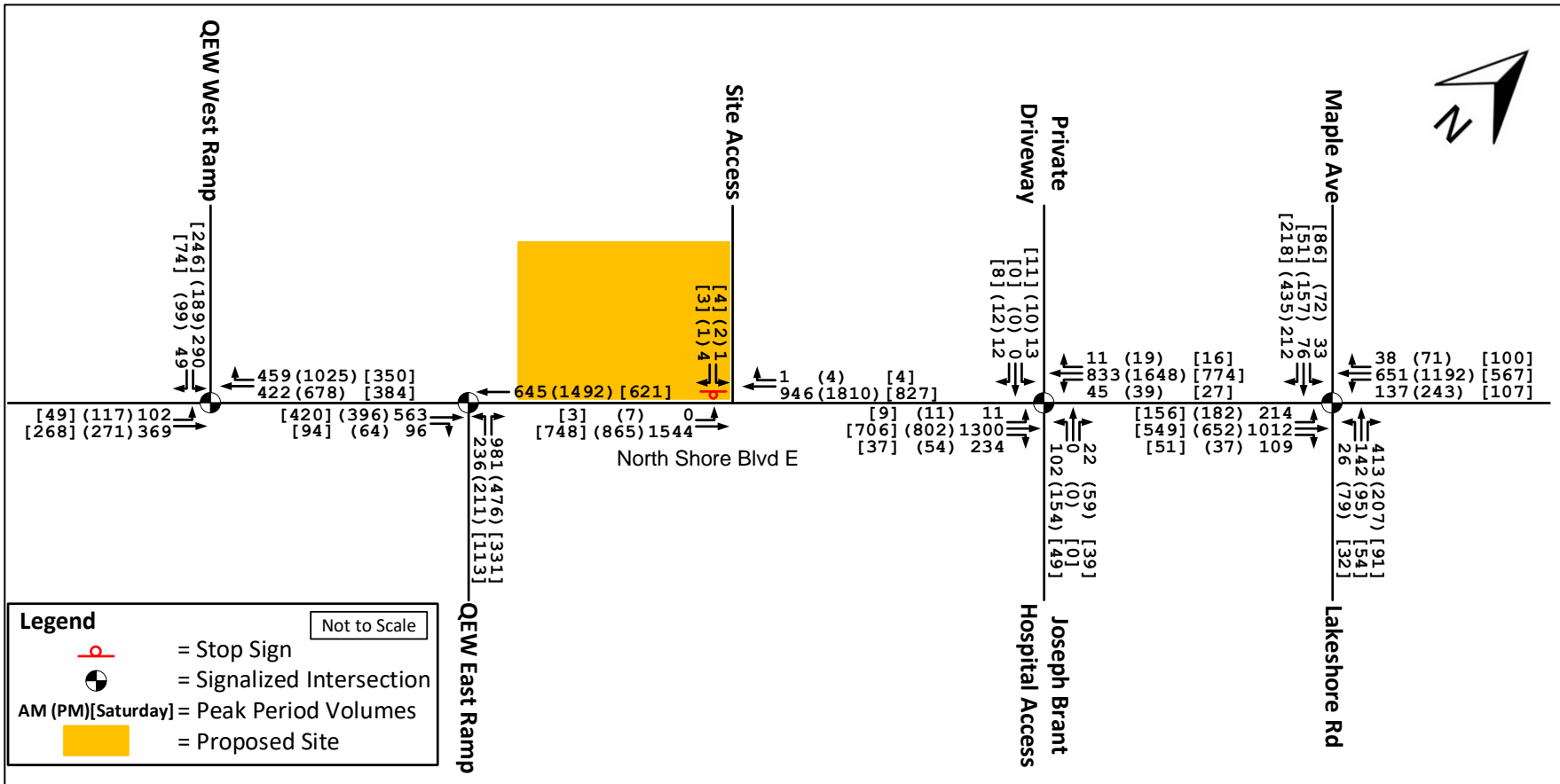
The trips generated by the development at 490-492 Brock Avenue / 1298 Ontario Street were added and distributed through the study area for the AM and PM peak hours, based on the supporting Parsons TIS reports Appendix G (dated July 12, 2017, provided by City staff) and a review of existing traffic patterns.

Based on the Parsons TIS report, 14 and 15 trips (inbound and outbound) are anticipated to travel through the study area during the weekday AM and PM peak hours, respectively. The Parsons TIS report did not analyze the Saturday peak hour. For the purposes of estimating this background development's Saturday peak hour traffic volumes, the highest of the documented AM and PM peak hour trip volumes were used, which is still regarded as low impact relative to existing traffic activity along the study area corridors.

5 2024 Future Background Traffic Analysis

To establish the future background condition traffic volumes, the existing traffic volumes were grown and the trips generated by the background development were added. **Exhibit 5-1** illustrates 2024 future background traffic volumes during the weekday AM, PM, and Saturday peak hours.

Exhibit 5-1: 2024 Future Background Traffic Volumes (Weekday AM, PM and Saturday Peak Hours)



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements. Not to scale.

The signalized and unsignalized intersection operations are respectively summarized in **Exhibit 5-2** and **Exhibit 5-3**, containing the weekday (AM and PM) and Saturday peak hours. Full 2024 future background Synchro and SimTraffic reports are provided in **Appendix G**.

Exhibit 5-2: 2024 Future Background Traffic Operations – Signalized Intersections

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
QEW East Ramp	A	0.84	NBR	A	0.81	-	700
JBH Access	B	0.64	NBL	D	0.54	37.6	30
Lakeshore Rd & Maple Ave	C	0.78	WBL	C	0.63	37.1	30
			NBT/R	D	0.92	167.8	-
PM Peak Hour							
QEW West Ramp	B	0.79	WBR	B	0.83	73.6	300
QEW East Ramp	A	0.71	NBL	E	0.82	92.0	700
JBH Access	A	0.72	NBL	D	0.60	54.1	30
Lakeshore Rd & Maple Ave	C	0.65	WBL	B	0.53	44.1	30
			WBT	C	0.76	216.4	-
Saturday Peak Hour							
No Critical Movements							

Exhibit 5-3: 2024 Future Background Traffic Operations – Unsignalized Intersection

North Shore Blvd Intersection	Movement	LOS	Delay (s)	V/C Ratio	Lane 95th Percentile Queue (m)
AM Peak Period					
Site Driveway	SBL/R	C	16.9	0.02	0.4
PM Peak Period					
Site Driveway	SBL/R	F	86.4	0.06	1.5
Saturday Peak Period					
Site Driveway	SBL/R	C	18.3	0.03	0.6

As anticipated, the critical movements identified under existing conditions were exacerbated by the background traffic volume growth. When comparing 2024 future background operations to existing conditions, the following additional critical intersections and/or movements are noted:

Weekday AM Peak Hour

- The QEW east ramp terminal intersection's northbound right turn movement is anticipated to operate with a v/c ratio of 0.81, although delays are low with LOS 'A'.
- The JBH access / North Shore Boulevard intersection's northbound left turn movement is expected to have minor queue spillover internally of approximately one car length.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's northbound through movement is expected to experience some congestion (v/c ratio of 0.92).
- The Site Driveway is expected to operate with no critical issues.

Weekday PM Peak Hour

- The QEW West Ramp / North Shore Boulevard intersection's westbound right turn movement is anticipated to operate critically due to a v/c ratio of 0.83. Overall intersection delays are noted to be low (LOS 'B').
- The QEW East Ramp / North Shore Boulevard intersection's northbound left turn movement is expected to operate with some congestion (v/c ratio of 0.82).
- At the JBH access, the northbound left turn movement's internal queue spillover is anticipated to continue occurring.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's westbound left turn movement is expected to experience some queue storage spillover.
- The Site Driveway access's outbound operations is expected to continue deteriorating due to an increase in vehicular volumes heading westbound along North Shore Boulevard expected from regional traffic growth.

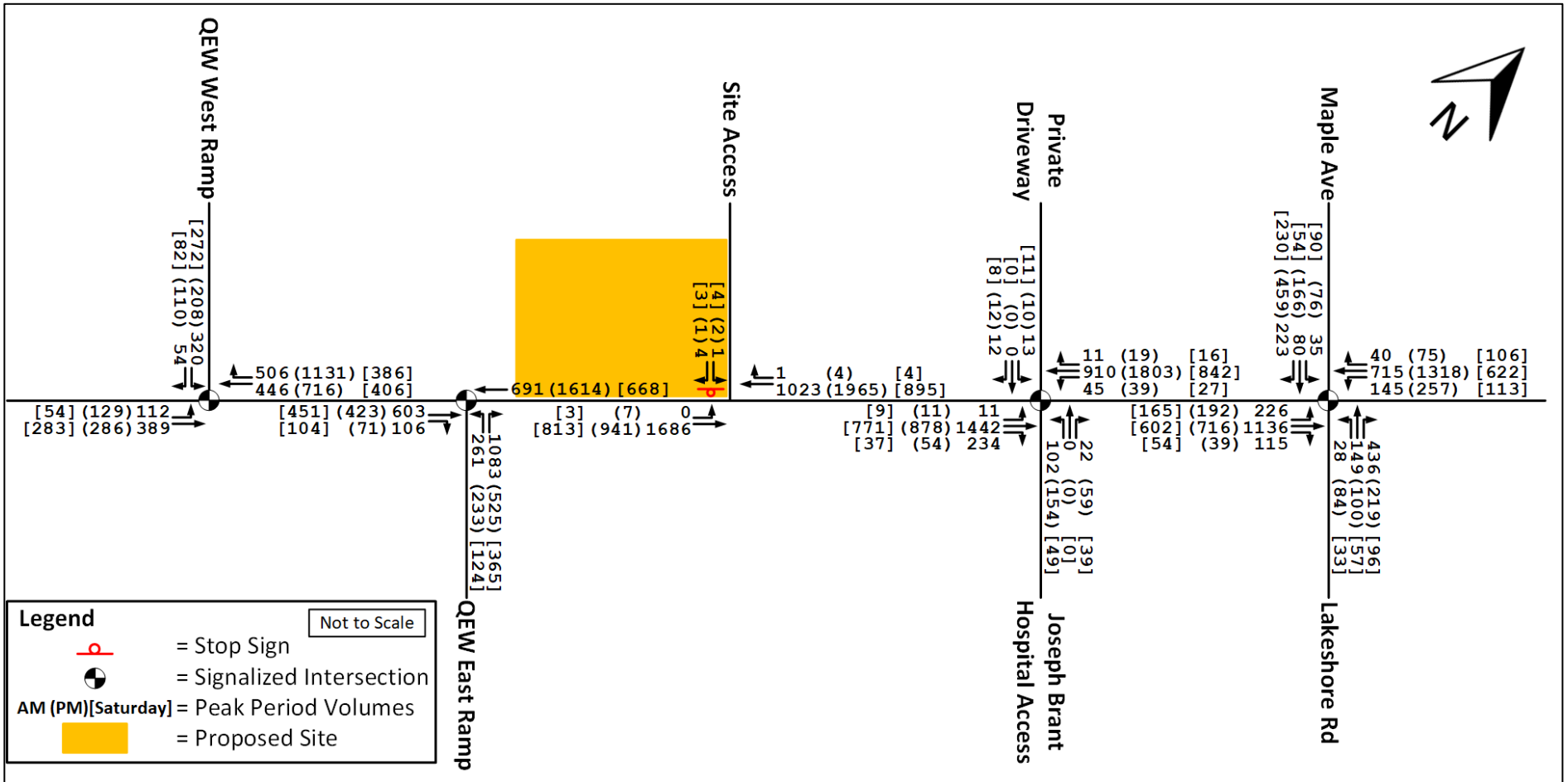
Saturday Peak Hour

- All study area intersections are expected to operate within acceptable conditions with regards to delays, v/c ratios, and queues as determined from the 95th percentile queuing results.

6 2029 Future Background Traffic Analysis

To obtain 2029 future background volumes, the 2024 future background volumes were further grown using the growth rates discussed in **Section 4.2. Exhibit 6-1** illustrates 2029 future background traffic volumes during the weekday AM, PM, and Saturday peak hours.

Exhibit 6-1: 2029 Future Background Traffic Volumes (Weekday AM, PM and Saturday Peak Hours)



The signalized and unsignalized intersection operations are summarized for the weekday and Saturday peak hours in **Exhibit 6-2** and **Exhibit 6-2**, respectively. Full 2029 future background Synchro and SimTraffic reports are provided in **Appendix H**.

Exhibit 6-2: 2029 Future Background Traffic Operations – Signalized Intersections

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
QEW East Ramp	B	0.93	NBR	A	0.89	19.6	700
JBH Access	B	0.69	NBL	D	0.54	37.6	30
Lakeshore Rd & Maple Ave	D	0.85	EBT	D	0.97	187.1	-
			WBL	D	0.68	39.2	30
			NBT/R	D	0.94	183.9	-
PM Peak Hour							
QEW West Ramp	C	0.88	WBR	C	0.92	341.8	300
			SBL	E	0.80	76.7	290
QEW East Ramp	A	0.77	WBT	A	0.75	18.3	-
			NBL	E	0.89	105.7	700
JBH Access	A	0.78	NBL	D	0.60	54.1	30
Lakeshore Rd & Maple Ave	C	0.72	EBL	E	0.68	68.0	165
			WBL	B	0.61	49.1	30
			WBT	D	0.90	253.4	-
			SBT	D	0.87	60.7	-
Saturday Peak Hour							
No Critical Movements							

Exhibit 6-3: 2029 Future Background Traffic Operations – Unsignalized Intersections

North Shore Blvd Intersection	Movement	LOS	Delay (s)	V/C Ratio	Lane 95th Percentile Queue (m)
AM Peak Period					
Site Driveway	SBL/R	C	18.5	0.02	0.4
PM Peak Period					
Site Driveway	SBL/R	F	131.6	0.10	2.2
Saturday Peak Period					
Site Driveway	SBL/R	C	19.7	0.03	0.6

The previously identified critical movements were exacerbated by the additional background traffic volume growth. When comparing 2029 future background operations to 2024 future background operations, the following additional critical intersections and/or movements were noted:

Weekday AM Peak Hour

- The QEW east ramp terminal intersection's northbound right movement is expected to operate with a v/c ratio of 0.89, although delays continue to be low with LOS 'A'. Overall, some congestion is noted with a v/c ratio of 0.93.
- The JBH access / North Shore Boulevard intersection's northbound left movement is anticipated to have minor queue spillover internally of approximately one car length.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's northbound and eastbound through movements are expected to approach capacity (v/c ratios of 0.94 and 0.97).
- The Site Driveway is expected to operate with no critical issues.

Weekday PM Peak Hour

- The QEW West Ramp / North Shore Boulevard intersection's westbound right movement and southbound left movement are anticipated to operate with some congestion due to v/c ratios of 0.92 and 0.80, respectively. Some congestion is expected for overall intersection operations (v/c ratio of 0.88).
- The QEW East Ramp / North Shore Boulevard intersection's northbound left turn movement is expected to operate with some congestion (v/c ratio of 0.89).
- At the JBH access, the northbound left turn movement's internal queue spillover is expected to continue.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's westbound left turn movement is expecting some queue storage spillover. Some congestion is also expected for the westbound through and southbound through movements.
- The Site Driveway access's outbound operations is expected to continue deteriorating due to an increase in vehicular volumes heading westbound along North Shore Boulevard expected from regional traffic growth.

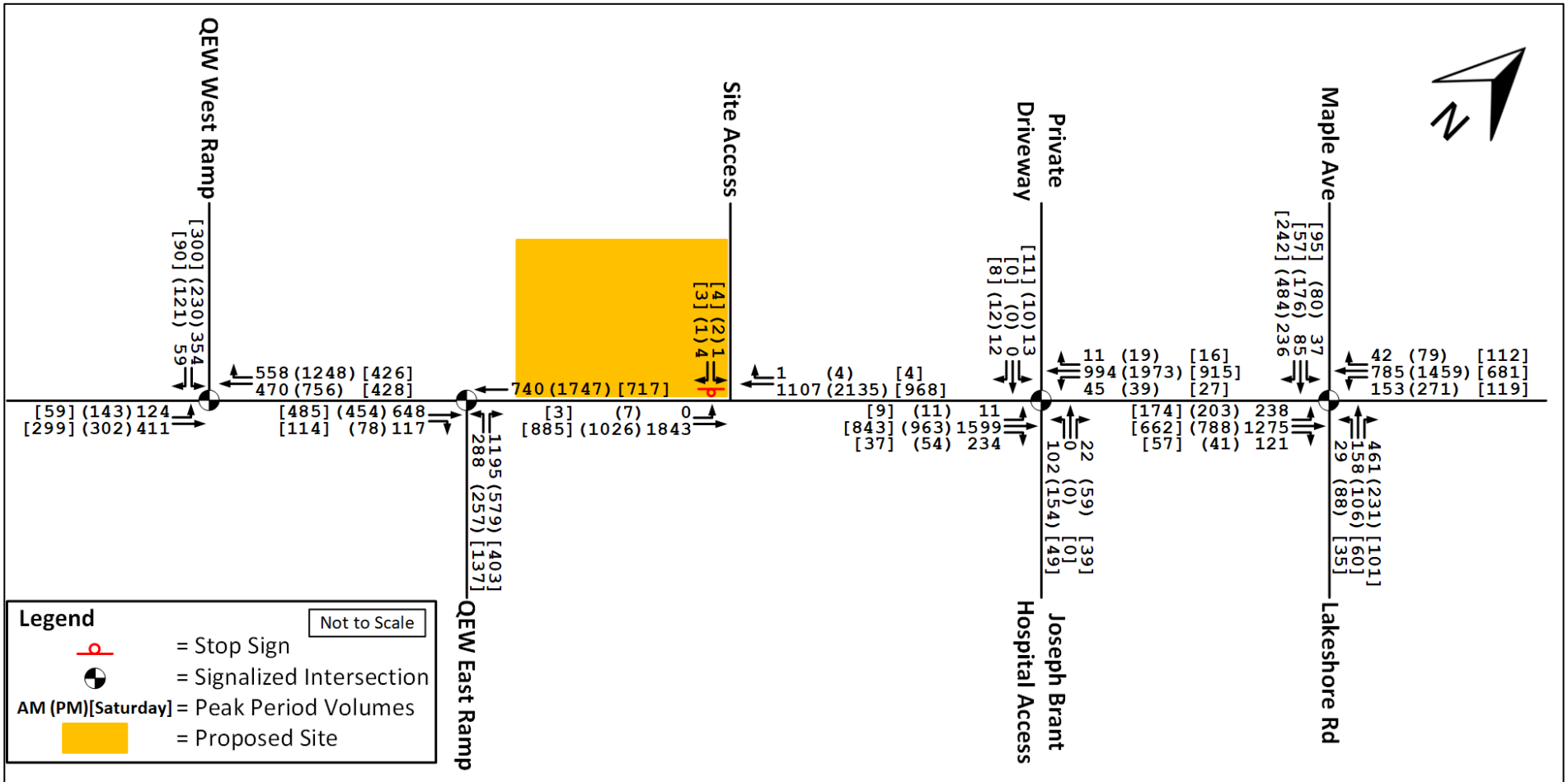
Saturday Peak Hour

- All study area intersections are operating within acceptable conditions with regards to delays, v/c ratios, and queues as determined from the 95th percentile queuing results.

7 2034 Future Background Traffic Analysis

To obtain 2034 future background volumes, the 2029 future background volumes were further grown using the growth rates discussed in **Section 4.2. Exhibit 7-1** illustrates 2034 future background traffic volumes during the weekday AM, PM, and Saturday peak hours.

Exhibit 7-1: 2034 Future Background Traffic Volumes (Weekday AM, PM and Saturday Peak Hours)



The signalized and unsignalized intersection operations are summarized during the weekday and Saturday peak hours in **Exhibit 7-2** and **Exhibit 7-3** respectively. Full 2034 future background Synchro and SimTraffic reports are provided in **Appendix I**.

Exhibit 7-2: 2034 Future Background Traffic Operations – Signalized Intersections

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
QEW West Ramp	B	0.71	SBL	D	0.80	91.8	290
QEW East Ramp	B	1.03	NBL	D	0.76	82.2	700
			NBR	C	0.98	68.4	700
JBH Access	B	0.75	EBT	B	0.82	221.8	-
			NBL	D	0.54	37.6	30
Lakeshore Rd & Maple Ave	D	0.93	EBT	E	1.08	224.7	-
			WBL	D	0.71	43.7	30
			WBT	D	0.80	115.1	-
			NBT	E	1.03	202.4	-
PM Peak Hour							
QEW West Ramp	C	0.99	WBR	D	1.03	400.7	300
			SBL	E	0.88	93.0	290
QEW East Ramp	B	0.84	WBT	A	0.81	18.0	-
			NBL	F	0.98	120.4	700
JBH Access	B	0.84	WBT	A	0.85	78.4	-
			NBL	D	0.60	54.1	30
Lakeshore Rd & Maple Ave	D	0.79	EBL	E	0.70	74.0	165
			WBL	B	0.68	70.3	30
			WBT	E	1.02	294.4	-
			SBT	D	0.90	66.1	-
Saturday Peak Hour							
No Critical Movements							

Exhibit 7-3: 2034 Future Background Traffic Operations – Unsignalized Intersections

North Shore Blvd Intersection	Movement	LOS	Delay (s)	V/C Ratio	Lane 95th Percentile Queue (m)
AM Peak Period					
Site Driveway	SBL/R	C	20.6	0.02	0.5
PM Peak Period					
Site Driveway	SBL/R	F	248.0	0.17	3.7
Saturday Peak Period					
Site Driveway	SBL/R	C	21.4	0.03	0.7

The previously identified critical movements were exacerbated by the additional background traffic volume growth. When comparing 2034 future background operations to 2029 future background operations, the following additional critical intersections and/or movements were noted:

Weekday AM Peak Hour

- The QEW west ramp terminal intersection's southbound left turn movement is expected to operate with a v/c ratio of 0.80, although delays continue to be acceptable with LOS 'D'. Overall intersection operations are expected to be acceptable with LOS 'B'.
- The QEW east ramp terminal intersection's northbound right movement is expected to operate with a v/c ratio of 0.98, indicating capacity constraints. Overall, the intersection is expected to operate with capacity constraints with a v/c ratio of 1.03.
- The JBH access / North Shore Boulevard intersection's eastbound through movement may spill past the QEW east ramp terminal intersection.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's northbound and eastbound through movements are anticipated to be at capacity (v/c ratios of 1.03 and 1.08).
- The Site Driveway is expected to operate with no critical issues.

Overall, when compared to existing weekday AM peak hour traffic operations, critical movements are expected at both QEW ramp terminals, and eastbound queues at the JBH intersection may spill past the QEW east ramp terminal. Capacity constraints are expected at more movements at the Lakeshore Road & Maple Avenue / North Shore Boulevard intersection.

Weekday PM Peak Hour

- The QEW West Ramp / North Shore Boulevard intersection's westbound right movement and southbound left movement are expected to be critical due to v/c ratios of 1.03 and 0.88, respectively. Capacity constraints are expected for overall intersection operations (v/c ratio of 0.99).
- The QEW East Ramp / North Shore Boulevard intersection's northbound left turn movement is expected to approach capacity (v/c ratio of 0.98).
- At the JBH access, the northbound left turn movement's internal queue spillover is expected to continue.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's westbound left turn movement is expected to experience queue storage spillover. Capacity constraints are also noted for the westbound through (v/c ratio of 1.02) and southbound through (v/c ratio of 0.90) movements.
- The Site Driveway access's outbound operations are expected to continue deteriorating due to an increase in vehicular volumes heading westbound along North Shore Boulevard expected from regional traffic growth.

Overall, when compared to existing weekday PM peak hour traffic operations, similarly, critical movements are now expected at both QEW ramp terminals. Capacity constraints are expected at more movements at the Lakeshore Road & Maple Avenue / North Shore Boulevard intersection.

Saturday Peak Hour

- All study area intersections are expected to operate within acceptable conditions with regards to delays, v/c ratios, and queues as determined from the 95th percentile queuing results.

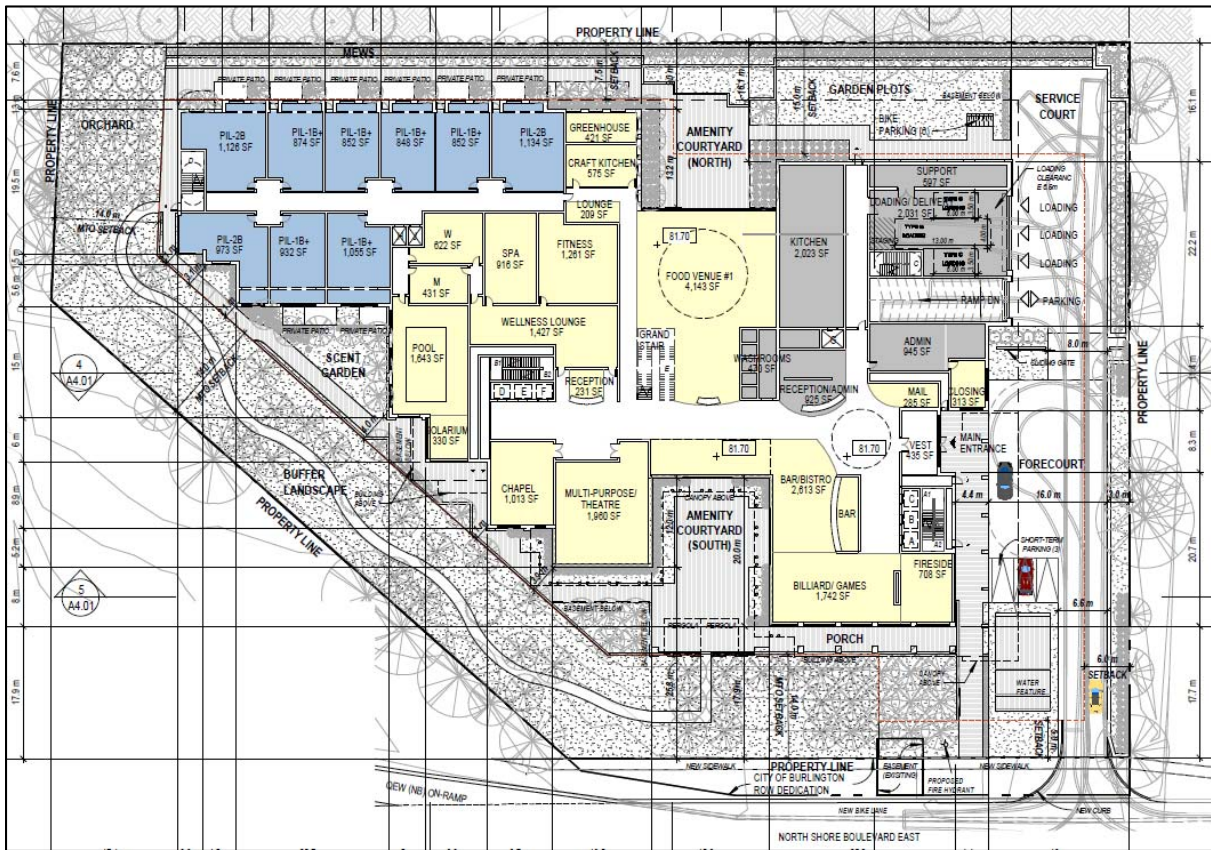
8 Future Total Traffic Conditions

8.1 Site Development

Amico is proposing to construct a seniors living campus, consisting of four buildings of varying height up to 17 storeys. These include 55 memory care units, 155 assisted living units, and 209 independent living units, for a total of 419 units.

The most recent site plan (August 15, 2019) is shown in **Exhibit 8-1**.

Exhibit 8-1: Subject Site Plan



Vehicle access to the subject site will be provided from the existing private driveway, located approximately 170 metres east of the North Shore Boulevard / QEW east ramp terminal intersection.

8.2 Trip Generation

To estimate trips generated by the subject site, trip generation rates were first obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual – 10th Edition. Specifically,

Land Use Code (LUC) 255 (Continuing Care Retirement Community) was considered the best fit for the subject site as this land use includes elements of senior adult living, congregate care, assisted living and skilled nursing care (e.g. memory care) land uses. The trip generation average rate for the AM, PM, and Saturday peak hours are summarized in **Exhibit 8-2**.

Exhibit 8-2: Subject Site Trip Generation (ITE Methodology)

Land Use	Unit	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Continuing Care Retirement Community, 419 Units (ITE LUC 255)	Trips/Unit	0.09	0.04	0.14	0.07	0.09	0.16	0.11	0.11	0.22
	%	65%	35%	100%	39%	61%	100%	52%	48%	100%
	Trips	38	21	59	26	41	67	48	44	92

It is noted that the subject site contains a proportion of residents that are in memory care (55 units out of 419 units, 13%) who are not able to drive. Therefore, the ITE Trip Generation Manual rates for Continuing Care Retirement Community uses may not accurately represent subject site traffic activity due to the broad range of continuing care housing sub-types surveyed for the ITE rates. To determine if this is the case, a proxy site trip generation survey was conducted at a site with similar characteristics to the subject site

8.3 Proxy Site Selection

To estimate the subject site's trip generation, traffic surveys and parking utilization surveys were conducted at one proxy site of a similar nature to the subject site. Amico provided unit statistics for several senior living centres across Southern Ontario, as displayed in **Exhibit 8-3**.

Exhibit 8-3: Potential Proxy Site Statistics

Unit Type	Subject Site		Barrie		Milton		Cambridge		Bayview Garden		Bayview	
	# of Units	% of Units	# of Units	% of Units	# of Units	% of Units	# of Units	% of Units	# of Units	% of Units	# of Units	% of Units
Independent Living	209	50%	68	51%	-	-	-	-	122	83%	111	79%
Assisted Living	155	37%	49	37%	131	86%	120	89%	25	17%	29	21%
Memory Care	55	13%	16	12%	21	14%	15	11%	-	-	-	-
Total	419	100%	133	100%	152	100%	135	100%	147	100%	140	100%
Distance to Highway	170 m		960 m		5,000 m		-		730 m		660 m	

When comparing the subject site's unit type breakdown and the distance to the nearest major highway, the Amico senior care centre in Barrie is considered most comparable. Both sites contain all three unit types (independent living, assisted living, and memory care) with similar unit percentages, and both sites are within a kilometre of a major highway.

On-site trip generation data was collected on July 19, 2018 from 7:30 AM to 10:00 AM, from 5:30 PM to 7:00 PM, and on July 21, 2018 from 11:00 AM to 1:00 PM. The inbound and outbound peak hour trips observed at the Barrie proxy site (133 units) were used to develop trip generation rates, which were then applied to the subject site (419 units) to generate trips. The trip generation assessment is summarized in **Exhibit 8-4**.

Exhibit 8-4: Subject Site Trip Generation (Using Proxy Site Trip Rates)

Site	Unit	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Barrie Proxy Site (133 units)	Trips	32	14	46	10	11	21	13	12	25
	%	69%	31%	100%	50%	50%	100%	53%	47%	100%
	Trips/Unit	0.24	0.11	0.35	0.08	0.08	0.16	0.10	0.09	0.19
Subject Site (419 units)	Trips (Based on proxy trip rate above)	100	44	144	31	34	65	40	37	77

The subject site's trip generation based on proxy site derived trip rates range between 31 and 100 one-way (i.e. inbound or outbound) trips during the various peak hours.

The subject site trip estimates based on the ITE and proxy site methodologies are compared and summarized in **Exhibit 8-5**.

Exhibit 8-5: Subject Site Trip Generation (ITE and Proxy Site Methodology Comparison)

Trip Generation Methodology	Unit	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
ITE	Trips/Unit	0.11	0.06	0.17	0.07	0.11	0.19	0.13	0.13	0.26
	%	65%	35%	100%	39%	61%	100%	52%	48%	100%
	Trips	38	21	59	26	41	67	48	44	92
Proxy Site	Trips/Unit	0.24	0.11	0.35	0.08	0.08	0.16	0.10	0.09	0.19
	%	69%	31%	100%	50%	50%	100%	53%	47%	100%
	Trips	100	44	144	31	34	65	40	37	77
Trip Difference (ITE – Proxy)		-62	-23	-85	-5	7	2	8	7	15

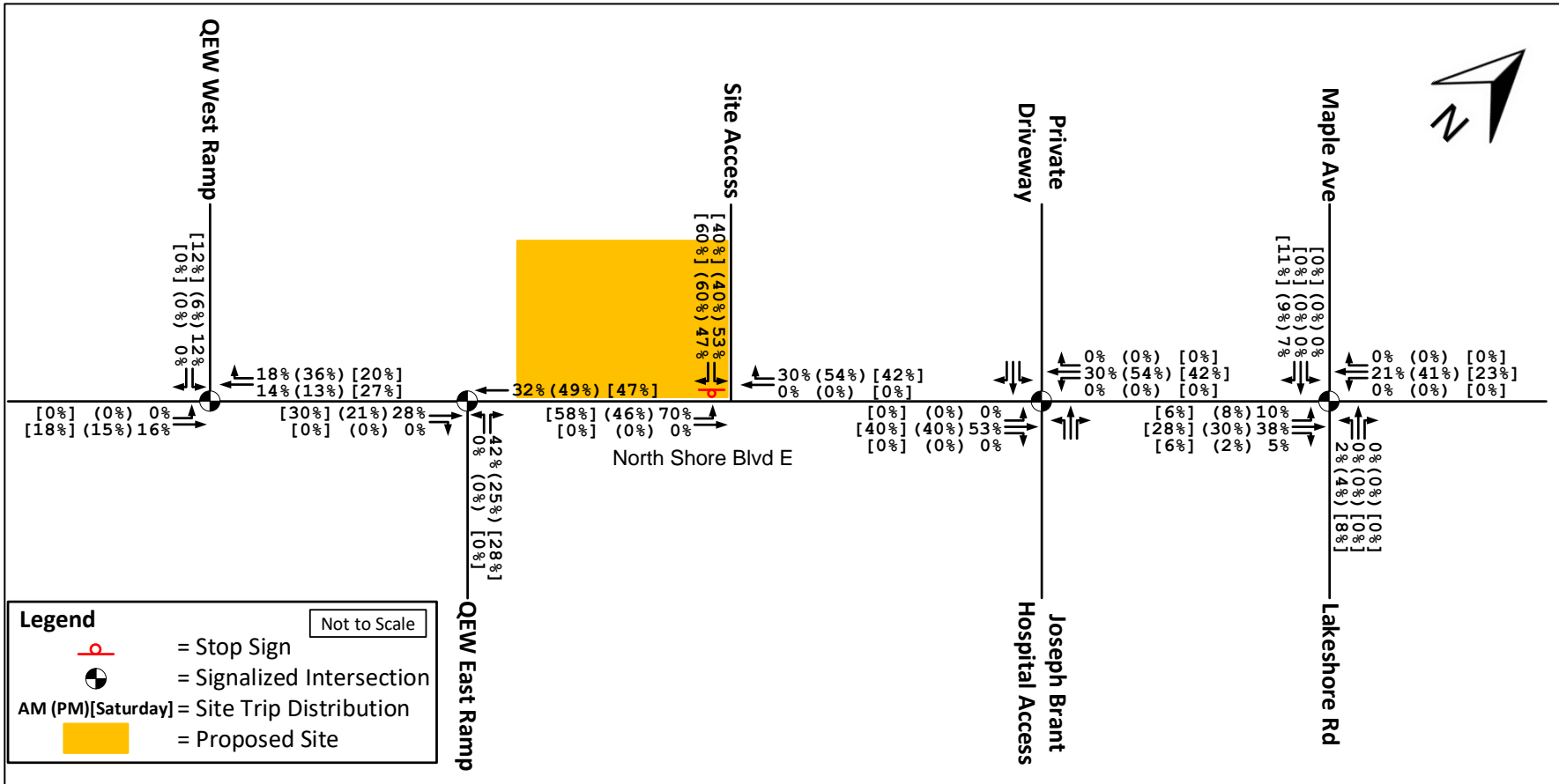
Based on the comparison between the ITE and Proxy Site methodologies, trips estimated using the proxy site trip rate method resulted in 85 more two-way trips (i.e. inbound and outbound) during the weekday AM peak hour, 2 less the weekday PM peak hour, and 15 less during the Saturday peak hour. Therefore, for this report's traffic assessment, proxy site trip rates were deemed more appropriate and applicable to the subject site's characteristics, and were used to estimate subject site trips.

8.4 Trip Distribution and Assignment

Trip distribution was based on an assessment of traffic patterns at the intersection east of the subject site, containing the Chartwell Brant Centre Long Term Care Residence, Joseph Brant Hospital, and other facilities. This method was preferred over the use of Transportation Tomorrow Survey (TTS) travel pattern data, since locally sourced specific trip traffic patterns relating to the study area and similar long term care land uses was deemed more accurate and applicable.

Trip assignment and distribution during the weekday AM, PM, and Saturday peak hours are displayed in **Exhibit 8-6**.

Exhibit 8-6: Subject Site Trip Distribution (Weekday AM, PM and Saturday Peak Hour)

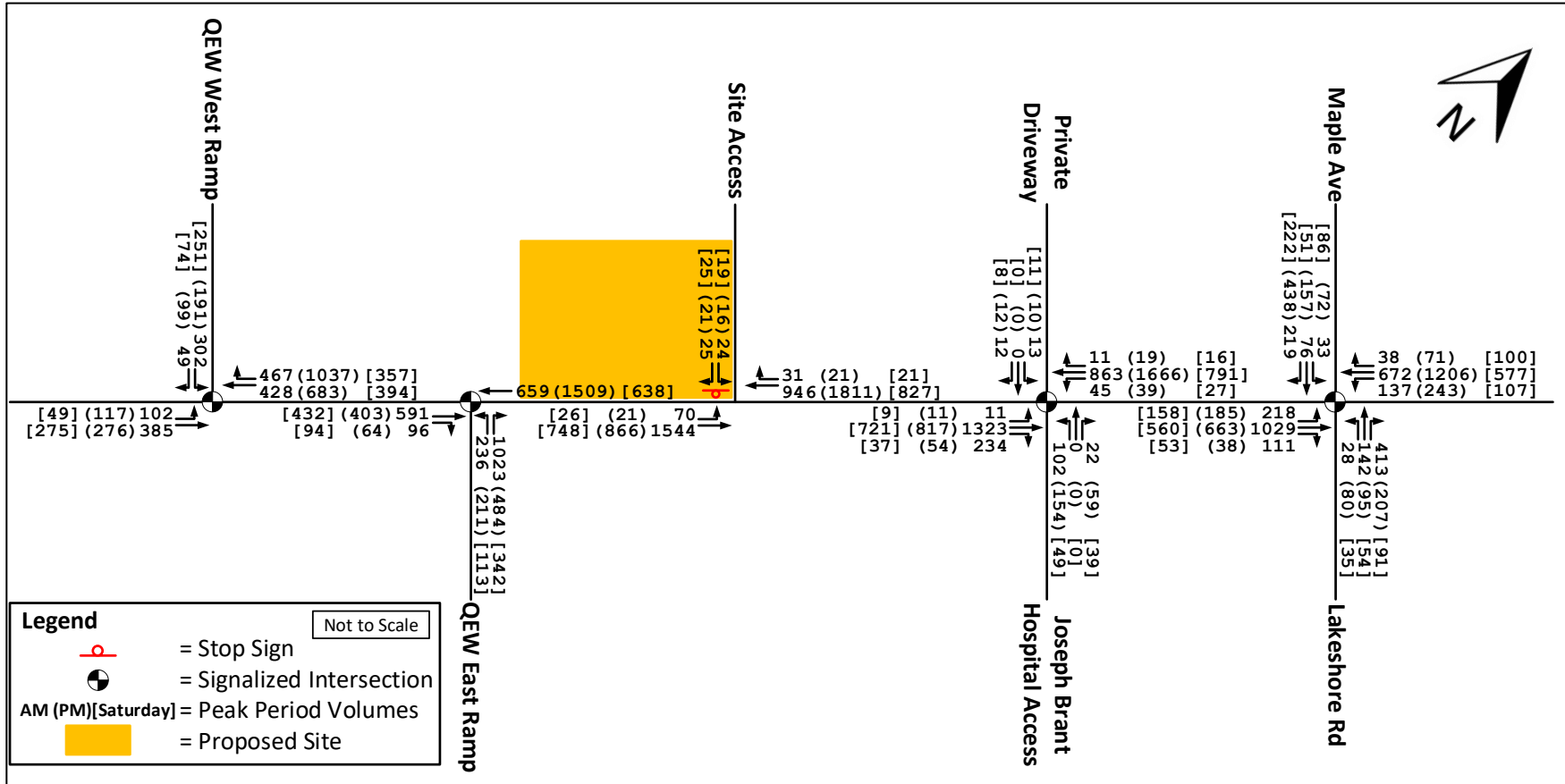


Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements. Not to scale.

9 2024 Future Total Traffic Analysis

Future total traffic volumes for the 2024 horizon year were obtained by adding site generated trips to the 2024 future background volumes. **Exhibit 9-1** illustrates 2024 future total traffic volumes during the weekday (AM and PM) and Saturday peak hours.

Exhibit 9-1: 2024 Future Total Traffic Volumes (Weekday AM, PM and Saturday Peak Hours)



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements. Not to scale.

Exhibit 9-2 and **Exhibit 9-3** summarize the signalized and unsignalized intersection operations respectively during the weekday (AM and PM) and Saturday peak hours. Full 2024 future total Synchro and SimTraffic reports are provided in **Appendix J**.

Exhibit 9-2: 2024 Future Total Traffic Operations – Signalized Intersections

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
QEW East Ramp	A	0.88	NBR	A	0.84	-	700
JBH Access	B	0.65	NBL	D	0.54	37.6	30
Lakeshore Rd & Maple Ave	C	0.79	EBT	C	0.86	136.5	-
			WBL	C	0.63	37.1	30
			NBT/R	D	0.92	167.8	-
PM Peak Hour							
QEW West Ramp	B	0.80	WBR	B	0.84	73.7	300
QEW East Ramp	A	0.72	NBL	E	0.82	92.0	700
JBH Access	A	0.73	NBL	D	0.60	54.1	30
Lakeshore Rd & Maple Ave	C	0.66	WBL	B	0.54	44.1	30
			WBT	C	0.79	220.4	-
Saturday Peak Hour							
No Critical Movements							

Exhibit 9-3: 2024 Future Total Traffic Operations – Unsignalized Intersections

North Shore Blvd Intersection	Movement	LOS	Delay (s)	V/C Ratio	Lane 95th Percentile Queue (m)
AM Peak Period					
Site Driveway	SBL/R	F	51.1	0.41	13.4
PM Peak Period					
Site Driveway	SBL/R	F	134.9	0.64	20.7
Saturday Peak Period					
Site Driveway	SBL/R	C	19.7	0.16	4.4

To evaluate the impact the subject site has on the study area road network, the 2024 future total operations are compared to the 2024 future background operations. In general, study area traffic operations marginally deteriorate due to the additional trips generated by the subject site. In detail, the following critical operations are observed:

Weekday AM Peak Hour

- The QEW east ramp terminal intersection's northbound right movement is expected to operate with a v/c ratio of 0.84, indicating some congestion. Overall, the intersection is expected to operate with capacity constraints with a v/c ratio of 0.88.
- The JBH access / North Shore Boulevard intersection's northbound left movement is expected to experience a minor queue spillover internally of approximately one car length.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's northbound through movement and eastbound movement is expected to experience some congestion.
- The Site Driveway is expected to operate with delays approaching one minute, with delays of approximately two car lengths.

Weekday PM Peak Hour

- The QEW West Ramp / North Shore Boulevard intersection's westbound right movement is expected to have some congestion due to a v/c ratio of 0.84. Overall intersection delays are expected to be low (LOS 'B').
- The QEW East Ramp / North Shore Boulevard intersection's northbound left turn movement is expected to operate with some congestion (v/c ratio of 0.82).
- At the JBH access, the northbound left turn movement's internal queue spillover is expected to continue.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's westbound left turn movement is expected to experience some queue storage spillover (approximately two car lengths).
- The Site Driveway is expected to operate with delays of approximately two minute, with delays of approximately three car lengths.

Saturday Peak Hour

- All study area intersections are expected to operate within acceptable conditions with regards to delays, v/c ratios, and queues as determined from the 95th percentile queuing results.

10 2029 Future Total Traffic Analysis

The 2029 future total volumes were obtained by adding site generated trips to the 2029 future background volumes. **Exhibit 10-1** illustrates 2029 future total traffic volumes during the weekday AM, PM, and Saturday peak hours.

Exhibit 10-1: 2029 Future Total Traffic Volumes (AM, PM and Saturday Peak Hours)

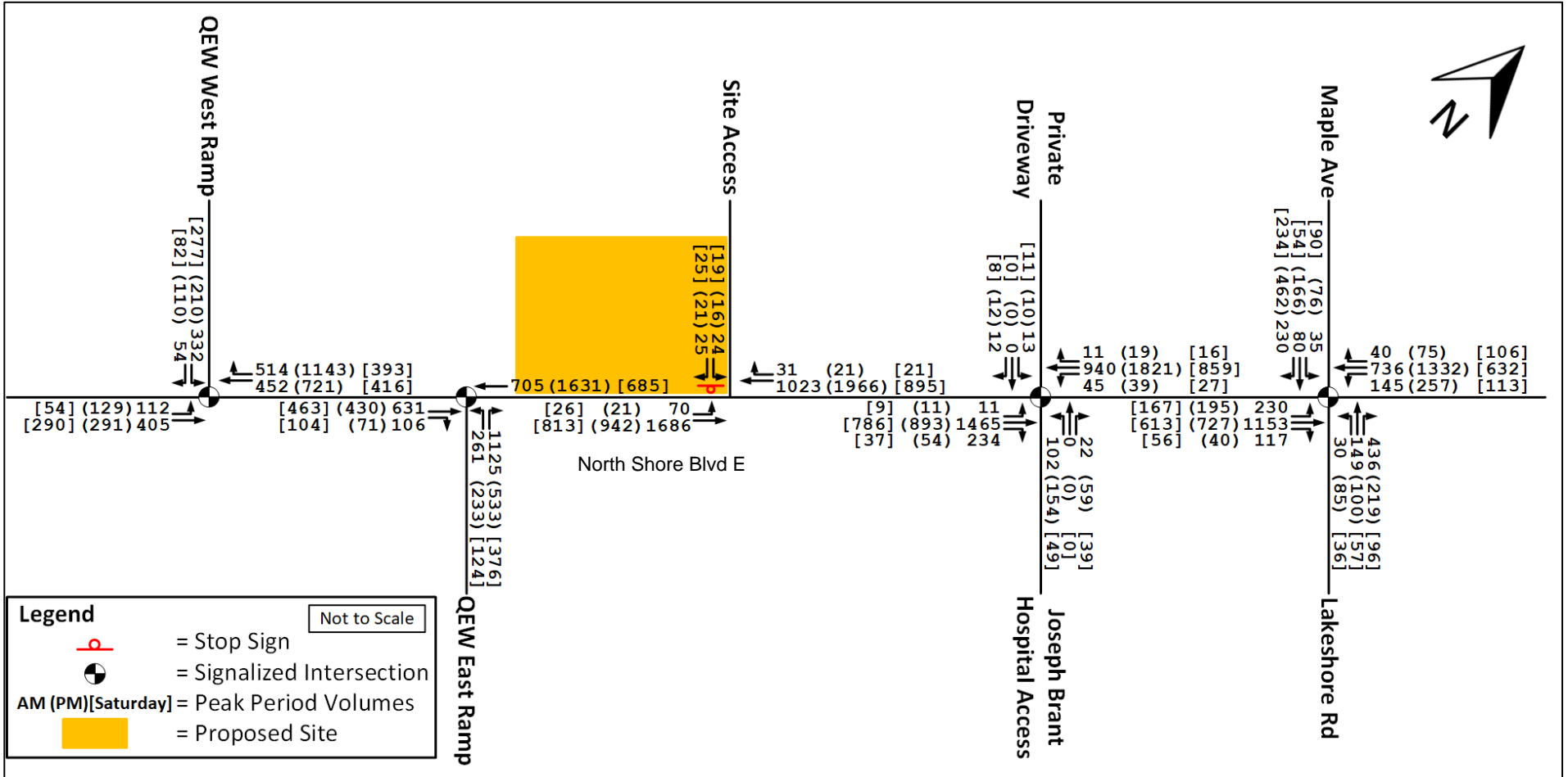


Exhibit 10-2 and **Exhibit 10-3** summarize the signalized and unsignalized intersection operations, respectively during the weekday (AM and PM) and Saturday peak hours. Full 2029 future total Synchro and SimTraffic reports are provided in **Appendix K**.

Exhibit 10-2: 2029 Future Total Traffic Operations – Signalized Intersections

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
QEW West Ramp	B	0.67	SBL	C	0.75	83.7	290
QEW East Ramp	B	0.97	NBR	B	0.93	38.1	700
JBH Access	B	0.70	NBL	D	0.54	37.6	30
Lakeshore Rd / Maple Ave	D	0.86	EBT	D	0.99	192.2	-
			WBL	D	0.68	39.2	30
			NBT/R	D	0.94	183.9	-
PM Peak Hour							
QEW West Ramp	C	0.89	WBR	C	0.94	348.5	300
			SBL	E	0.81	77.9	290
QEW East Ramp	A	0.78	WBT	A	0.76	18.6	-
			NBL	E	0.89	105.7	700
JBH Access	B	0.78	NBL	D	0.60	54.1	30
Lakeshore Rd / Maple Ave	C	0.72	WBL	B	0.62	49.1	30
			WBT	D	0.91	257.3	-
			SBT	D	0.87	61.2	-
Saturday Peak Hour							
No Critical Movements							

Exhibit 10-3: 2029 Future Total Traffic Operations – Unsignalized Intersections

North Shore Blvd Intersection	Movement	LOS	Delay (s)	V/C Ratio	Lane 95th Percentile Queue (m)
AM Peak Period					
Site Driveway	SBL/R	F	65.9	0.49	16.5
PM Peak Period					
Site Driveway	SBL/R	F	289.1	0.99	29.2
Saturday Peak Period					
Site Driveway	SBL/R	C	21.5	0.18	4.9

To evaluate the impact the subject site has on the study area road network, the 2029 future total operations are compared to the 2029 future background operations.

In detail, the following critical operations are observed:

Weekday AM Peak Hour

- The QEW west ramp terminal intersection's southbound left movement is expected to operate with a v/c ratio of 0.75, although delays are acceptable with LOS 'C'.
- The QEW east ramp terminal intersection's northbound right turn movement is expected to approach capacity with a v/c ratio of 0.93.
- The JBH access / North Shore Boulevard intersection's northbound left movement is expecting to have minor queue spillover internally of approximately one car length.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's northbound and eastbound through movements are expecting to approach capacity (v/c ratios of 0.94 and 0.99).
- The Site Driveway's outbound movements are anticipated to operate with delays of one minute, however operations are within capacity, and queues of approximately three car lengths are anticipated.

Weekday PM Peak Hour

- The QEW West Ramp / North Shore Boulevard intersection's westbound right movement and southbound left movement are anticipated to be critical due to v/c ratios 0.94 and 0.81, respectively. Some congestion is expected for overall intersection operations (v/c ratio of 0.89).
- The QEW East Ramp / North Shore Boulevard intersection's northbound left turn movement is expected to operate with some congestion (v/c ratio of 0.89).
- At the JBH access, the northbound left turn movement's internal queue spillover is expected to continue.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's westbound left turn movement is expected to experience some queue storage spillover. Some congestion is also noted for the westbound through and southbound through movements.
- The Site Driveway's outbound movements is expected to operate with delays of approximately five minutes, with capacity constraints (v/c ratio of 0.99), and queues of approximately five car lengths anticipated.

Saturday Peak Hour

- All study area intersections are expected to operate within acceptable conditions with regards to delays, v/c ratios, and queues as determined from the 95th percentile queuing results.

11 2034 Future Total Traffic Analysis

2034 future total volumes were obtained by adding site generated trips to the 2034 future background volumes. **Exhibit 11-1** illustrates 2034 future total traffic volumes during the weekday AM, PM, and Saturday peak hours.

Exhibit 11-1: 2034 Future Background Traffic Volumes (AM, PM and Saturday Peak Hours)

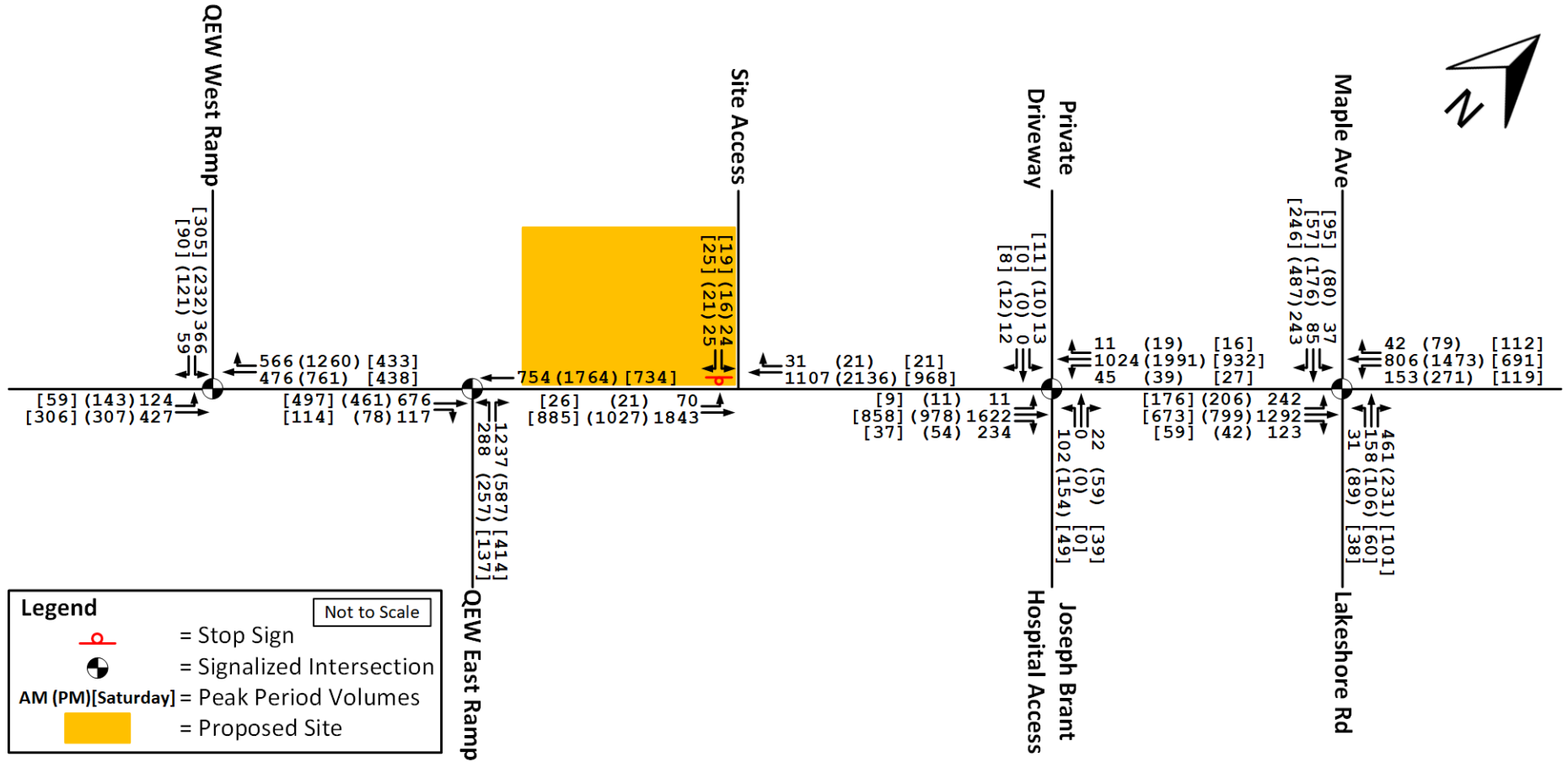


Exhibit 11-2 and **Exhibit 11-3** summarize the signalized and unsignalized intersection operations, respectively, for the weekday (AM and PM) and Saturday peak hours. Full 2034 future total Synchro and SimTraffic reports are provided in **Appendix L**.

Exhibit 11-2: 2034 Future Total Traffic Operations – Signalized Intersections

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
QEW West Ramp	B	0.72	SBL	D	0.83	96.5	290
QEW East Ramp	D	1.06	NBL	D	0.76	82.2	700
			NBR	E	1.02	86.5	700
JBH Access	B	0.76	EBT	B	0.83	237.6	-
			WBL	E	0.25	6.9	70
			NBL	D	0.54	37.6	30
Lakeshore Rd / Maple Ave	E	0.94	EBT	E	1.10	229.4	-
			WBL	D	0.71	43.7	30
			WBT	D	0.83	119.1	-
			NBT/R	E	1.03	202.4	-
PM Peak Hour							
QEW West Ramp	C	1.0	WBT	B	0.75	118.7	-
			WBR	D	1.04	407.2	300
			SBL	E	0.89	93.5	290
QEW East Ramp	B	0.85	WBT	A	0.82	18.5	-
			NBL	F	0.98	120.4	700
JBH Access	B	0.84	WBT	A	0.86	78.9	-
			NBL	D	0.60	54.1	30
Lakeshore Rd/Maple Ave	D	0.80	EBL	E	0.70	75.9	165
			WBL	B	0.68	72.6	30
			WBT	E	1.03	298.3	-
			SBT	D	0.90	66.8	-
Saturday Peak Hour							
No Critical Movements							

Exhibit 11-3: 2034 Future Total Traffic Operations – Unsignalized Intersections

North Shore Blvd Intersection	Movement	LOS	Delay (s)	V/C Ratio	Lane 95th Percentile Queue (m)
AM Peak Period					
Site Driveway	SBL/R	F	90.6	0.59	20.5
PM Peak Period					
Site Driveway	SBL/R	F	862.8	1.99	40.3
Saturday Peak Period					
Site Driveway	SBL/R	C	23.7	0.20	5.5

To evaluate the impact the subject site has on the study area road network, the 2034 future total operations are compared to the 2034 future background operations. In general, site driveway southbound outbound delays increase due to higher North Shore Boulevard westbound volumes.

In detail, the following critical operations are observed:

AM Peak Hour

- The QEW west ramp terminal intersection's southbound left movement is expected to operate with a v/c ratio of 0.76, although delays are acceptable with LOS 'D'.
- The QEW east ramp terminal intersection's northbound right turn movement is expected to operate at capacity.
- The JBH access / North Shore Boulevard intersection's northbound left movement is anticipated to have minor queue spillover internally with a length of approximately one car length. The westbound left queue will operate with LOS 'E'.
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's northbound and eastbound through movements are anticipated to be at capacity. Overall operations are expecting capacity constraints (v/c ratio of 0.94).
- The Site Driveway's outbound movements is anticipated to operate with delays of 90 seconds; however operations are within capacity, and queues of approximately three car lengths are anticipated.

Overall, when compared to 2034 future background AM peak hour traffic operations, negligible operational changes are anticipated at the QEW West Ramp due to site traffic volumes. The most notable change is at the QEW East ramp, with an increased queue length of three car lengths. Similar comparable minor differences are reported for the other study area intersections, with the exception of the subject site driveway.

PM Peak Hour

- The QEW West Ramp / North Shore Boulevard intersection's westbound movements and southbound left movement are expected to be congested. Capacity constraints are also expected for overall intersection operations.
- The QEW East Ramp / North Shore Boulevard intersection's northbound left turn movement is expected to operate with capacity constraints (v/c ratio of 0.98).
- At the JBH access, the northbound left turn movement's internal queue spillover is expected to continue. Some congestion is anticipated for the westbound through movement (v/c ratio of 0.86).
- The Lakeshore Road & Maple Avenue / North Shore Boulevard intersection's westbound left turn movement may experience some queue storage spillover. Some congestion is also anticipated for the westbound through and southbound through movements.
- The Site Driveway's outbound movements may operate with excessive delays, with capacity constraints (v/c ratio of 1.99), and queues of approximately five car lengths are anticipated.

Overall, when compared to 2034 future background PM peak hour traffic operations, minimal impacts to study area intersections attributed to subject site traffic are expected, with the subject site driveway itself being the exception.

Saturday Peak Hour

- All study area intersections are operating within acceptable conditions with regards to delays, v/c ratios, and queues as determined from the 95th percentile queuing results.

12 Traffic Operations Summary

12.1 Future Background and Future Total Traffic Comparison

In the previous future background (**Section 4**) and future total (**Section 5**) discussions, V/C ratios obtained through Synchro Analysis were analyzed. By comparing these two scenarios, it was observed that the redevelopment of the subject site is anticipated to result in minimal additional impacts to future background traffic operations. The majority of traffic operational issues in the future are observed to result from background traffic growth. To illustrate these observations, **Exhibit 12-1** compares the change in LOS and V/C ratios for the 2034 future background and 2034 future total scenarios at the major signalized intersections.

Exhibit 12-1: Comparison Between 2034 Future Background and 2034 Future Total Traffic Conditions – Overall intersection Operations

Intersection with North Shore Blvd	2034 Future Background Traffic Conditions		2034 Future Total Traffic Conditions		% Change for V/C Ratio (%)
	LOS	V/C Ratio	LOS	V/C Ratio	
AM Peak Hour					
QEW West Ramp	B	0.71	B	0.72	1.4%
QEW East Ramp	B	1.03	D	1.06	2.9%
JBH Access	B	0.75	B	0.76	1.3%
Lakeshore Rd & Maple Ave	D	0.93	E	0.94	1.1%
PM Peak Hour					
QEW West Ramp	C	0.99	C	1	1.0%
QEW East Ramp	B	0.84	B	0.85	1.2%
JBH Access	B	0.84	B	0.84	0.0%
Lakeshore Road & Maple Avenue	D	0.79	D	0.8	1.3%
Saturday Peak Hour					
QEW West Ramp	B	0.55	B	0.56	1.8%
QEW East Ramp	A	0.38	A	0.39	2.6%
JBH Access	A	0.37	A	0.38	2.7%
Lakeshore Road & Maple Avenue	B	0.41	B	0.42	2.4%

Based on the comparison, it is observed that the addition of site traffic to the future background scenario incurs minimal impact to the overall intersection V/C ratios (as high 2.9%, but typically in the order of 1.6%). This demonstrates the minimal impact the subject site is anticipated to have on future traffic operations.

A further detailed comparison of key critical movement operations in the study area was also undertaken for the 2034 future background and 2034 future total traffic scenarios, provided in **Exhibit 12-2**.

Exhibit 12-2: Comparison between 2034 Future Background and 2034 Future Total Traffic Conditions – Critical Movement Operations

North Shore Boulevard Intersection	Mvmt	2034 Future Background			2034 Future Total			% Change	
		LOS	V/C Ratio	95th %tile Queue (m)	LOS	V/C Ratio	95th %tile Queue (m)	V/C Ratio	95th %tile Queue (m)
AM Peak Hour									
QEW West Ramp	SBL	D	0.80	91.8	D	0.83	96.5	3.8%	5.1%
QEW East Ramp	NBL	D	0.76	82.2	D	0.76	82.2	0.0%	0.0%
	NBR	C	0.98	68.4	E	1.02	86.5	4.1%	26.5%
JBH Access	EBT	B	0.82	221.8	B	0.83	237.6	1.2%	7.1%
	WBL	E	0.25	7.0	E	0.25	6.9	0.0%	-1.4%
	NBL	D	0.54	37.6	D	0.54	37.6	0.0%	0.0%
Lakeshore Rd/Maple Ave	EBT	E	1.08	224.7	E	1.10	229.4	1.9%	2.1%
	WBL	D	0.71	43.7	D	0.71	43.7	0.0%	0.0%
	WBT	D	0.80	115.1	D	0.83	119.1	3.8%	3.5%
	NBT	E	1.03	202.4	E	1.03	202.4	0.0%	0.0%
PM Peak Hour									
QEW West Ramp	WBT	B	0.74	117.8	B	0.75	118.7	1.4%	0.8%
	WBR	D	1.03	400.7	D	1.04	407.2	1.0%	1.6%
	SBL	E	0.88	93.0	E	0.89	93.5	1.1%	0.5%
QEW East Ramp	WBT	A	0.81	18.0	A	0.82	18.5	1.2%	2.8%
	NBL	F	0.98	120.4	F	0.98	120.4	0.0%	0.0%
JBH Access	WBT	A	0.85	78.4	A	0.86	78.9	1.2%	0.6%
	NBL	D	0.60	54.1	D	0.60	54.1	0.0%	0.0%
Lakeshore Rd/Maple Ave	EBL	E	0.70	74.0	E	0.70	75.9	0.0%	2.6%
	WBL	B	0.68	70.3	B	0.68	72.6	0.0%	3.3%
	WBT	E	1.02	294.4	E	1.03	298.3	1.0%	1.3%
	SBT	D	0.90	66.1	D	0.90	66.8	0.0%	1.1%
Saturday Peak Hour									
No Critical Movements									

In this comparison, minimal impacts to V/C ratios (less than a 5% increase) are observed when comparing 2034 future background and 2034 future total volumes.

Similarly, minimal impacts to Synchro queues are observed, with increases of approximately up to 5%. A larger impact is noted during the weekday AM peak hour at the QEW east ramp terminal intersection for the northbound right movement (26.5%); however, this reflects an increase of 18 metres or just three car lengths, which is also regarded as minimal. The change in SimTraffic queues (as provided in the appendices) is much more pronounced, where some future total queues are expected to lengthen and others are expected to shorten compared to future background conditions.

To further illustrate off-ramp queues at the QEW ramp intersections, an illustration of distances between ramp elements and terminal spacing is provided in **Exhibit 12-3**.

Ramp terminal queues for all future background and future total traffic scenario years are provided in **Exhibit 12-4** and **Exhibit 12-5** for Synchro and SimTraffic queues, respectively. The queues were derived from the previously discussed exhibits and appendices that documented study area intersection operations.

Exhibit 12-3: Distances between QEW Ramp Terminal Elements

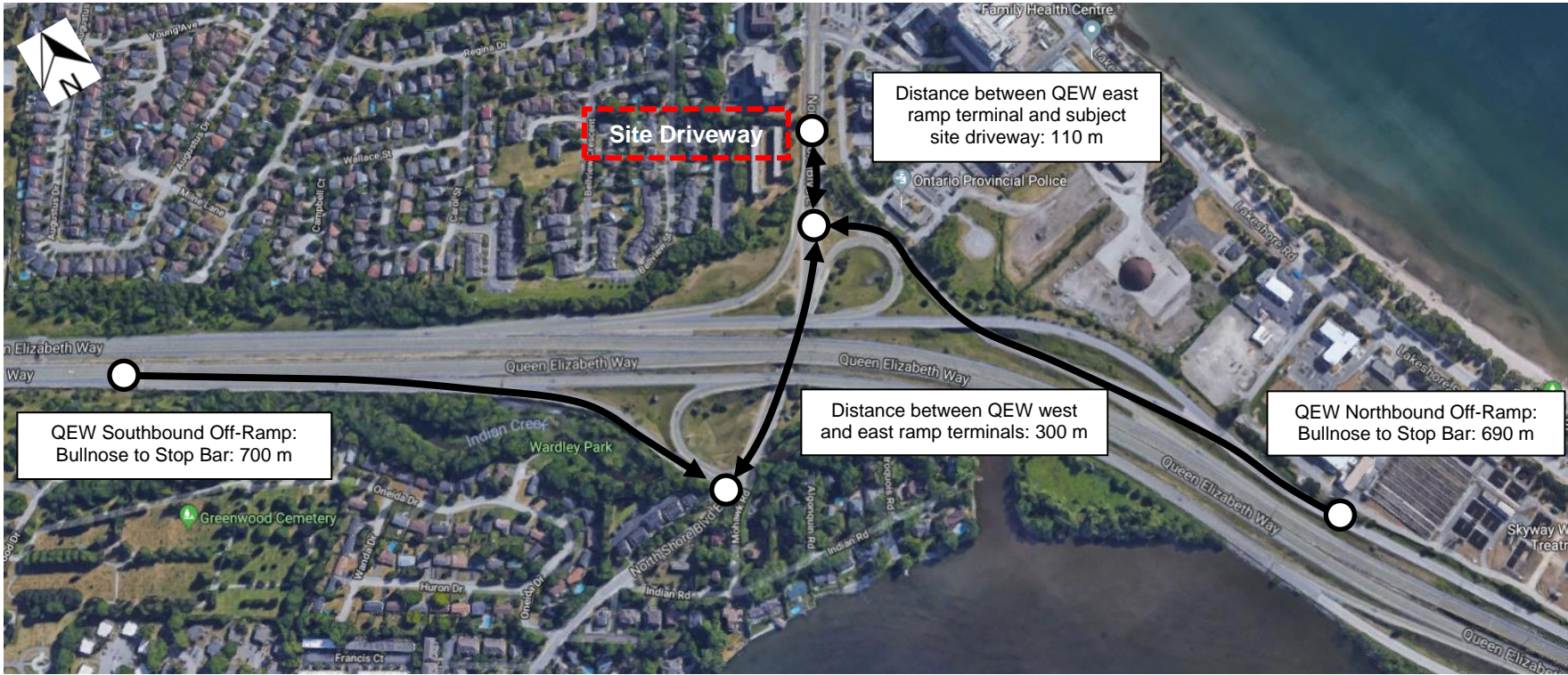


Exhibit 12-4: QEW Ramp Terminal Synchro Queue Comparison by Scenario Year

Location and Queue Direction	Existing (m)	2024 Future Background (m)	2024 Future Total (m)	2029 Future Background (m)	2029 Future Total (m)	2034 Future Background (m)	2034 Future Total (m)	Queue Limits (to Hwy Bullnose / to upstream intersection) (m)
AM Peak Hour								
QEW West Ramp – SB	58.9	71.5	76.1	81.1	86.0	91.0	96.0	700
QEW East Ramp – NB	57.5	62.4	62.4	68.5	68.5	74.8	74.8	690
QEW West Ramp - WB	77.4	83.2	84.5	93.0	100.0	106.1	107.9	300
QEW East Ramp - EB	29.1	30.5	32.1	32.2	33.7	33.9	35.5	300
PM Peak Hour								
QEW West Ramp – SB	62.1	67.6	67.6	73.6	73.6	80.0	80.0	700
QEW East Ramp – NB	77.2	85.0	85.0	96.8	96.8	108.6	108.6	690
QEW West Ramp - WB	44.4	186.3	187.8	310.0	315.7	368.4	374.2	300
QEW East Ramp - EB	8.3	9.2	9.3	9.5	9.6	9.8	10.0	300
Saturday Peak Hour								
QEW West Ramp – SB	46.3	50.5	51.1	55.9	56.4	61.2	62.0	700
QEW East Ramp – NB	32.0	33.7	33.7	36.0	36.0	38.5	38.5	690
QEW West Ramp - WB	61.5	65.8	67.8	70.4	72.2	74.6	76.9	300
QEW East Ramp - EB	17.3	17.1	19.0	20.2	20.6	22.0	22.5	300

Exhibit 12-5: QEW Ramp Terminal SimTraffic Queue Comparison by Scenario Year

Location and Queue Direction	Existing (m)	2024 Future Background (m)	2024 Future Total (m)	2029 Future Background (m)	2029 Future Total (m)	2034 Future Background (m)	2034 Future Total (m)	Queue Limits (to Hwy Bullnose / to upstream intersection) (m)
AM Peak Hour								
QEW West Ramp – SB	61.8	58.3	65.8	85.5	67.8	89.1	88.2	700
QEW East Ramp – NB	62.3	66.8	65.9	66.3	104.9	93.3	146.4	690
QEW West Ramp - WB	56.9	56.1	70.7	75.8	69.8	57.9	69.8	300
QEW East Ramp - EB	33.1	30.5	34.4	38.4	38.4	35.5	33.9	300
PM Peak Hour								
QEW West Ramp – SB	49.4	78.8	58.4	71.2	80.7	60.4	72.7	700
QEW East Ramp – NB	84.2	67.6	72.8	91.6	83.3	97.0	137.4	690
QEW West Ramp - WB	76.3	95.3	110.2	153.3	88.6	141.8	143.6	300
QEW East Ramp - EB	17.9	17.5	14.2	20.9	19.1	17.1	16.7	300
Saturday Peak Hour								
QEW West Ramp – SB	46.6	60.4	47.2	50.9	54.0	64.7	54.7	700
QEW East Ramp – NB	36.9	34.8	45.5	35.8	37.2	40.6	42.7	690
QEW West Ramp - WB	52.9	67.5	58.6	56.1	63.1	60.5	61.4	300
QEW East Ramp - EB	22.9	21.0	20.5	20.7	22.9	24.6	22.4	300

During all studied horizon years, QEW off-ramp queues associated with the west ramp's southbound movement and east ramp's northbound movement are both not expected to spill towards the bullnose of the QEW mainline.

By comparing queue increases for the observed critical movements, it is evident that the increases are primarily caused by background growth from the 2024 to 2034 horizon years.

During the weekday PM peak hour, based on Synchro queue results, westbound queues at the QEW west ramp intersection may spill past the east ramp intersection during the PM peak hour starting from the 2029 horizon year onwards due to background traffic growth, with queues increasing for the 2034 horizon year. By the 2034 horizon year, the westbound spillover is projected to extend at least 74 metres east of the QEW east ramp intersection, but will not interfere with subject site operations, which is located 120 metres east.

With regards to future total traffic conditions, the comparison reveals that subject site traffic activity adds minimal additional queuing to the critical movements when comparing future total and future background traffic conditions per studied horizon year.

12.2 Mitigating Measures

Based on the 2034 future total traffic conditions, there is potential for operational improvements by making adjustments to signal timings at the two North Shore Boulevard / QEW ramp terminal intersections and the North Shore Boulevard / Maple Avenue intersection.

Specifically, during the weekday AM peak hour:

- The QEW west ramp terminal intersection cycle length can be lengthened from the existing seconds to 80 seconds, with the additional time distributed to all movements.
- The QEW east ramp terminal timings can be optimized by reallocating east-west green time to the northbound phase. Additional operational improvements can be achieved by further increasing the cycle length.
- The Maple Avenue intersection timings can be optimized by removing the advanced left-turn phases for the northbound left and southbound left turn movements, based on the low turning volumes, and reallocating the green time to the other phases.

During the weekday PM peak hour:

- The QEW east ramp terminal timings can be optimized by reallocating east-west green time to the northbound phase.
- The Maple Avenue intersection timings can be optimized by reallocating north-south green time to the east-west phases.

The Synchro and SimTraffic reports summarizing these improvements are provided in **Appendix I. Exhibit 12-6** summarizes the signalized intersection operations during the weekday AM, PM, and Saturday peak hours.

Exhibit 12-6: 2034 Future Total Traffic Operations – Signalized Intersections (Optimized Timings)

North Shore Blvd Intersection	Overall LOS	Overall V/C Ratio	Critical Movement				
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour							
QEW West Ramp	B	0.72	WBT	C	0.75	101.2	-
			SBL	C	0.75	95.3	290
QEW East Ramp	D	1.06	NBR	E	1.02	86.5	700
JBH Access	B	0.76	EBT	B	0.83	237.6	-
			NBL	D	0.54	37.6	30
			NBR	D	0.02	-	-
			SBL	D	0.05	7.7	-
			SBT	D	0.01	-	-
Lakeshore Rd & Maple Ave	D	0.92	EBL	C	0.67	33.0	165
			EBT	C	0.96	210.5	-
			WBL	D	0.71	46.0	30
			WBT	C	0.69	108.1	-
			NBT	E	0.97	185.4	-
PM Peak Hour							
QEW West Ramp	D	1.0	WBT	A	0.75	104.9	-
			WBR	D	1.04	415.4	300
			SBL	E	0.89	93.5	290
			SBR	D	0.11	11.5	-
QEW East Ramp	A	0.85	WBT	A	0.87	26.5	-
			NBL	E	0.80	101.9	700
JBH Access	B	0.84	WBT	A	0.86	300.6	-
			NBL	D	0.60	54.1	30
			NBR	D	0.04	10.4	-
			SBL	D	0.04	6.8	-
			SBT	D	0.01	-	-
Lakeshore Rd & Maple Ave	D	0.79	EBL	E	0.81	94.0	165
			WBL	B	0.67	58.0	30
			WBT	D	0.98	256.2	-
			NBT	D	0.68	89.3	-
			SBT	D	0.99	82.8	-

To compare the operational improvements gained via the aforementioned signal optimisation methods for the 2034 future total traffic scenario, **Exhibit 12-7** compares LOS and V/C ratios for the critical movements.

Exhibit 12-7: 2034 Future Total Traffic Conditions – V/C Ratio Comparison between Existing and Optimized Signal Timings

North Shore Blvd Intersection	Critical Movement – 2034 Future Total Traffic Conditions								
	Mvmt	Existing Signal Timings			Optimized Signal Timings			% Change	
		LOS	V/C Ratio	95th %tile Synchro Queue (m)	LOS	V/C Ratio	95th %tile Synchro Queue (m)	V/C Ratio	95th %tile Synchro Queue (m)
AM Peak Hour									
QEW West Ramp	EBL	A	0.35	12.8	B	0.38	15.4	9%	20%
	WBT	C	0.71	93.3	C	0.75	101.2	6%	8%
	SBL	D	0.83	96.5	C	0.75	95.3	-10%	-1%
QEW East Ramp	NBL	D	0.76	82.2	C	0.66	67.6	-13%	-18%
	NBR	E	1.02	86.5	E	1.02	86.5	0%	0%
Lakeshore Rd & Maple Ave	EBL	C	0.72	45.0	C	0.67	33.0	-7%	-36%
	EBT	E	1.10	229.4	C	0.96	210.5	-15%	-9%
	WBL	D	0.71	43.7	D	0.71	46.0	0%	5%
PM Peak Hour									
QEW West Ramp	EBL	C	0.38	12.4	C	0.38	12.4	0%	0%
	WBT	B	0.75	118.7	A	0.75	104.9	0%	-12%
	WBR	D	1.04	407.2	D	1.04	415.4	0%	2%
	SBL	E	0.89	93.5	E	0.89	93.5	0%	0%
	SBR	D	0.11	11.5	D	0.11	11.5	0%	0%
QEW East Ramp	WBT	A	0.82	18.5	A	0.87	26.5	6%	43%
	NBL	F	0.98	120.4	E	0.80	101.9	-18%	-15%
Lakeshore Rd & Maple Ave	EBL	E	0.70	75.9	E	0.81	94.0	16%	24%
	WBL	B	0.68	72.6	B	0.67	58.0	-1%	-20%
	WBT	E	1.03	298.3	D	0.98	256.2	-5%	-14%
	NBT	D	0.71	83.4	D	0.68	89.3	-4%	7%

By optimizing signal timings at the congested major intersections, it is demonstrated that the 2034 future total traffic operations can be improved.

Based on the operations comparison for the weekday AM peak hour after signal timing improvements:

- At the QEW west ramp terminal, southbound left turn LOS and capacity is increased with minimal impacts to the westbound movement.
- At the QEW east ramp terminal, northbound left turn queues are shortened.
- At the Lakeshore Road and Maple Avenue intersection, eastbound congestion is improved.

For the weekday PM peak hour:

- At the QEW east ramp terminal, northbound left congestion is improved.
- At the Lakeshore and Maple Avenue intersection, westbound through congestion is reduced while incurring minimal impacts to the northbound operations.

12.3 Subject Site Driveway Mitigation Measures - Traffic Signal Warrant

To assess signalization feasibility, a signal warrant was conducted using the OTM Book 12 Section 4.10 Justification 7 (Projected Volumes) methodology. Via this method, the warrant calculations required in Table 19 of the Book are summarized in **Exhibit 12-8**.

Exhibit 12-8: Signal Warrant for Subject Site Driveway Intersection

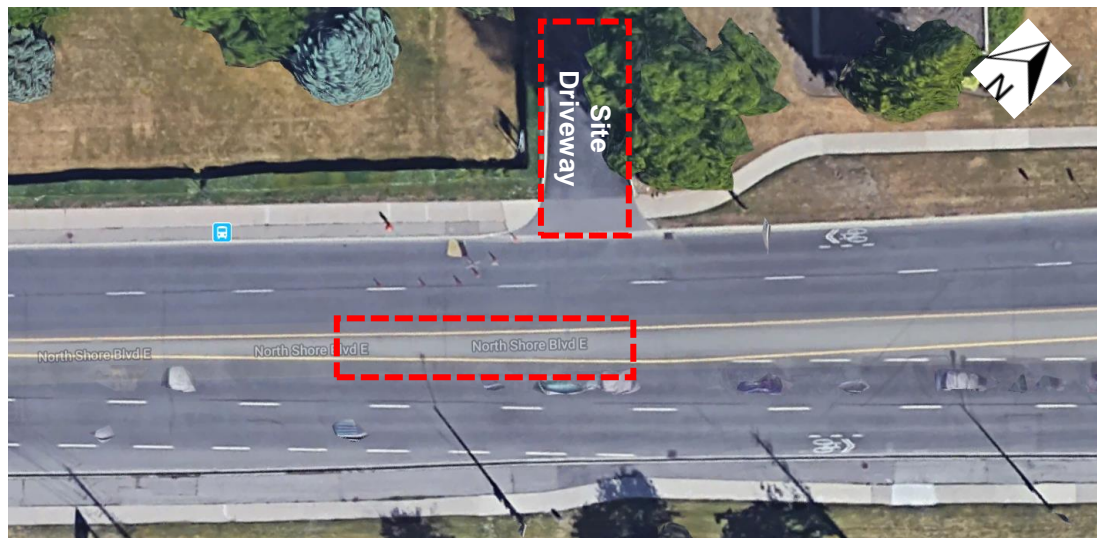
Traffic Signal Justification for Future Development								
OTM Book 12 (November, 2007) Section 4.10 - Table 19 - Justification 7 - Projected Volumes								
Justification 1: 120% met? (Existing Intersection) [Y/N]				N		Warranted only if Justification 1 & 2 are		
Justification 2: 120% met? (Existing Intersection) [Y/N]				N		fulfilled to % criteria.		
Restr flow = urban conditions, < 70km/hr posted speed								
Free Flow = rural case, 70km/hr or greater posted speed								
Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Entire %
		1 Lane Highways		2 or more lanes		Sectional		
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%	
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (avg hour)	480	720	600	900	1586	176%	95%
	B. Vehicle volume, along minor streets (avg hour)	120	170	120	170	22	13%	
2. Delay to cross traffic	A. Vehicle volume, major street (avg hour)	480	720	600	900	1564	174%	90%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (avg hour)	50	75	120	170	10	6%	
Average Hourly Volume Formula: $AHV = (AmPHV + PmPHV) / 4$								
Where:				All Mvt		Vol AM+PM	Vol AHV	
AHV = Average Hourly Volume				All Minor		6342	1586	
AmPHV = AM Peak Hourly Volume				All Major		86	22	
PmPHV = PM Peak Hourly Volume				Cross Traffic		6256	1564	
						40	10	

Based on the results of the signal warrant, neither Justification 1 (95% compliance) or Justification 2 (90% compliance) meet the 120% fulfillment criteria to warrant the signaling of the subject site driveway. However, it is noted that Justification 1.A and 2.A's sectional percentages are individually significantly higher than the fulfillment criteria.

12.4 Subject Site Driveway Mitigation Measures - Left Turn Assessment

Based on the lane configuration of the subject site's existing driveway intersection with North Shore Boulevard, eastbound left turning traffic may attempt to use the centre median as storage while waiting to turn into the site. It is noted that the centre median narrows towards the west, and does not fully accommodate the width of a passenger vehicle until east of the site's driveway, where a formalized eastbound left turn storage lane is provided at the signalized Joseph Brant Hospital intersection. This is illustrated in **Exhibit 12-9**.

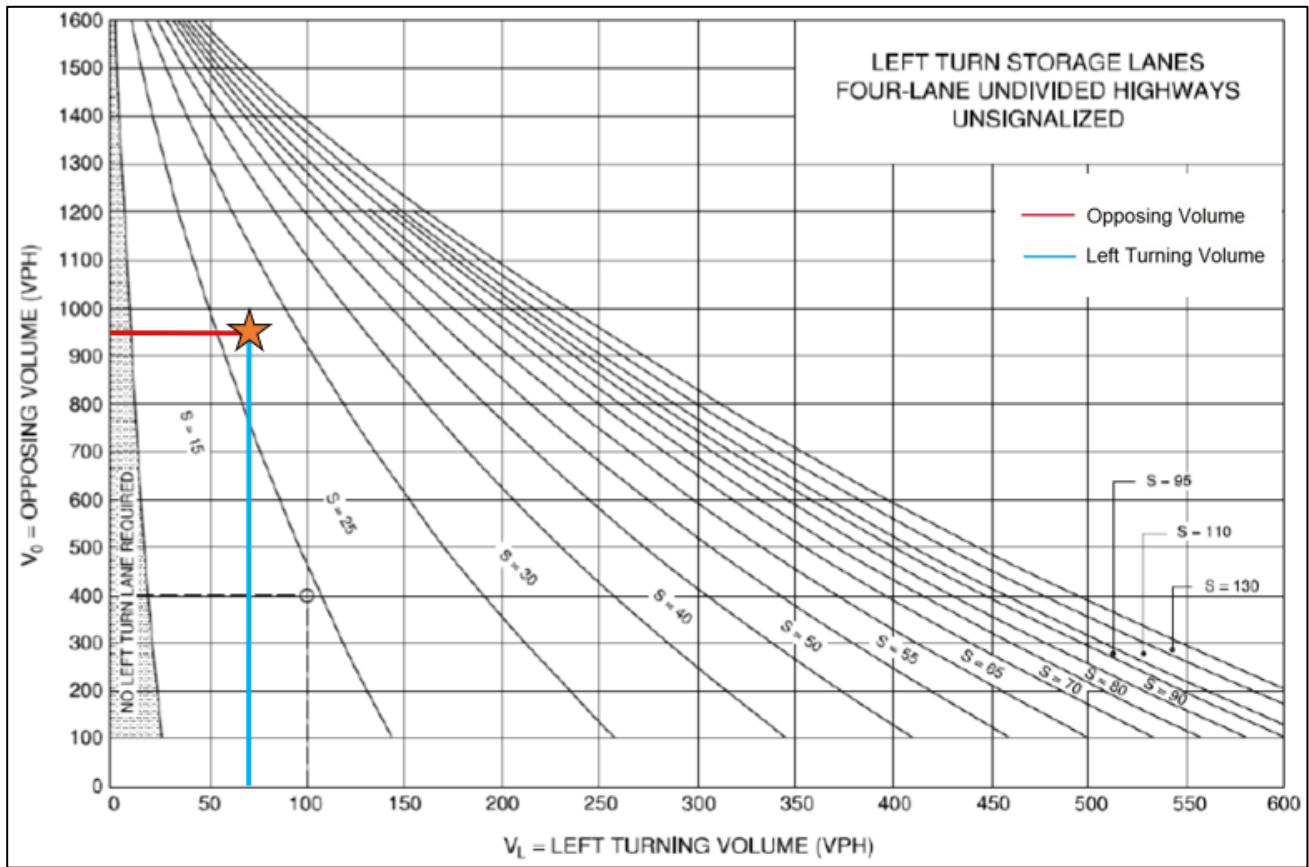
Exhibit 12-9: Centre Median at Site Driveway



It is also noted left turn storage requirements can be facilitated by means of a dedicated left turn lane with a deceleration taper, or with a two-way centre left turn lane. To assess potential left turn storage requirements associated with the subject site, the MTO Design Supplement for the TAC Geometric Design Guide for Canadian Roads (June 2017) was reviewed. Specifically, Exhibit 9A-30 (Left turn storage lane at a four lane undivided highway, unsignalized) was used.

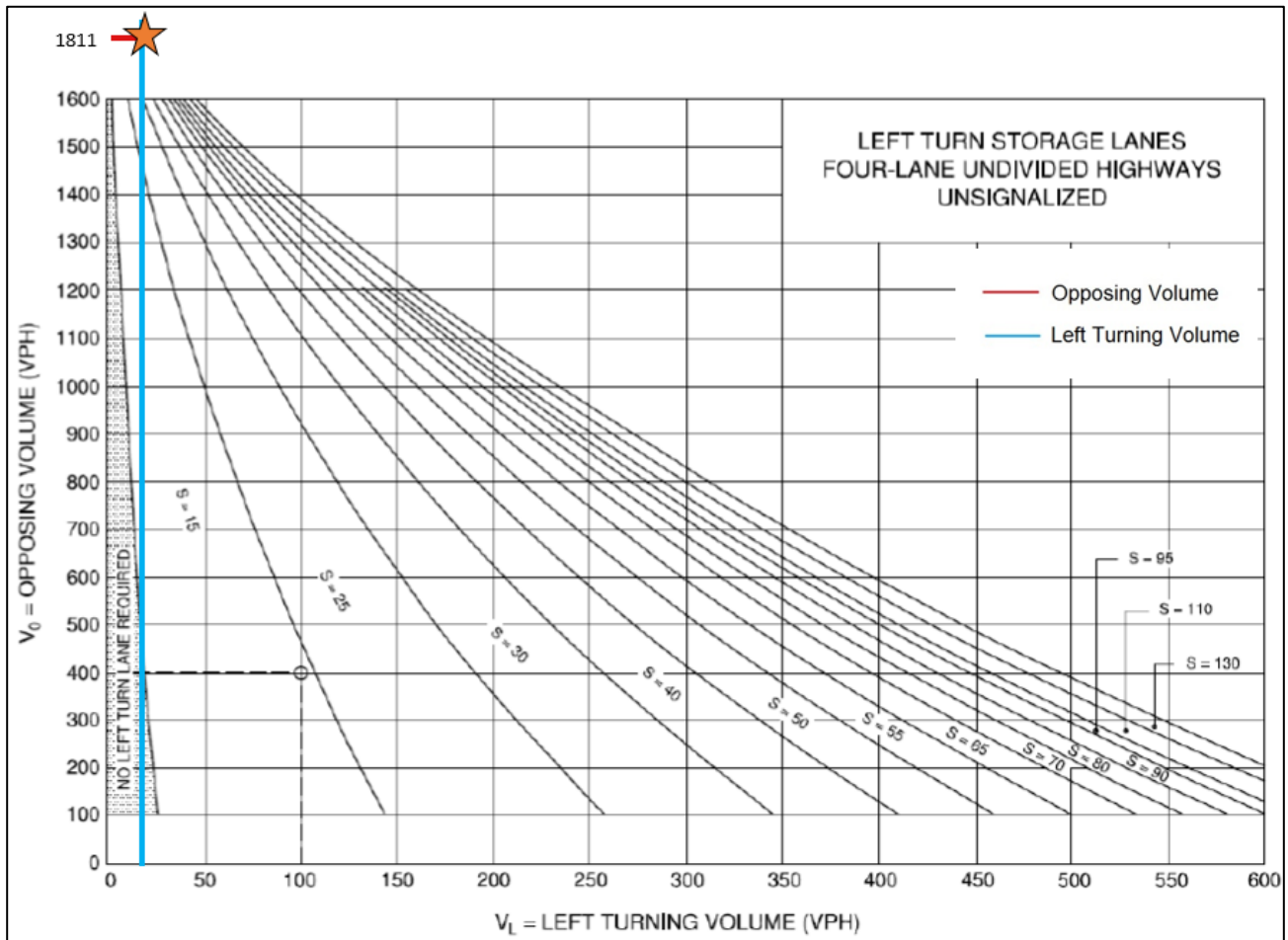
Inbound left turning site volumes during the weekday AM, PM, and Saturday peak hours during the 2034 horizon year were compared with opposing through (i.e. westbound) traffic, as illustrated in **Exhibit 12-10**, **Exhibit 12-11**, and **Exhibit 12-12**, respectively.

Exhibit 12-10: Left Turn Storage Lane Assessment: 2034 AM Peak Hour



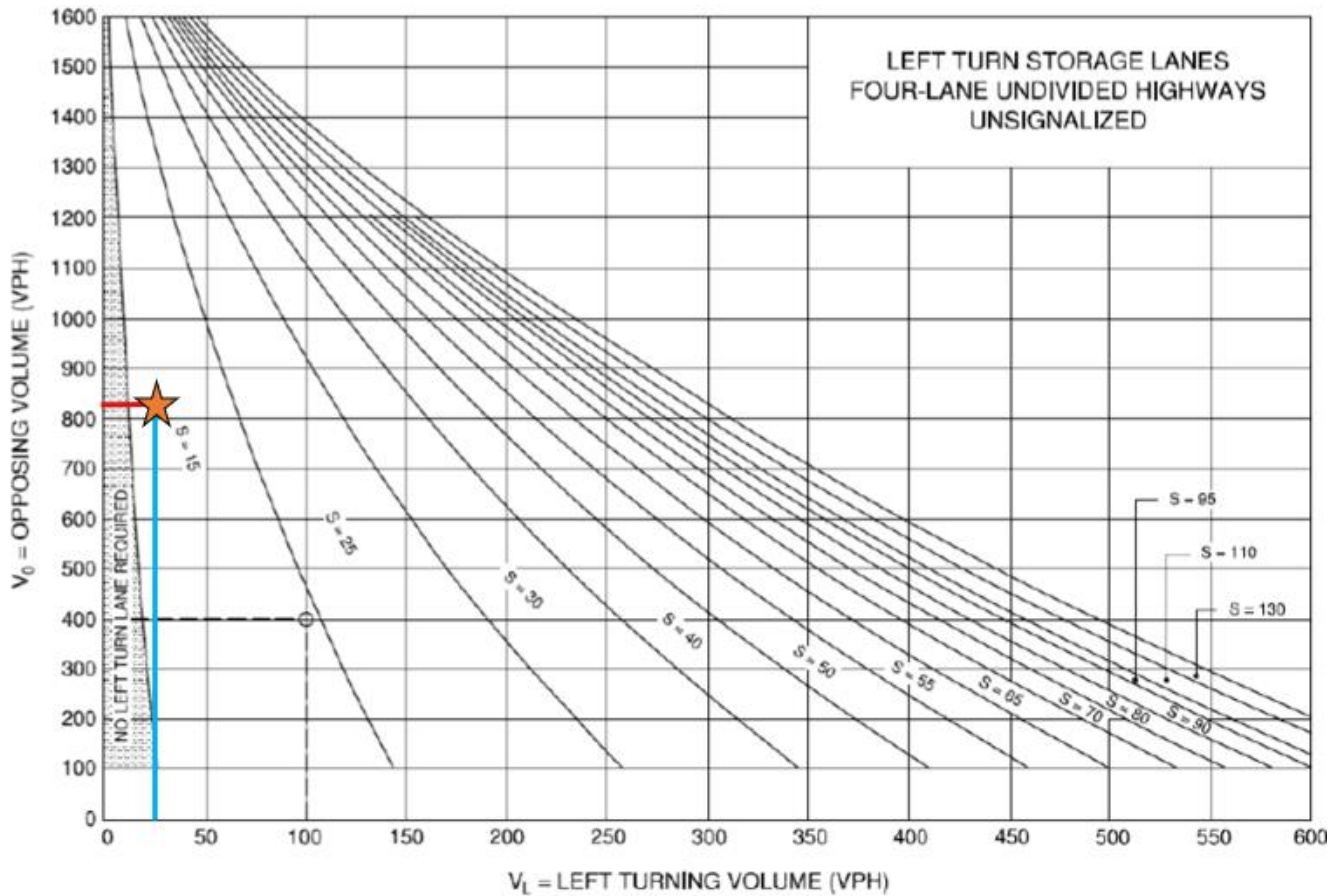
For the 2034 AM peak hour, a left turn storage lane length of 25 metres is recommended.

Exhibit 12-11: Left Turn Storage Lane Assessment: 2034 PM Peak Hour



For the 2034 PM peak hour, the exhibit indicates that permitted left turn movements at unsignalized intersections with such high opposing volumes is not typical for four-lane undivided highways.

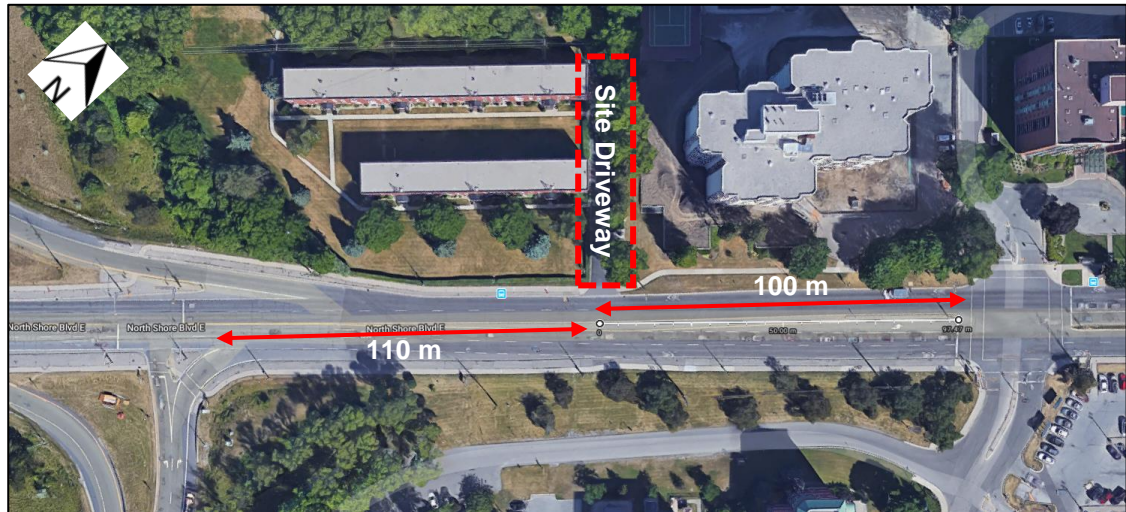
Exhibit 12-12: Left Turn Storage Lane Assessment: 2034 Saturday Peak Hour



Based on **Exhibit 12-12** above, a left turn storage lane length of 15 metres is recommended during the Saturday peak hour.

Regarding potential concerns for high opposing westbound through traffic, it should be noted that there is a signalized intersection located approximately 100 metres downstream, which will meter westbound traffic flow during red phases, thereby creating gaps in traffic for left turning vehicles. This is illustrated in **Exhibit 12-13**.

Exhibit 12-13: Signalized Intersection Adjacent to Subject Site Driveway



Regarding weaving activity (i.e. QEW East Ramp northbound right traffic making eastbound left movements into the subject site), it is noted that during the 2034 future total traffic conditions, at the JBH intersection, eastbound v/c ratios of 0.83 and 0.47 are noted for the weekday AM and PM peak hours when handling 1622 and 978 vehicles, respectively. This indicates that there is sufficient additional capacity (i.e. gap opportunities) for NBR vehicles wishing to access the site to merge across the eastbound through traffic. Regarding eastbound queues at the JBH intersection, during the weekday AM peak hour, 95th and 50th percentile queues of 238 metres and 144 metres are forecasted. Therefore, on average, the eastbound downstream queues do not hinder the ability for drivers to complete their weaving maneuver.

It should be noted that the above scenario is the worst case scenario where NBR vehicles must simultaneously merge with vehicles travelling eastbound. During the northbound green phase at the QEW East Ramp, northbound right turning vehicles will be able to free-flow onto North Shore Boulevard with vehicles wishing to access the site driveway, safely merging across the eastbound lanes without competing for space with general eastbound traffic flow. To ensure vehicles are able to capitalize on the northbound green phase, signal timings at the downstream JBH intersection could be coordinated with the QEW East Ramp to reduce eastbound queues, providing additional opportunities for merging vehicles. To coordinate the two signals, the traffic signal timing lengths, coordination, and offsets at the JBH Access can be adjusted to align with the QEW East Ramp (i.e. the ramp timings would remain unchanged).

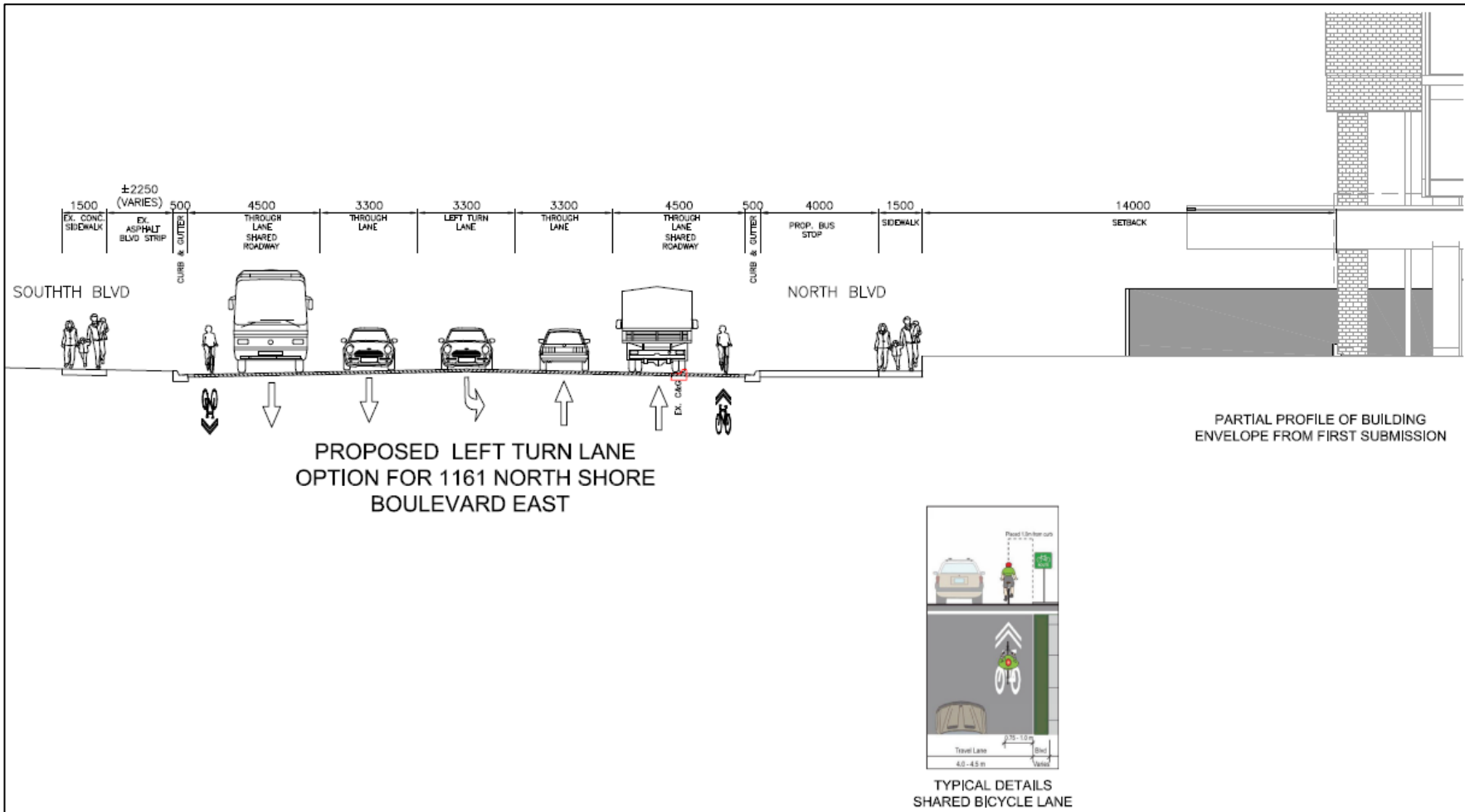
Overall, based on the critical 2034 AM peak hour, a left turn storage lane length of 25 metres by means of a dedicated left turn lane or a two-way centre left turn lane is recommended. It should be noted that the eastbound left turn lane at the JBH intersection has a storage length of 30 metres and a 55 metre taper.

A preliminary concept drawing was prepared by IBI Group to illustrate an eastbound left turn storage lane option for the subject site driveway, with provisions for a 30 metre storage lane and a 60 metre taper, as seen below in **Exhibit 12-14** and in **Appendix N**. Existing lanes were reduced to minimum accepted lane widths, with additional lands taken from the north side of North Shore Boulevard. Space for a transit bus shelter based on Burlington Transit bus stop standards was also accommodated for. Minor curb shifts are also proposed on the south side of the road. The curb side lanes in both eastbound and westbound directions were sized to accommodate a bicycle lane of 1.5 metres width, as required by City staff. The road layout at the QEW east ramp terminal intersection is pending the completion and release of the detailed

design drawings by MTO regarding the future planned bicycle lane installation along North Service Boulevard.

A preliminary proposed cross section with the eastbound left turn lane and future east-west curbside bicycle lanes is also provided for illustration purposes, as seen in **Exhibit 12-15** and **Appendix O**. Based on the proposed design, a dedicated eastbound left turn lane can be provided.

Exhibit 12-15: Cross Section Profile of Proposed Left Turn Storage Lane Option for Subject Site



12.5 As-Of-Right Comparison

The subject site is currently designated as part of the *Downtown High Density Residential* (DRH) zone, which permits up to 185 residential units per hectare. Given then subject site's approximate size of 1.2 hectares, 222 residential units are permitted. The trip generation for the as-of-right 222 residential units is compared to the subject site's trip generation in **Exhibit 12-16**. The apartment land use (code 220) was used to generate the trips for the as-of-right development.

Exhibit 12-16: Trip Generation Comparison

Land Use	AM Peak		PM Peak	
	Rate (trips/unit)	Trips	Rate (trips/unit)	Trips
Apartment (222 units)	0.46	102	0.56	124
Continuing Care Retirement Community (419 units)	0.14	59	0.16	67

As shown in **Exhibit 12-16**, the as-of-right development is projected to generate a significantly higher number of trips (42% higher in AM, 46% higher in PM) than the subject site. In other words, the proposed land use is anticipated to have a smaller impact on the study area's traffic operations than a development containing an as-of-right land use.

12.6 Vehicle Turning Templates

Vehicle turning path analysis was undertaken using the AutoTURN software to review if automobiles, City fire trucks, and garbage service vehicles can enter, navigate the site, and exit in an appropriate manner. Based on the analysis, no circulation issues were observed. The turning templates are provided in **Appendix P**.

13 Parking Assessment

The parking assessment's objective is to project the proposed development's parking demand and propose a Zoning By-law parking requirement variance, if warranted. The parking assessment consists of a City of Burlington zoning by-law review, a proxy site parking utilization survey, and a parking demand projection for the subject site.

Based on the latest site designs, a total of 419 dwelling units and 244 parking spaces are proposed at the subject site.

13.1 City of Burlington Zoning By-law Review

13.1.1 General Parking Requirements

Parking requirements for developments in the City of Burlington are defined in *Part 1 – General Conditions and Provisions of Zoning By-law 2020*. When determining the zoning by-law parking requirement, the *retirement home* land use was considered most applicable to the proposed senior living centre. As per Zoning By-law 2020, retirement homes require:

- 0.85 spaces per employee; plus
- 0.50 resident spaces per unit; plus

- 0.25 visitor spaces per unit.

Considering the proposed development’s 419 units, 210 resident and 105 visitor parking spaces are required. Through discussion with AMICO staff, the projected maximum number of staff on-site at any given time is estimated to be 134 individuals, resulting in an employee parking requirement of 114 spaces. In total, 429 parking spaces are required for the subject site based on Zoning By-law 2020.

Burlington is currently in the process of completing the City-wide Parking Standards Review. The new parking requirements are anticipated to be adopted in fall 2019, which will replace Zoning By-law 2020. For comparison purposes, the parking requirements under the draft parking standards were also determined. Based on the July 21, 2017 Burlington City-Wide Parking Standards Review report, the Burlington staff report PB-65-17, and discussions with City staff, 244 parking spaces are required to satisfy the City’s requirements, as outlined in **Exhibit 13-1**.

Exhibit 13-1: Burlington City-Wide Parking Standards Review Requirements

Unit type	Parking Rate	No. of Units/ Beds	Residential Requirements	TDM Reduction (20%)*	Visitor Requirement	Service Vehicle Requirement	Total Requirement
Memory Care	0.35 spaces/ bed	55	19.25	0	0	0	19.25
Assisted Living	0.35 spaces/ bed	155	54.25	0	0	0	54.25
Independent Living	0.5 spaces/ unit + 0.2 visitor space/ unit	144	72	0	28.8	0	100.8
Premium Independent Living	1.0 space/ unit + 0.25 visitor space/ unit + 1 vehicle space per unit for every 75 units	65	65	-13	16.25	1	69.25
Total Parking Required							244

*Note: Based on discussions with Burlington staff, a 20% transportation demand management (TDM) parking supply reduction can be applied to the residential requirements of Premium Independent Living units. A 15% reduction is attributed to a shuttle bus service provided to residents and the remaining 5% reduction is attributed to the provision of unbundled parking.

13.1.2 Accessible Parking Requirements

Based on Zoning By-law 2020, when over 90 general parking spaces are required, 3% of the parking spaces must be reserved for users with accessible needs. Considering the 429 general parking requirement, 13 spaces are required to serve users with accessible needs. Each accessible parking space must be located adjacent to a 2m delineated accessible parking aisle.

Based on the City-wide Parking Standards Review, Burlington’s draft accessible parking requirements will match the Accessibility for Ontarians with Disability Act (AODA) guidelines. The new standards will require two parking spaces plus an addition 2% of the parking spaces to serve users with accessible needs when between 201 and 1,000 parking spaces are required. Considering the 244 general parking requirement, 7 spaces would be required to serve users with accessible needs.

AODA also specifies two types of accessible parking spaces. Half of the required accessible parking supply must be Type A, while the other half Type B. Type A spaces are wider parking spaces intended to accommodate mobility friendly vans and have a minimum width of 3.4m, while Type B spaces have a standard minimum width of 2.4m. Where an odd number of

accessible parking spaces are required, the additional parking space may be Type B. For the proposed development, 4 parking spaces must be Type B while the remaining 3 spaces must be Type A. Each accessible space must be served by a 1.5m wide access aisle. Two adjacent spaces may share one access aisle.

13.1.3 Bicycle Parking Requirements

13.1.3.1 Number of Bicycle Spaces Required

As per Zoning By-law 2020, Burlington's bicycle parking requirements are as follows:

- Retail, retail centre, service commercial office, institutional: 2 spaces plus 1 space per 1,000 m² GFA;
- Industrial: 1 space plus 0.25 spaces per 1,000 m² GFA;
- Elementary and Secondary School: 1 space per 10 students plus 1 space per 35 employees; and
- Post-secondary school: 1 space per 20 students.

Residential developments such as the proposed seniors living campus do not require any bicycle parking according to the Zoning By-law 2020.

However, based on the City-wide Parking Standards Review, the proposed development requires bicycle parking spaces as outlined in **Exhibit 13-2**. Note that the proposed development is located in Burlington's Downtown Urban Growth Centre. Therefore, the intensification area bicycle parking requirements are used.

Through discussions with Burlington staff, the residential bicycle parking requirement was determined to be applicable to the premium independent units, while the employment parking requirement is applied to the other unit types and all on-site areas. Given that senior citizens are anticipated to cycle less than typical residents, the employment parking requirement is proposed to be applied to the premium independent units instead of the residential requirements. **Exhibit 13-2** compares the proposed bicycle parking requirements to those stated by Burlington staff.

Exhibit 13-2: Bicycle Parking Requirements

Land Use	Parking Rate	Quantity	Parking Required
Burlington Stated Requirements			
Residential	0.5 long term spaces per unit 0.05 short term spaces per unit	65 units	33 long term spaces 4 short term spaces
Employment	2 long term spaces + 1 space/1,000 m ² GFA 2 short term spaces + 1 space/1,000 m ² GFA For every 30 long term bicycle parking spaces, 1 male and 1 female shower and change facility shall be provided	35,784 m ²	38 long term spaces 38 short term spaces
Total			71 long term spaces 42 short term spaces
Proposed Requirements			
Employment	2 long term spaces + 1 space/1,000 m ² GFA 2 short term spaces + 1 space/1,000 m ² GFA For every 30 long term bicycle parking spaces, 1 male and 1 female shower and change facility shall be provided	42,335 m ²	45 long term spaces 45 short term spaces
Total			45 long term spaces 45 short term spaces

Based on the City-wide Parking Standards Review bicycle parking requirements, the proposed development requires 71 long term and 42 short term bicycle parking spaces. Based on the proposed bicycle parking requirements, 45 long term and 45 short term spaces would be provided. Additionally, 2 male and 2 female showers with change facilities shall be provided under both scenarios.

Short term bicycle parking is intended to accommodate visitors who will be parking for a short period of time, while long term parking is intended to accommodate employees and residents who will be parking for the majority of the day or overnight.

Each bicycle parking space shall be 0.60m x 1.8m in size. In addition to size, the City-wide Parking Standards Review recommends various design considerations such as location, adjacent curb cuts, durable and strong bicycle racks, and clearance.

13.2 Parking Utilization Survey

To estimate the proposed development’s parking demand, parking utilization surveys were completed at the Barrie proxy site. As approved by Burlington and MTO staff, the parking utilization surveys were conducted on:

- One Tuesday, Wednesday, or Thursday from 8:00 AM to 6:00 PM; and
- One Saturday from 9:00 AM to 6:00 PM.

Based on the above criteria, Thursday, July 19, 2018 and Saturday, July 21, 2018 were selected for the surveys. These survey times represent the anticipated peak conditions at the proposed seniors living campus development. The parking surveys recorded parking demand on the site

every 30 minutes. The observed weekday and weekend parking utilization survey results are displayed in **Exhibit 13-3** and **Exhibit 13-4**, respectively.

Exhibit 13-3: Observed Weekday Parking Demand

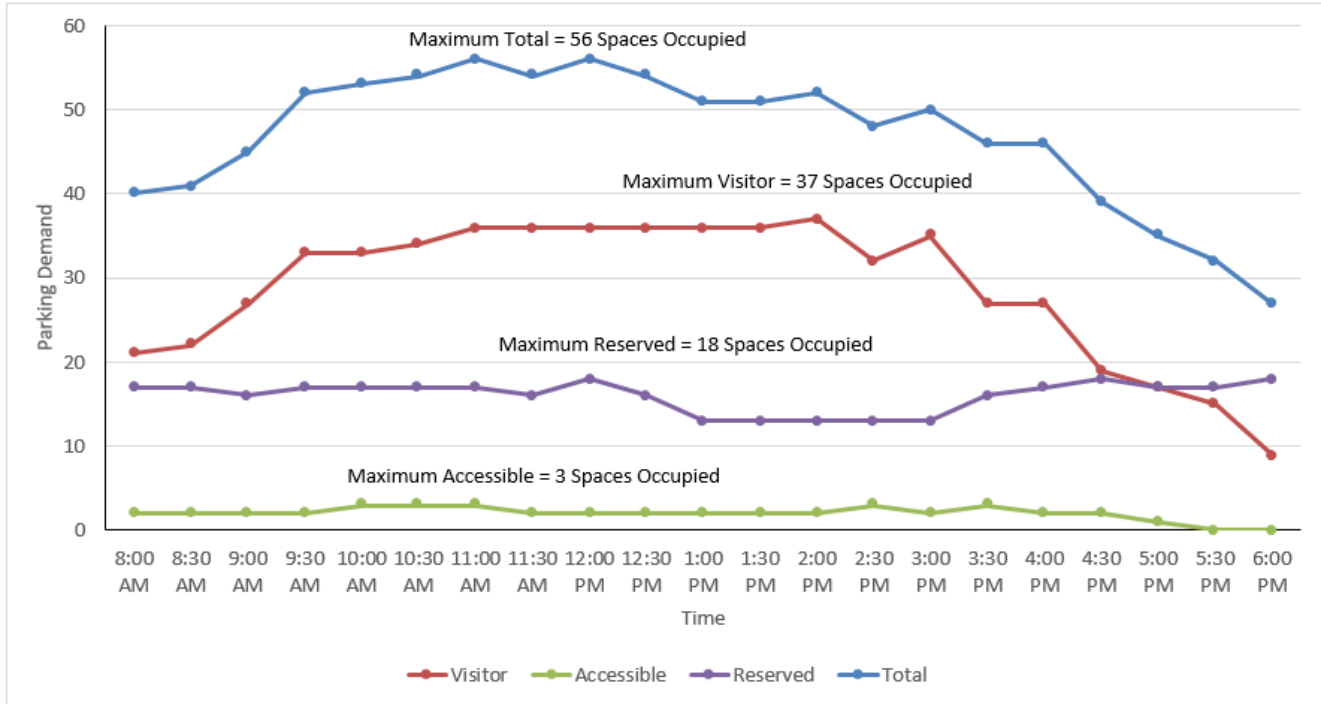
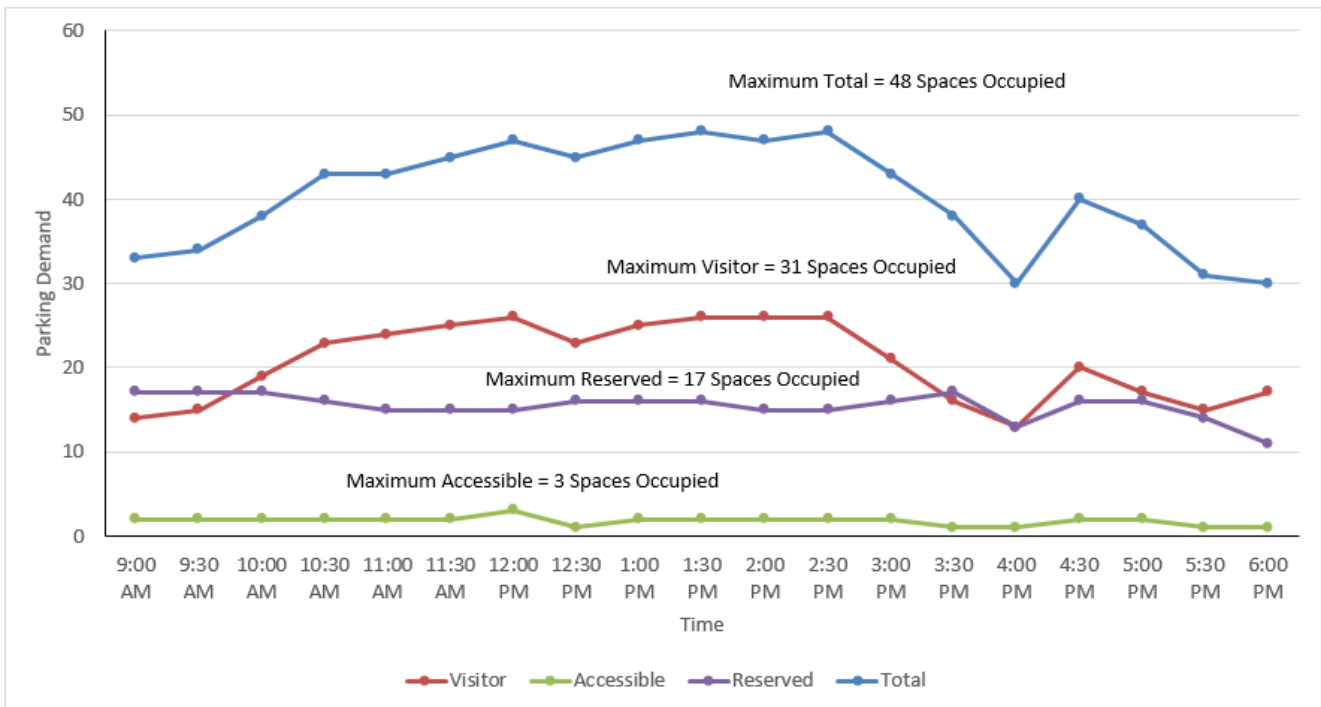


Exhibit 13-4: Observed Weekend Parking Demand



As shown in **Exhibit 13-3** and **Exhibit 13-4**, a maximum of 56 spaces were occupied on a weekday while a maximum of 48 spaces were occupied on the weekend. Given that the Barrie proxy site contains 133 units, the peak parking rate observed during the parking surveys was 0.42 spaces occupied per unit, which occurred at 12:00 PM (noon) on a weekday. The 0.42 spaces per unit includes resident, visitor, and accessible parking demand.

When isolating accessible parking, a peak parking demand of 3 spaces occupied was observed, resulting in a rate of 0.02 spaces occupied per unit.

13.3 Parking Demand Review

Using the proposed development's known unit count (419 units) and the peak parking rate obtained from the proxy site survey data (0.42 spaces/unit), the proposed development's peak parking demand is estimated to be 176 spaces occupied. The proposed development's parking requirements are summarized in **Exhibit 13-5**.

Exhibit 13-5: Parking Requirement Summary

Source	Parking Requirement	Parking Provided	Deficiency/Surplus
Zoning By-law 2020	429 spaces	244 spaces	185 space deficiency
Parking Standards Review	244 spaces		0 space deficiency
Parking Utilization Survey	176 spaces		68 space surplus

According to the Burlington Zoning By-law 2020, the site would be deficient by 185 spaces. However, the proposed development is in compliance with the new parking requirements defined by the City-wide Parking Standards Review and it provides parking supply exceeding the projected peak parking demand. Based on the projected parking demand and the proposed parking supply, a peak utilization of 72% is predicted.

Additionally, the difference between the existing parking requirements and those defined by the City-wide Parking Standards Review is anticipated to predominantly be a result of the proposed development providing assisted living and memory care units. These residents are not permitted to drive and therefore generate lower parking demand than independent living residents. The existing zoning by-law defines a retirement home as a residential facility which may be a rest home but does not include a nursing home, home for the aged, or group home. The by-law parking requirement is not perceived to account for the lower parking demand generated by assisted living and memory care residents.

Given these findings, the proposed parking supply is considered sufficient to meet the projected parking demand and is recommended to be approved given the compliance with the new parking standards set for fall 2019 adoption.

Applying the 0.02 spaces per unit parking rate for accessible parking, a peak accessible parking demand of 9 – 10 vehicles is projected for the proposed development. To meet the projected parking demand and provide a buffer for day-to-day variations in accessible parking demand, an accessible parking supply of 11 spaces is recommended, consisting of 5 Type A and 6 Type B spaces. While the proposed accessible parking supply is 2 spaces lower than the existing by-law requirements, the proposed supply exceeds the City-wide Parking Standard Review requirements and the accessible parking demand projected by the proxy site surveys.

14 Conclusions and Recommendations

This section summarizes the key findings of this transportation impact study and parking analysis.

14.1 Transportation Impact Study

The final site plan dated references 419 units, which includes 55 memory care units, 155 assisted living units and 209 independent living units.

14.1.1 Existing Traffic Conditions

Under existing conditions, the following operations are observed:

- The QEW West and East ramp terminal intersections are operating with no critical movements during all studied peak hours.
- Some critical movements are noted at the Lakeshore Road & Maple Avenue / North Shore Boulevard intersection, however overall operations are acceptable.
- The existing subject site driveway access is presently operating at a LOS 'F' during the weekday PM peak hour as a result of North Shore Boulevard traffic.

14.1.2 Future Background Traffic Conditions

Under future background traffic conditions, the following operations are observed:

- The two background developments that generate traffic into the subject site's study area were provided by City staff. The associated traffic volumes generated are regarded as minimal;
- Background traffic growth rates were provided by MTO and City staff, regarding ramp terminal intersections, North Shore Boulevard, and Maple Avenue – Lakeshore Road corridors. Specifically, a 2.0% and 1.1% annual growth rate was respectively applied to the traffic analysis pertaining to the subject site's full build-out horizon year (i.e. 2024), and 5 (i.e. 2029) and 10 (i.e. 2034) years post-development; and
- Based on the Synchro analysis for the 2024, 2029, and 2034 horizon years, it was observed that increases in study area traffic congestion was primarily attributed to annual traffic growth.

14.1.3 Site Trip Generation

- Amico is proposing to construct a seniors living campus, consisting of four buildings of varying height up to 17 storeys. These include 55 memory care units, 155 assisted living units, and 209 independent living units, for a total of 419 units.
- Based on the comparison of ITE and proxy site derived trip rates, trips estimated using the proxy site method resulted in more two-way trips during the AM peak hour, fewer trips during the PM peak hour, and fewer trips during the Saturday peak hour.
- For this report's traffic assessment, proxy site trip rates were used to estimate subject site trips based on the relevance to the subject site's land use; and

14.1.4 Future Total Traffic Conditions

To evaluate the impact the subject site has on the study area road network, the 2034 future total operations are compared to the 2034 future background operations. Overall, when compared to 2034 future background PM peak hour traffic operations, minimal impacts to study area intersections attributed to subject site traffic is observed, with the subject site driveway itself being the exception.

14.1.5 Mitigating Measures

Based on the 2034 future background traffic conditions, there is potential for operational improvements. The following improvements were assessed:

- The following adjustments to signal timings at the two QEW ramp terminals and the North Shore / Maple Avenue intersections were carried out:
- By optimizing signal timings at the congested major intersections, it is demonstrated that the 2034 future total traffic operations scenario can be improved.
- To assess signalization feasibility at the site driveway, a signal warrant was conducted using the OTM Book 12 Section 4.10 Justification 7 (Projected Volumes) methodology. Via this method, signalizing the site driveway was found to be not warranted.
- Based on the lane configuration of the subject site's existing driveway intersection with North Shore Boulevard, eastbound left turning traffic may attempt to use the centre median as storage while waiting to turn into the site, which currently does not fully accommodate the width of a passenger vehicle until east of the site driveway.
- To assess left turn storage requirements associated with the subject site and the resulting traffic volumes, the MTO Design Supplement for the TAC Geometric Design Guide for Canadian Roads (June 2017) was reviewed. A 25m eastbound left turn storage lane by means of a dedicated left turn lane or two-way centre left turn lane was determined to be justified. IBI Group provided a conceptual design for an east bound left turn lane that provided similar storage and taper dimensions as the downstream eastbound left turn lane at the Joseph Brant Hospital intersection.
- The road layout at the QEW east ramp terminal intersection is pending the completion and release of the detailed design drawings by MTO regarding the future planned bicycle lane installation along North Service Boulevard. A preliminary proposed cross section with the eastbound left turn lane and future east-west curbside bicycle lanes was also provided by IBI Group for illustration purposes

14.1.6 As-Of-Right Comparison

- The subject site is anticipated to have a smaller impact on the study area's traffic operations than the as-of-right development.

14.2 Parking Assessment

The parking assessment has been updated to reflect the latest site plan characteristics:

- A total of 419 dwelling units and 244 parking spaces are proposed at the subject site.
- Based on the City of Burlington Zoning By-law 2020, the subject site requires 429 parking spaces resulting in a deficiency of 185 spaces.

- Burlington is currently in the process of updating its City-wide Parking Standards. Based on the requirements anticipated to be adopted in fall 2019, the subject site requires 244 parking spaces which is in line with the proposed parking supply.
- To approximate the proposed development's peak parking demand, a parking demand survey was completed at a site of similar nature. Considering the peak parking demand observed during the proxy site survey (56 spaces occupied), and the 133 units contained at the proxy site, the peak parking rate was determined to be 0.42 spaces occupied per unit.
- A peak parking demand of 176 spaces occupied is projected for the subject site, which is 68 spaces less than the proposed parking supply. Based on the projected parking demand and the proposed parking supply, a peak utilization of 72% is predicted.
- A peak accessible parking demand of 9 – 10 vehicles is projected for the proposed development. To meet the projected parking demand and provide a buffer for day-to-day variations in accessible parking demand, an accessible parking supply of 11 spaces is recommended, consisting of 5 Type A and 6 Type B spaces.
- Based on the City-wide Parking Standards Review bicycle parking requirements, the proposed development requires 71 long term and 42 short term bicycle parking spaces. Based on the proposed bicycle parking requirements, 45 long term and 45 short term spaces would be provided. Additionally, 2 male and 2 female showers with change facilities shall be provided under both scenarios.

Appendix A – Agency Correspondence – Scope of Work



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September 27, 2018

Carmen Corvalan
Ministry of Transportation, Ontario
159 Sir William Hearst Ave
Toronto, Ontario, M3M 0B7

Dear Ms. Corvalan:

SCOPE OF WORK FOR TRANSPORTATION IMPACT AND PARKING STUDY FOR PROPOSED DEVELOPMENT AT 1161-1167 NORTH SHORE BLVD, BURLINGTON, ON

1. Introduction

This letter provides our proposed scope of work for a transportation and parking study for the proposed seniors living campus at 1161-1167 North Shore Boulevard in the City of Burlington, Ontario. The subject site is located along North Shore Boulevard immediately northeast of the North Shore Boulevard / Queen Elizabeth Way (QEW) east ramp terminal intersection.

This transportation impact study component will examine the proposed development's anticipated impact on the study area's traffic operations and identify any necessary road improvements required to accommodate the generated traffic. The parking study component will review the proposed development's anticipated parking demand and propose a Zoning By-law parking requirement variance, if warranted.

2. Scope of Work

The proposed scope of work, outlined in this section, was developed based on the MTO Traffic Impact Study Guidelines.

Transportation Impact Study

1. **Development Study Area:** We will comment on existing transportation facilities within 500 metres of the subject site. Existing key roadways, major intersections, transit services, and pedestrian facilities will be discussed, as appropriate.
2. **Analysis Time Periods and Intersections:** Based on the proposed development's land use, size, and proximity to the QEW highway, we plan to analyze the following intersections during the AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
 - North Shore Boulevard East / Queen Elizabeth Way West Ramp Terminal;
 - North Shore Boulevard East / Queen Elizabeth Way East Ramp Terminal;
 - North Shore Boulevard East / Existing Site Driveway;
 - North Shore Boulevard East / Joseph Brant Hospital; and
 - North Shore Boulevard East / Lakeshore Road and Maple Avenue.

Carmen Corvalan – September 27, 2018

3. **2018 Existing Conditions:** Traffic counts at the study area intersections will be obtained through the City of Burlington and MTO, if available. If up-to-date (within the past 2 years) turning movement counts are not readily available for these intersections, new turning movement counts will be collected. The 2018 existing traffic operations at the aforementioned intersections will be analyzed using the software program Synchro (version 9) for the weekday AM, PM, and Saturday peak hours.
4. **2023, 2028, 2033 Future Background Traffic Conditions:** The background traffic volumes will be determined for the study area intersections, coinciding with the years of full build-out (2023), five years, and ten years after the estimated occupancy date for the site (i.e. 2028 and 2033, respectively). We will identify an applicable background traffic growth rate and other area developments that may introduce traffic into the study area, based on discussions with the City and MTO. Planned road improvements and other approved developments within close proximity will be taken into consideration. The 2023, 2028, and 2033 background traffic operations will be analyzed for the weekday AM, PM, and Saturday peak hours.
5. **Site Traffic Generation and Trip Distribution:** The size and nature of the proposed subject site will be documented based on the received site drawings and statistics, and will be used to estimate the number of automobile and non-automobile trips likely to be produced during the weekday AM, PM, and Saturday peak hours. The estimation will be based on information from the Institute of Transportation Engineers (ITE) publication, *Trip Generation, 9th Edition*.

The trip distribution for the proposed site will be based on a review of the 2011 Transportation Tomorrow Survey (TTS).

The forecast site traffic for the development will be added to the road network based on the trip distribution, and assigned to the network based on existing travel patterns, logical travel routes, and available traffic capacity.
6. **2023, 2028, 2033 Future Total Traffic Conditions:** The estimated site traffic volumes will be combined with the future background traffic volumes to determine the 2023, 2028, and 2033 total traffic volumes for the study area intersections. Intersection operations analysis will be undertaken for the weekday AM, PM, and Saturday peak hours. Any necessary road improvements required to accommodate total traffic volumes will be identified if necessary, such as additional turning lanes, storage length modifications, intersection reconfigurations, signal timing adjustments, and signal installation.
7. **Traffic Signal Warrant Analysis:** Ontario Traffic Manual (OTM) Book 12 will be referenced with regards to signal warrant guidelines to determine if the installation of a traffic signal at the subject site access fronting North Shore Boulevard is currently required, and if one will be required in the future.
8. **Road Improvements (Left Turn Storage Lane):** An eastbound left turn storage lane assessment will be conducted to determine if eastbound site traffic volumes entering the site from North Shore Boulevard will be high enough to warrant the extension of existing left turn storage provisions upon full buildout of the subject site. The assessment will be based on the methodology outlined in the Transportation Association of Canada (TAC) Geometric Design Guide.

Carmen Corvalan – September 27, 2018

Parking Study

1. **City of Burlington Zoning By-law Review:** The proposed development's parking requirements as per City of Burlington Zoning By-law 2020 will be determined. The by-law parking requirement will be used as a baseline for comparison with the parking demand observed during the parking utilization survey.
2. **Parking Utilization Survey:** In order to estimate the proposed development's peak parking demand, parking utilization surveys will be conducted at one proxy site of similar nature to the proposed development. The proxy site will be identified through discussions with Burlington staff. The parking utilization surveys will take place on:
 - One weekday (Tuesday, Wednesday, or Thursday) from 8:00 AM to 6:00 PM; and
 - One Saturday from 9:00 AM to 6:00 PM.

These survey times represent the anticipated peak conditions at the proposed seniors living campus development. The parking surveys will record parking demand on the site every 30 minutes.

3. **Parking Demand Review:** Using the observed parking rate obtained from the proxy site survey data, a parking rate will be recommended that is deemed applicable to the subject site. The recommended rate will then be used to estimate the number of parking spaces needed to meet the projected parking demand.

The estimated parking supply needed will be compared to the By-law required supply to assess the feasibility of providing less than the By-law supply requirements. In the event that the parking review determines that a parking reduction cannot be justified, the report will speak to this point.

Hugo Chan

From: Polus, Asia (MTO) <Asia.Polus@ontario.ca>
Sent: Monday, April 23, 2018 12:51 PM
To: Attila Hertel
Cc: McBride, Connor (MTO); Singh, Christian (MTO); Lawrence, Morgan (MTO)
Subject: FW: 1161-1167 North Short Blvd Proposed Development
Attachments: TTP_1161-1167NorthShoreBlvd Scope of Work_2018-04-10_MTO.DOCX

Hi Attila,

Further to your request please note that your "Scope of Work" for the TIS (attached above) was reviewed and the ministry has the following comments to offer:

- Our Traffic Office has reviewed all locations/intersections which were listed to be included in your analysis and please note that we do not require any other/additional locations to be included
- Please be advised that the section of North Shore Blvd within the CAH limits is under MTO's control. Therefore, any geometric changes proposed to the road (e.g. traffic lane configurations or widths, cycling lanes, turning lanes, etc.) which encroach into CAH lands must meet or exceed the requirements of the TAC Geometric Design Guide for Canadian Roads in addition to any requirements of MTO's TAC Geometric Design Supplement.

In addition I am including the general requirements for the future submission regarding any development proposal for this land:

- The owner should be aware that MTO requires a full submission in order to complete the technical review of the proposal and subsequently provide more specific comments related to the development.
- As a part of the Site Plan review and approval process the owner will be required to submit a Site Grading/Site Servicing plan, Stormwater Management Report and Traffic Impact Study Report. **In addition, please note that the drainage submission must also be provided in a digital format (CD, DVD or storage device).**
- MTO Building and Land Use permits are required prior to any grading/construction activity within 45m of QEW limits, or within 395m radius of centrepont of QEW and North Short Blvd. All above and below ground structures (including but not limited to, fire routes, stormwater management facilities and servicing/utilities) must be setback a minimum of 14m from all MTO property limits. The 14m setback from the ministry ROW must be clearly indicated on all plans submitted for our review.
- Furthermore, the ministry would like to see a lighting plan and report for the site. The MTO will only accept plan in LUX unit. Also, the Hwy property limits must be clearly defined so that our electrical office can verify the amount of acceptable light trespass on the Hwy ROW.
- In general, required parking must be setback a minimum of 14m from the QEW property limits. The Ministry will only allow surplus parking to be located within the 14m setback limit. Surplus parking must be labelled as "surplus" on the site plan.
- As part of the review and approval process the applicant will be required to submit 3 copies of all required documentation. All plans and reports must be stamped and signed, and circulated to the MTO through municipal site plan application process for a formal review and comments.
- The ministry controls all signage within 400m of any provincial highway ROW.
- We would request that all signage issues be kept as a separate entity from the site plan approval process, however, if the proponent prefer to have all signage approved as part of the site plan approval process, then all details regarding signage must be submitted to this ministry.
- Any proposed sign shall be located at min of 3m setback.

I trust that the above is clear and satisfactory.

If you require any additional clarification do not hesitate to call Connor or me.

The full package of the development proposal has to be sent to Connor attention through the City of Burlington to make sure that the both agencies are reviewing the same package.

Best Regards

W. Asia Polus

Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
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Fax 416 - 235-4267



From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: April 10, 2018 11:27 AM
To: Corvalan, Carmen (MTO)
Cc: Hugo Chan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

Thank you for taking my call this morning. As discussed, please find attached the proposed scope of work document for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington for MTO review. As a note, we've been in touch with Burlington who have reviewed and approved the scope.

Kind Regards

- Attila

From: Attila Hertel
Sent: Thursday, April 5, 2018 11:51 AM
To: 'carmen.corvalan@ontario.ca'
Cc: Hugo Chan
Subject: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

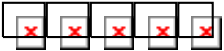
My name is Attila Hertel. I work for IBI Group who has been retained by Amico Properties to prepare the traffic impact and parking study for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington. I received an out of office notification from Connor McBride (who I believe is our client's MTO contact) to direct all inquires to you.

I wanted to touch base to confirm to project scope and methodology. If I provided a scope of work document, could you review, provide comments, and approve?

Thank you

Attila Hertel

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Hugo Chan

From: Polus, Asia (MTO) <Asia.Polus@ontario.ca>
Sent: Friday, June 01, 2018 8:21 AM
To: Hugo Chan
Cc: Attila Hertel; McBride, Connor (MTO)
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Categories: Green Category

Hi Hugo,

Please note that today Connor is away from the office therefore I am sending our Traffic Office clarifications on his behalf.

Below are MTO comments/clarifications in red.

3. Synchro Parameters which should be considered:

- a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
 - Do you require the SFR study to take place for the same length of time as the turning movement count data collection, or only one hour sample for each peak period is sufficient? **SFR study may be completed with 1 hr samples for each peak period.**
 - i.e. AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
- c. Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
 - Please clarify the required models parameters of the SimTraffic study, with regards to # of runs required, seed time, and study area. **The analysis should be carried out with 10min seeding and 60 min recording for at least 3 iterations.**
 - o Is the SimTraffic study area limited to the 2 ramp terminals, or all 5 intersections required? **Please include all 5 intersections in SimTraffic Study Area**
 - What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required? **Calibration targets for Sim traffic 95th percentile queues should be within 10% of synchro existing conditions.**
- d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
 - Do you require the lost time study to take place for the same length of time as the turning movement count data collection, or only 30 min sample for each peak period?
30 min sample of each peak period is sufficient enough for study.

- Do you require field collection for **both** start-up lost time and clearance lost time values? Reference material has indicated that clearance lost time is often not observable and is typically determined by adding yellow + allred times. **Complete field collection for start-up lost time.**
- Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey. **There is no MTO approved methodology for obtaining lost time adjustment values, please compare values in HCM.**

I trust that the above is clear however if you have any questions, please feel free to ask.

Regards

W. Asia Polus

Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Hugo Chan [mailto:hugo.chan@ibigroup.com]
Sent: May-28-18 3:56 PM
To: McBride, Connor (MTO)
Cc: Polus, Asia (MTO); Attila Hertel
Subject: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hi Connor,

I am working with Attila for the 1161-1167 North Shore Blvd TIS. May I ask for clarifications for the following items:

3. Synchro Parameters which should be considered:

- Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
 - Do you require the SFR study to take place for the same length of time as the turning movement count data collection, or only one hour sample for each peak period is sufficient?
 - i.e. AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
- Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
 - Please clarify the required models parameters of the SimTraffic study, with regards to # of runs required, seed time, and study area.
 - o Is the SimTraffic study area limited to the 2 ramp terminals, or all 5 intersections required?

- What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required?
- d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
- Do you require the lost time study to take place for the same length of time as the turning movement count data collection, or only 30 min sample for each peak period?
 - Do you require field collection for **both** start-up lost time and clearance lost time values? Reference material has indicated that clearance lost time is often not observable and is typically determined by adding yellow + allred times.
 - Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey.

Thanks for your help,

Hugo Chan

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From: Polus, Asia (MTO) [mailto:Asia.Polus@ontario.ca]
Sent: Thursday, May 24, 2018 1:14 PM
To: Attila Hertel <attila.hertel@IBIGroup.com>
Cc: McBride, Connor (MTO) <Connor.McBride@ontario.ca>; Singh, Christian (MTO) <Christian.Singh@ontario.ca>; Lawrence, Morgan (MTO) <Morgan.Lawrence@ontario.ca>
Subject: RE: 1161-1167 North Short Blvd Proposed Development
Importance: High

Hi Attila,

Further to our yesterday meeting please note that as we have received more detailed information regarding the development proposal, our Traffic Office for a second time has reviewed your previously provided "Scope of Work" for the TIS and the following are updated comments:

- 1) Identify Type of Land Use from ITE Trip Generation Manual prior to completing TIS;
- 2) Proposed Development Access concerns and additional analysis required to be addressed in TIS:
 - a. Determine if Northshore Rd EB left turn traffic requires a left turn storage lane or access from development might be require Right In or Right Out restrictions;
 - b. Investigate the possibility of a shared access from an adjacent property;

- c. Access to development is in close proximity to QEW/North Shore Rd East Ramp Terminal, please ensure alternatives methods of accessing the development are considered to ensure unsafe lane manoeuvres with the off ramp are not promoted.

3) Synchro Parameters which should be considered:

- a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
- b. Please calculate PHF value from existing volume counts and use it within the analysis for existing as well as for all the future scenarios. Use of PHF=1 value within the analysis is not recommended;
- c. Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
- d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
- e. Ministry recommends use of 2% growth rate for traffic at all the ramp terminals within the analysis limits; otherwise, please justify use of any other value;
- f. As outlined in MTO guidelines for Traffic impact studies, v/c ratio of 0.75 for ramp approaches and 0.85 for others are deemed to be critical in terms of operations and considered for geometric improvements. In report please provide recommendations for improvements if required by existing or any future scenario.

In addition I have attached the TMCs which you have requested yesterday.

I trust that the above is clear, however if you have any questions please feel free to ask Connor McBride, included in this e-mail, and he may be reached at 416-235-5383 or me.

Regards

W. Asia Polus
Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Polus, Asia (MTO)
Sent: April-23-18 12:51 PM
To: 'attila.hertel@IBIGroup.com'
Cc: McBride, Connor (MTO); Singh, Christian (MTO); Lawrence, Morgan (MTO)
Subject: FW: 1161-1167 North Short Blvd Proposed Development

Hi Attila,

Further to your request please note that your "Scope of Work" for the TIS (attached above) was reviewed and the ministry has the following comments to offer:

- Our Traffic Office has reviewed all locations/intersections which were listed to be included in your analysis and please note that we do not require any other/additional locations to be included
- Please be advised that the section of North Shore Blvd within the CAH limits is under MTO's control. Therefore, any geometric changes proposed to the road (e.g. traffic lane configurations or widths, cycling lanes, turning lanes, etc.) which encroach into CAH lands must meet or exceed the requirements of the TAC Geometric Design Guide for Canadian Roads in addition to any requirements of MTO's TAC Geometric Design Supplement.

In addition I am including the general requirements for the future submission regarding any development proposal for this land:

- The owner should be aware that MTO requires a full submission in order to complete the technical review of the proposal and subsequently provide more specific comments related to the development.
- As a part of the Site Plan review and approval process the owner will be required to submit a Site Grading/Site Servicing plan, Stormwater Management Report and Traffic Impact Study Report. **In addition, please note that the drainage submission must also be provided in a digital format (CD, DVD or storage device).**
- MTO Building and Land Use permits are required prior to any grading/construction activity within 45m of QEW limits, or within 395m radius of centrepont of QEW and North Short Blvd. All above and below ground structures (including but not limited to, fire routes, stormwater management facilities and servicing/utilities) must be setback a minimum of 14m from all MTO property limits. The 14m setback from the ministry ROW must be clearly indicated on all plans submitted for our review.
- Furthermore, the ministry would like to see a lighting plan and report for the site. The MTO will only accept plan in LUX unit. Also, the Hwy property limits must be clearly defined so that our electrical office can verify the amount of acceptable light trespass on the Hwy ROW.
- In general, required parking must be setback a minimum of 14m from the QEW property limits. The Ministry will only allow surplus parking to be located within the 14m setback limit. Surplus parking must be labelled as "surplus" on the site plan.
- As part of the review and approval process the applicant will be required to submit 3 copies of all required documentation. All plans and reports must be stamped and signed, and circulated to the MTO through municipal site plan application process for a formal review and comments.
- The ministry controls all signage within 400m of any provincial highway ROW.
- We would request that all signage issues be kept as a separate entity from the site plan approval process, however, if the proponent prefer to have all signage approved as part of the site plan approval process, then all details regarding signage must be submitted to this ministry.
- Any proposed sign shall be located at min of 3m setback.

I trust that the above is clear and satisfactory.

If you require any additional clarification do not hesitate to call Connor or me.

The full package of the development proposal has to be sent to Connor attention through the City of Burlington to make sure that the both agencies are reviewing the same package.

Best Regards

W. Asia Polus
Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: April 10, 2018 11:27 AM
To: Corvalan, Carmen (MTO)
Cc: Hugo Chan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

Thank you for taking my call this morning. As discussed, please find attached the proposed scope of work document for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington for MTO review. As a note, we've been in touch with Burlington who have reviewed and approved the scope.

Kind Regards

- Attila

From: Attila Hertel
Sent: Thursday, April 5, 2018 11:51 AM
To: 'carmen.corvalan@ontario.ca'
Cc: Hugo Chan
Subject: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

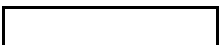
My name is Attila Hertel. I work for IBI Group who has been retained by Amico Properties to prepare the traffic impact and parking study for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington. I received an out of office notification from Connor McBride (who I believe is our client's MTO contact) to direct all inquires to you.

I wanted to touch base to confirm to project scope and methodology. If I provided a scope of work document, could you review, provide comments, and approve?

Thank you

Attila Hertel

IBI GROUP
7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61263 fax +1 416 596 0644



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Hugo Chan

From: Polus, Asia (MTO) <Asia.Polus@ontario.ca>
Sent: Thursday, June 07, 2018 2:28 PM
To: Hugo Chan
Cc: Attila Hertel; McBride, Connor (MTO)
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Categories: Green Category

Hi Hugo,

Your request was reviewed by our MTO's Traffic Expert and he has no further comments in regards yours methodology for obtaining lost time and the times when you will be collecting the information.

Regards

W. Asia Polus
Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Hugo Chan [mailto:hugo.chan@ibigroup.com]
Sent: June-07-18 10:36 AM
To: Polus, Asia (MTO)
Cc: Attila Hertel; McBride, Connor (MTO)
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hello Asia,

For Item 3 (d), can you confirm if you agree with my proposed field survey methodology to collect start up lost time data, based on the HCM 2010 methodology?

- 30 min interval: Weekday AM (8:30-9:00), Weekday PM (5:00-5:30), Saturday (12:00-12:30)
- For each direction's cycle during a 30 min interval, surveyor will collect start up lost time, t_i , (s) for the first 4 cars in the queue, as per HCM2010 manual Exhibit 4-6, Exhibit 4-7, and Equation 4-9.
 - o 1st headway will be measured as time elapsed between onset of green phase and time taken for front wheels of vehicle #1 to pass stop bar.
 - o 2nd headway will be time elapsed between onset of green phase and time taken for front wheels of vehicle #2 to pass stop bar.

- 3rd and 4th headway will be similarly measured.
- Total start-up lost time for a cycle will be the summation of the first 4 vehicle start-up lost times.
- For the Synchro model, start-up lost time will be calculated as the 85th percentile of the surveyed total start-up lost times obtained during the 30 min survey time.

Thanks,

Hugo Chan

IBI GROUP

7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 905 763 2322 ext 63421 fax +1 416 596 0644



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From: Polus, Asia (MTO) [mailto:Asia.Polus@ontario.ca]
Sent: Friday, June 01, 2018 8:21 AM
To: Hugo Chan <hugo.chan@ibigroup.com>
Cc: Attila Hertel <attila.hertel@IBIGroup.com>; McBride, Connor (MTO) <Connor.McBride@ontario.ca>
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hi Hugo,

Please note that today Connor is away from the office therefore I am sending our Traffic Office clarifications on his behalf.

Below are MTO comments/clarifications in red.

3. Synchro Parameters which should be considered:

- a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
 - Do you require the SFR study to take place for the same length of time as the turning movement count data collection, or only one hour sample for each peak period? **SFR study may be completed with 1 hr samples for each peak period.**
 - i.e. AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
- c. Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
 - Please clarify the required models parameters of the SimTraffic study, with regards to # of runs required, seed time, and study area. **The analysis should be carried out with 10min seeding and 60 min recording for at least 3 iterations.**
 - Is the SimTraffic study area limited to the 2 ramp terminals, or all 5 intersections required? **Please include all 5 intersections in SimTraffic Study Area**

- What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required? **Calibration targets for Sim traffic 95th percentile queues should be within 10% of synchro existing conditions.**

d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;

- Do you require the lost time study to take place for the same length of time as the turning movement count data collection, or only 30 min sample for each peak period?

30 min sample of each peak period is sufficient enough for study.

- Do you require field collection for **both** start-up lost time and clearance lost time values? Reference material has indicated that clearance lost time is often not observable and is typically determined by adding yellow + allred times. **Complete field collection for start-up lost time.**
- Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey. **There is no MTO approved methodology for obtaining lost time adjustment values, please compare values in HCM.**

I trust that the above is clear however if you have any questions, please feel free to ask.

Regards

W. Asia Polus

Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Hugo Chan [<mailto:hugo.chan@ibigroup.com>]

Sent: May-28-18 3:56 PM

To: McBride, Connor (MTO)

Cc: Polus, Asia (MTO); Attila Hertel

Subject: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hi Connor,

I am working with Attila for the 1161-1167 North Shore Blvd TIS. May I ask for clarifications for the following items:

3. Synchro Parameters which should be considered:

- a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;

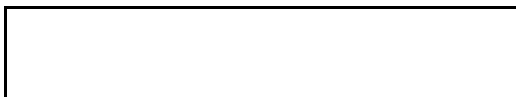
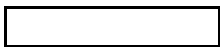
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 - i.e. AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
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- Please clarify the required models parameters of the SimTraffic study, with regards to # of runs required, seed time, and study area.
 - o Is the SimTraffic study area limited to the 2 ramp terminals, or all 5 intersections required?
 - What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required?
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 - Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey.

Thanks for your help,

Hugo Chan

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From: Polus, Asia (MTO) [<mailto:Asia.Polus@ontario.ca>]
Sent: Thursday, May 24, 2018 1:14 PM
To: Attila Hertel <attila.hertel@IBIGroup.com>
Cc: McBride, Connor (MTO) <Connor.McBride@ontario.ca>; Singh, Christian (MTO) <Christian.Singh@ontario.ca>; Lawrence, Morgan (MTO) <Morgan.Lawrence@ontario.ca>
Subject: RE: 1161-1167 North Short Blvd Proposed Development
Importance: High

Hi Attila,

Further to our yesterday meeting please note that as we have received more detailed information regarding the development proposal, our Traffic Office for a second time has reviewed your previously provided "Scope of Work" for the TIS and the following are updated comments:

- 1) Identify Type of Land Use from ITE Trip Generation Manual prior to completing TIS;
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In addition I have attached the TMCs which you have requested yesterday.

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W. Asia Polus
Corridor Management Planner

Ministry of Transportation
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Toronto, ON M3M 0B7
Tel. 416 - 235-3991
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From: Polus, Asia (MTO)
Sent: April-23-18 12:51 PM
To: 'attila.hertel@IBIGroup.com'
Cc: McBride, Connor (MTO); Singh, Christian (MTO); Lawrence, Morgan (MTO)
Subject: FW: 1161-1167 North Short Blvd Proposed Development

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- We would request that all signage issues be kept as a separate entity from the site plan approval process, however, if the proponent prefer to have all signage approved as part of the site plan approval process, then all details regarding signage must be submitted to this ministry.
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If you require any additional clarification do not hesitate to call Connor or me.

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Best Regards

W. Asia Polus

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Fax 416 - 235-4267



From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: April 10, 2018 11:27 AM
To: Corvalan, Carmen (MTO)
Cc: Hugo Chan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

Thank you for taking my call this morning. As discussed, please find attached the proposed scope of work document for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington for MTO review. As a note, we've been in touch with Burlington who have reviewed and approved the scope.

Kind Regards

- Attila

From: Attila Hertel
Sent: Thursday, April 5, 2018 11:51 AM
To: 'carmen.corvalan@ontario.ca'
Cc: Hugo Chan
Subject: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

My name is Attila Hertel. I work for IBI Group who has been retained by Amico Properties to prepare the traffic impact and parking study for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington. I received an out of office notification from Connor McBride (who I believe is our client's MTO contact) to direct all inquires to you.

I wanted to touch base to confirm to project scope and methodology. If I provided a scope of work document, could you review, provide comments, and approve?

Thank you

Attila Hertel

IBI GROUP

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Hugo Chan

From: Lucas, Steve <Steve.Lucas@burlington.ca>
Sent: Thursday, July 12, 2018 4:14 PM
To: Hugo Chan
Cc: Attila Hertel; Edgcumbe, Kaylan; Ozimkovic, Danijel
Subject: RE: background developments and traffic growth rate request RE: 1161-1167 North Short Blvd Proposed Development

Categories: Green Category

Hello Hugo,

With regards to the background traffic growth rate, we will require a rate of 1.1%. The back ground developments which would potentially impact your site can be found at the following links:

<https://www.burlington.ca/en/services-for-you/490---492-Brock-Ave---1298-Ontario-St.asp>

<https://www.burlington.ca/en/services-for-you/markay-homes---1159-bellview-crescent.asp>

For further details on projects occurring in the area you can find them here:

<https://www.burlington.ca/en/services-for-you/current-development-projects.asp>

Thank you,

Steve Lucas

City of Burlington | Transportation Planning Technologist
t: 905.335.7671 ext.7691 | e: steve.lucas@burlington.ca

From: Hugo Chan [mailto:hugo.chan@ibigroup.com]
Sent: Thursday, July 12, 2018 1:59 PM
To: Lucas, Steve
Cc: Attila Hertel; Edgcumbe, Kaylan; Ozimkovic, Danijel
Subject: background developments and traffic growth rate request RE: 1161-1167 North Short Blvd Proposed Development

Hi Steve,

Regarding the 1161-1167 North Shore Proposed Development, thank you for approving the scope of work.

Regarding the future background conditions in the study area as per the scope of work, can you please:

- Provide a background traffic growth rate for 2023, 2028, and 2033, for the adjacent corridors, namely North Shore Blvd east-west, and Maple/Lakeshore north-south?
- Provide background developments scheduled to be completed by 2023, 2028, and 2033 that would generated traffic in the study area?

Thanks in advance,

Hugo Chan

IBI GROUP

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From: Lucas, Steve [<mailto:Steve.Lucas@burlington.ca>]
Sent: Monday, April 9, 2018 11:35 AM
To: Attila Hertel
Cc: Ozimkovic , Danijel; Edgcumbe, Kaylan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Hello Attila,

Thank you for getting in touch with us with regards to your scope of work. Based on what was provided to us, we are satisfied with your proposed scope of work, and look forward to the results of your study.

Regards,

Steve Lucas
City of Burlington | Transportation Planning Technologist
t: 905.335.7671 ext.7691 | e: steve.lucas@burlington.ca

From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: Friday, April 06, 2018 1:16 PM
To: Edgcumbe, Kaylan
Cc: Ozimkovic , Danijel; Lucas, Steve
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Thank you for the quick responses and the introduction.

Danijel and Steve, please find attached the proposed scope of work. Feel free to contact me with any questions or concerns. My number is at the office is 416 596 1930 ext 61263.
Note that we are contacting the MTO to obtain their approval concurrently.

Regards

- Attila

From: Edgcumbe, Kaylan [<mailto:Kaylan.Edgcumbe@burlington.ca>]
Sent: Thursday, April 5, 2018 2:36 PM
To: Attila Hertel
Cc: Ozimkovic , Danijel; Lucas, Steve
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Hi Attila,

Please provide your proposed scope of work to Dan Ozimkovic and Steve Lucas (CC'd above) for our review and comment.

If you have any questions, please contact Dan directly at 905-335-7600 ext. 7485

Thanks,

Kaylan

Kaylan Edgcumbe, C.E.T.
Manager, Transportation Planning and Parking
Transportation Services Department

From: Minaji, Rosalind
Sent: Thursday, April 05, 2018 2:34 PM
To: 'Attila Hertel' <attila.hertel@IBIGroup.com>
Cc: Edgcumbe, Kaylan <Kaylan.Edgcumbe@burlington.ca>; Ozimkovic, Danijel <Danijel.Ozimkovic@burlington.ca>
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Hi Attila:

Our Transportation Services Department would be happy to provide feedback on the scope of work for the parking component of the TIS. I suggested to Hugo Chan that the MTO be consulted about the transportation component before the scope of work is prepared.

Thank you.

-Rosalind

Rosalind Minaji MCIP RPP
Coordinator of Development Review
Department of City Building | Planning Section
City of Burlington
426 Brant Street, Burlington L7R 3Z6
Phone: 905-335-7600 Ext. 7809
Fax: 905-335-7880
Email: rosalind.minaji@burlington.ca

From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: Thursday, April 05, 2018 2:06 PM
To: Minaji, Rosalind
Subject: 1161-1167 North Short Blvd Proposed Development

Good morning Rosalind

My name is Attila and I work for IBI Group. I just left you a voicemail regarding the 1161-1167 North Short Blvd proposed retirement development. I believe you've been in touch with my colleague (Hugo Chan) regarding the traffic component, for which comments were deferred until the MTO has approved. However, I wanted to touch base to confirm to parking component's scope and methodology. If I provided a scope of work document, could you review, provide comments, and approve?

Thank you
Regards

Attila Hertel

IBI GROUP

7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61263 fax +1 416 596 0644



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Appendix B – Turning Movement Count Data

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington
Site #: 1905300001
Intersection: North Shore Blvd E & QEW West R
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 810
 North Entering: 306
 North Peds: 0
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	2	0	4	6
Cars	42	0	258	300
Totals	44	0	262	



Heavys	0
Trucks	7
Cars	497
Totals	504

East Leg Total: 1386
 East Entering: 803
 East Peds: 0
 Peds Cross: \times

Heavys	0
Trucks	7
Cars	428
Totals	435

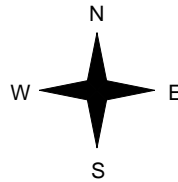


QEW West Ramp Terminal

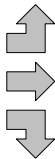
Cars	407	Trucks	5	Heavys	0	Totals	412
Cars	386	Trucks	5	Heavys	0	Totals	391
Cars	0	Trucks	0	Heavys	0	Totals	0
Totals	793	Totals	10	Totals	0		



North Shore Blvd E



Heavys	0
Trucks	2
Cars	90
Totals	92
Heavys	0
Trucks	12
Cars	296
Totals	308
Heavys	0
Trucks	0
Cars	0
Totals	0
Heavys	0
Trucks	14
Cars	386
Totals	386



North Shore Blvd E



Cars	567	Trucks	16	Heavys	0	Totals	583
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Peds Cross: \times
 West Peds: 0
 West Entering: 400
 West Leg Total: 835

Cars	0	Cars	0	0	13	13
Trucks	0	Trucks	0	0	0	0
Heavys	0	Heavys	0	0	0	0
Totals	0	Totals	0	0	13	



Peds Cross: \times
 South Peds: 0
 South Entering: 13
 South Leg Total: 13

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington
Site #: 1905300001
Intersection: North Shore Blvd E & QEW West R
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 1290
 North Entering: 261
 North Peds: 1
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	1	0	0	1
Cars	89	0	171	260
Totals	90	0	171	



Heavys	0
Trucks	5
Cars	1024
Totals	1029

East Leg Total: 1946
 East Entering: 1536
 East Peds: 0
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	4	699	703

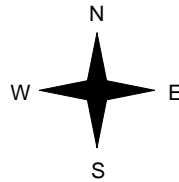
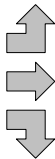


QEW West Ramp Terminal

Cars	Trucks	Heavys	Totals
918	5	0	923
610	3	0	613
0	0	0	0
1528	8	0	



Heavys	Trucks	Cars	Totals
0	0	106	106
0	2	235	237
0	0	0	0
0	2	341	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
408	2	0	410

Peds Cross: \times
 West Peds: 0
 West Entering: 343
 West Leg Total: 1046

Cars	0
Trucks	0
Heavys	0
Totals	0



Cars	0	0	2	2
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	0	2	

Peds Cross: \times
 South Peds: 0
 South Entering: 2
 South Leg Total: 2

Comments

Ontario Traffic Inc.

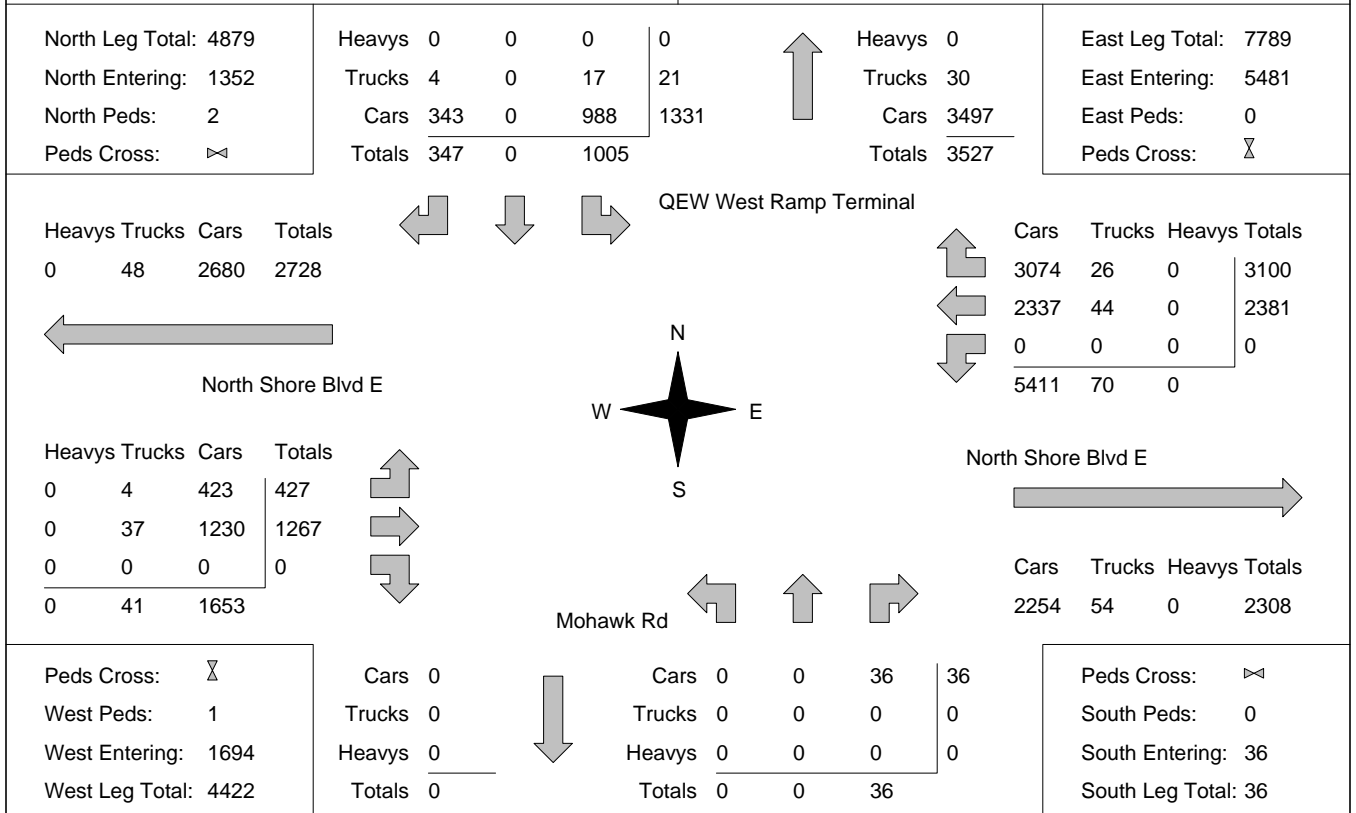
Total Count Diagram

Municipality: Burlington
Site #: 1905300001
Intersection: North Shore Blvd E & QEW West R
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E



Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & QEW West | Count Date: 26-Feb-19 | Municipality: Burlington

North Approach Totals						South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	North/South Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	272	0	32	304	0	316	8:00:00	0	0	12	12	0
9:00:00	266	0	49	315	1	322	9:00:00	0	0	7	7	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	164	0	66	230	0	239	16:00:00	0	0	9	9	0
17:00:00	129	0	89	218	0	223	17:00:00	0	0	5	5	0
18:00:00	174	0	111	285	1	288	18:00:00	0	0	3	3	0
Totals:	1005	0	347	1352	2	1388		0	0	36	36	0
East Approach Totals						West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	East/West Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	339	381	720	0	1072	8:00:00	80	272	0	352	0
9:00:00	0	391	353	744	0	1104	9:00:00	84	276	0	360	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	504	664	1168	0	1482	16:00:00	75	239	0	314	1
17:00:00	0	585	918	1503	0	1855	17:00:00	96	256	0	352	0
18:00:00	0	562	784	1346	0	1662	18:00:00	92	224	0	316	0
Totals:	0	2381	3100	5481	0	7175		427	1267	0	1694	1
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	7:00	8:00	9:00		15:00	16:00	17:00	18:00			
Crossing Values:	0	0	272	266		0	165	129	174			

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington
Site #: 1905300002
Intersection: North Shore Blvd E & QEW East R
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 278

North Entering: 0

North Peds: 0

Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys 0

Trucks 3

Cars 275

Totals 278

East Leg Total: 2250

East Entering: 869

East Peds: 0

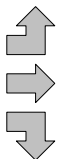
Peds Cross: \times

Heavys	0	Trucks	10	Cars	797	Totals	807
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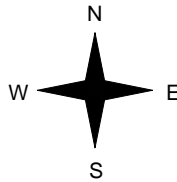


North Shore Blvd E

Heavys	0	Trucks	0	Cars	0	Totals	0
	0		8		487		495
	0		8		79		87
Totals	0	16	566				



QEW East Ramp Terminal



QEW East Ramp Terminal



Cars	273	Trucks	3	Heavys	0	Totals	276
	584		9		0		593
	0		0		0		0
Totals	857	12	0				

North Shore Blvd E



Cars	1363	Trucks	18	Heavys	0	Totals	1381
------	------	--------	----	--------	---	--------	------

Peds Cross: \times

West Peds: 0

West Entering: 582

West Leg Total: 1389

Cars	79	Cars	213	2	876	1091
Trucks	8	Trucks	1	0	10	11
Heavys	0	Heavys	0	0	0	0
Totals	87	Totals	214	2	886	



Peds Cross: \times

South Peds: 1

South Entering: 1102

South Leg Total: 1189

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:30:00
To: 17:30:00

Municipality: Burlington
Site #: 1905300002
Intersection: North Shore Blvd E & QEW East R
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 289
North Entering: 0
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys	0
Trucks	4
Cars	285
Totals	289

East Leg Total: 2423
East Entering: 1642
East Peds: 0
Peds Cross: \times

Heavys	0
Trucks	9
Cars	1535
Totals	1544

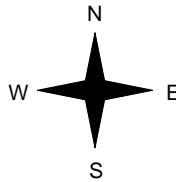


QEW East Ramp Terminal

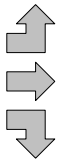
Cars	285	Trucks	4	Heavys	0	Totals	289
Cars	1344	Trucks	9	Heavys	0	Totals	1353
Cars	0	Trucks	0	Heavys	0	Totals	0
Cars	1629	Trucks	13	Heavys	0	Totals	1642



North Shore Blvd E



Heavys	0
Trucks	0
Cars	0
Totals	0
Heavys	0
Trucks	2
Cars	351
Totals	353
Heavys	0
Trucks	0
Cars	58
Totals	58
Heavys	0
Trucks	2
Cars	409
Totals	409



QEW East Ramp Terminal

North Shore Blvd E



Cars	778	Trucks	3	Heavys	0	Totals	781
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Peds Cross: \times
West Peds: 0
West Entering: 411
West Leg Total: 1955

Cars	58	Cars	191	0	427	618
Trucks	0	Trucks	0	0	1	1
Heavys	0	Heavys	0	0	0	0
Totals	58	Totals	191	0	428	



Peds Cross: \times
South Peds: 1
South Entering: 619
South Leg Total: 677

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1905300002
Intersection: North Shore Blvd E & QEW East R
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 1386
 North Entering: 0
 North Peds: 0
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys	0
Trucks	16
Cars	1370
Totals	1386

East Leg Total: 10933
 East Entering: 6025
 East Peds: 0
 Peds Cross: \times

Heavys	0	Trucks	71	Cars	5419	Totals	5490
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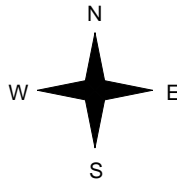


QEW East Ramp Terminal

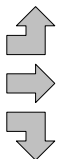
Cars	1368	Trucks	15	Heavys	0	Totals	1383
Cars	4573	Trucks	69	Heavys	0	Totals	4642
Cars	0	Trucks	0	Heavys	0	Totals	0
Cars	5941	Trucks	84	Heavys	0	Totals	



North Shore Blvd E



Heavys	0	Trucks	0	Cars	0	Totals	0
Heavys	0	Trucks	40	Cars	1941	Totals	1981
Heavys	0	Trucks	14	Cars	312	Totals	326
Heavys	0	Trucks	54	Cars	2253	Totals	



QEW East Ramp Terminal

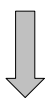
North Shore Blvd E



Cars	4836	Trucks	72	Heavys	0	Totals	4908
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Peds Cross: \times
 West Peds: 0
 West Entering: 2307
 West Leg Total: 7797

Cars	312	Cars	846	2	2895	3743
Trucks	14	Trucks	2	1	32	35
Heavys	0	Heavys	0	0	0	0
Totals	326	Totals	848	3	2927	



Peds Cross: \times
 South Peds: 3
 South Entering: 3778
 South Leg Total: 4104

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & QEW East F Count Date: 26-Feb-19 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	1151	8:00:00	206	1	944	1151	0
9:00:00	0	0	0	0	0	928	9:00:00	175	2	751	928	2
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	526	16:00:00	134	0	392	526	0
17:00:00	0	0	0	0	0	597	17:00:00	176	0	421	597	0
18:00:00	0	0	0	0	0	576	18:00:00	157	0	419	576	1
Totals:	0	0	0	0	0	3778		848	3	2927	3778	3
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	520	247	767	0	1323	8:00:00	0	482	74	556	0
9:00:00	0	566	242	808	0	1357	9:00:00	0	482	67	549	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	1035	320	1355	0	1766	16:00:00	0	343	68	411	0
17:00:00	0	1333	341	1674	0	2063	17:00:00	0	321	68	389	0
18:00:00	0	1188	233	1421	0	1823	18:00:00	0	353	49	402	0
Totals:	0	4642	1383	6025	0	8332		0	1981	326	2307	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	7:00	8:00	9:00			15:00	16:00	17:00	18:00		
Crossing Values:	0	0	207	177			0	134	176	157		

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington
Site #: 1905300003
Intersection: North Shore Blvd E & Co-Op Drive
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 6
 North Entering: 5
 North Peds: 3
 Peds Cross: 2

Heavys	0	0	0
Trucks	0	0	0
Cars	4	1	5
Totals	4	1	



Heavys	0
Trucks	0
Cars	1
Totals	1

East Leg Total: 2240
 East Entering: 862
 East Peds: 2
 Peds Cross: 2

Heavys	Trucks	Cars	Totals
0	12	853	865



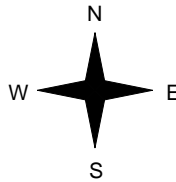
Co-Op Driveway



Cars	Trucks	Heavys	Totals
1	0	0	1
849	12	0	861
850	12	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	0	0
0	18	1359	1377
0	18	1359	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
1360	18	0	1378

Peds Cross: 2
 West Peds: 0
 West Entering: 1377
 West Leg Total: 2242

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington
Site #: 1905300003
Intersection: North Shore Blvd E & Co-Op Drive
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 14
 North Entering: 3
 North Peds: 3
 Peds Cross: \times

Heavys	0	0	0
Trucks	0	0	0
Cars	1	2	3
Totals	1	2	



Heavys	0
Trucks	0
Cars	11
Totals	11

East Leg Total: 2439
 East Entering: 1658
 East Peds: 0
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	13	1642	1655



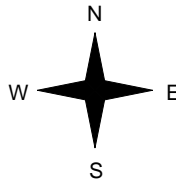
Co-Op Driveway



Cars	Trucks	Heavys	Totals
4	0	0	4
1641	13	0	1654
1645	13	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	7	7
0	3	776	779
0	3	783	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
778	3	0	781

Peds Cross: \times
 West Peds: 0
 West Entering: 786
 West Leg Total: 2441

Comments

Ontario Traffic Inc.

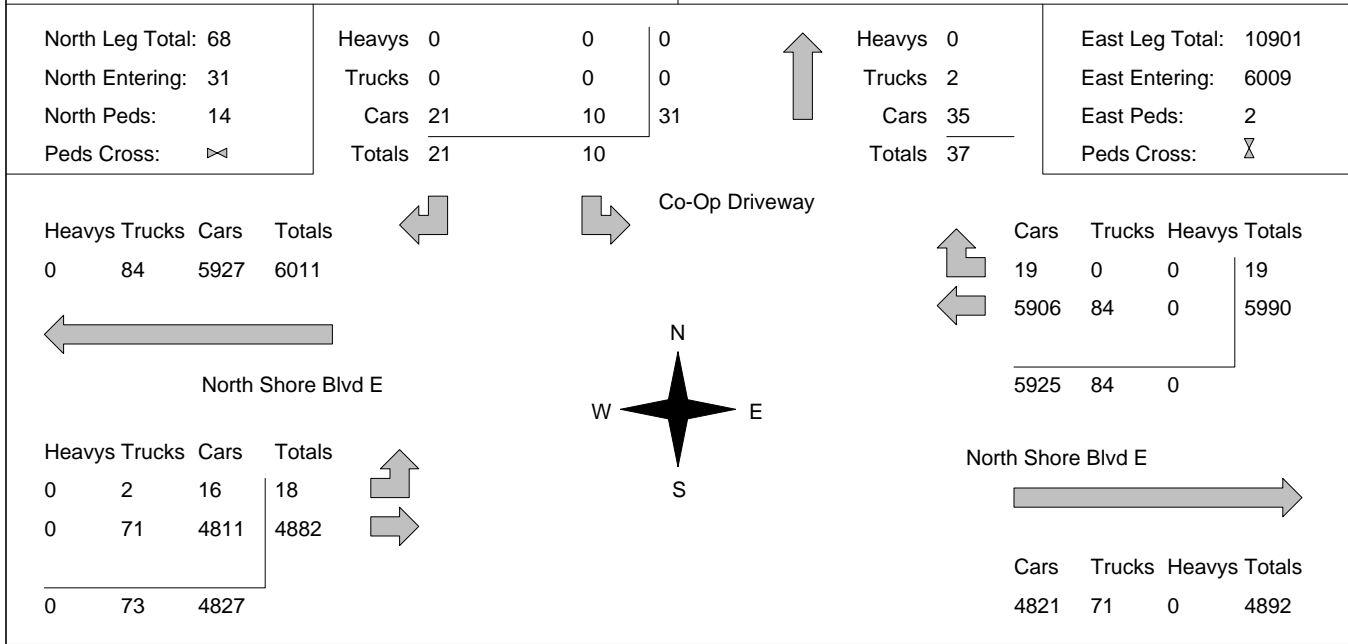
Total Count Diagram

Municipality: Burlington
Site #: 1905300003
Intersection: North Shore Blvd E & Co-Op Drive
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E



Peds Cross: ⌘
 West Peds: 0
 West Entering: 4900
 West Leg Total: 10911

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Co-Op Drive Count Date: 26-Feb-19 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	2	0	6	8	1	8	8:00:00	0	0	0	0	0
9:00:00	1	0	5	6	4	6	9:00:00	0	0	0	0	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	2	0	5	7	3	7	16:00:00	0	0	0	0	0
17:00:00	1	0	0	1	6	1	17:00:00	0	0	0	0	0
18:00:00	4	0	5	9	0	9	18:00:00	0	0	0	0	0
Totals:	10	0	21	31	14	31		0	0	0	0	0
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	758	0	758	0	2181	8:00:00	0	1423	0	1423	0
9:00:00	0	802	2	804	2	2025	9:00:00	1	1220	0	1221	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	0	1343	6	1349	0	2084	16:00:00	6	729	0	735	0
17:00:00	0	1684	4	1688	0	2434	17:00:00	5	741	0	746	0
18:00:00	0	1403	7	1410	0	2185	18:00:00	6	769	0	775	0
Totals:	0	5990	19	6009	2	10909		18	4882	0	4900	0
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	7:00	8:00	9:00			15:00	16:00	17:00	18:00		
Crossing Values:	0	0	2	3			0	2	1	4		

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Burlington
Site #: 1905300004
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 47
 North Entering: 25
 North Peds: 2
 Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	12	0	13	25
Totals	12	0	13	



Heavys	0
Trucks	1
Cars	21
Totals	22

East Leg Total: 1969
 East Entering: 798
 East Peds: 11
 Peds Cross: \bowtie

Heavys	0
Trucks	13
Cars	843
Totals	856

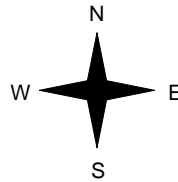


Condo Driveway

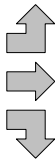
Cars	10	Trucks	1	Heavys	0	Totals	11
Cars	731	Trucks	11	Heavys	0	Totals	742
Cars	44	Trucks	1	Heavys	0	Totals	45
Cars	785	Trucks	13	Heavys	0	Totals	



North Shore Blvd E



Heavys	0
Trucks	0
Cars	11
Totals	11
Heavys	0
Trucks	17
Cars	1119
Totals	1136
Heavys	0
Trucks	1
Cars	233
Totals	234
Heavys	0
Trucks	18
Cars	1363
Totals	



North Shore Blvd E



Cars	1153	Trucks	18	Heavys	0	Totals	1171
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Joseph Brant Hospital



Peds Cross: \bowtie
 West Peds: 0
 West Entering: 1381
 West Leg Total: 2237

Cars	277	Cars	100	0	21	121
Trucks	2	Trucks	2	0	1	3
Heavys	0	Heavys	0	0	0	0
Totals	279	Totals	102	0	22	



Peds Cross: \bowtie
 South Peds: 1
 South Entering: 124
 South Leg Total: 403

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Burlington
Site #: 1905300004
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 53

North Entering: 22

North Peds: 1

Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	2	2
Cars	12	0	8	20
Totals	12	0	10	



Heavys 0

Trucks 1

Cars 30

Totals 31

East Leg Total: 2346

East Entering: 1554

East Peds: 5

Peds Cross: \times

Heavys	0	Trucks	13	Cars	1649	Totals	1662
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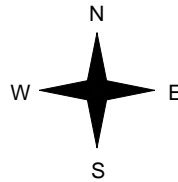


North Shore Blvd E

Heavys	0	Trucks	0	Cars	11	Totals	11
	0		3		720		723
	0		0		54		54
	0		3		785		785



Condo Driveway



Cars	19	Trucks	0	Heavys	0	Totals	19
	1483		13		0		1496
	38		1		0		39
	1540		14		0		1540

North Shore Blvd E



Cars	787	Trucks	5	Heavys	0	Totals	792
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Peds Cross: \times

West Peds: 2

West Entering: 788

West Leg Total: 2450

Cars	92	Cars	154	0	59	213
Trucks	1	Trucks	0	1	0	1
Heavys	0	Heavys	0	0	0	0
Totals	93	Totals	154	1	59	



Peds Cross: \times

South Peds: 2

South Entering: 214

South Leg Total: 307

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1905300004
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 219
 North Entering: 103
 North Peds: 14
 Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	0	0	4	4
Cars	54	1	44	99
Totals	54	1	48	



Heavys 0
 Trucks 2
 Cars 114
 Totals 116

East Leg Total: 10180
 East Entering: 5597
 East Peds: 31
 Peds Cross: \bowtie

Heavys	0	Trucks	86	Cars	5913	Totals	5999
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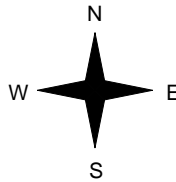


Condo Driveway

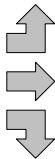
Cars	73	Trucks	1	Heavys	0	Totals	74
Cars	5247	Trucks	84	Heavys	0	Totals	5331
Cars	187	Trucks	5	Heavys	0	Totals	192
Totals	5507	90	0				



North Shore Blvd E



Heavys	0	Trucks	0	Cars	40	Totals	40
Heavys	0	Trucks	70	Cars	4204	Totals	4274
Heavys	0	Trucks	2	Cars	578	Totals	580
Heavys	0	Trucks	72	Cars	4822	Totals	



North Shore Blvd E



Cars	4507	Trucks	76	Heavys	0	Totals	4583
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Peds Cross: \bowtie
 West Peds: 9
 West Entering: 4894
 West Leg Total: 10893

Cars	766	Cars	612	1	259	872
Trucks	7	Trucks	2	1	2	5
Heavys	0	Heavys	0	0	0	0
Totals	773	Totals	614	2	261	



Peds Cross: \bowtie
 South Peds: 11
 South Entering: 877
 South Leg Total: 1650

Joseph Brant Hospital



Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Joseph Brant Count Date: 26-Feb-19 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	10	0	6	16	0	130	8:00:00	94	0	20	114	0
9:00:00	13	0	14	27	6	108	9:00:00	48	0	33	81	4
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	10	1	12	23	1	270	16:00:00	159	1	87	247	4
17:00:00	9	0	10	19	4	304	17:00:00	212	0	73	285	2
18:00:00	6	0	12	18	3	168	18:00:00	101	1	48	150	1
Totals:	48	1	54	103	14	980		614	2	261	877	11
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	32	663	7	702	10	2120	8:00:00	8	1133	277	1418	0
9:00:00	41	734	9	784	8	2008	9:00:00	6	1061	157	1224	0
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	43	1174	23	1240	3	1976	16:00:00	7	676	53	736	5
17:00:00	34	1470	17	1521	7	2259	17:00:00	9	682	47	738	1
18:00:00	42	1290	18	1350	3	2128	18:00:00	10	722	46	778	3
Totals:	192	5331	74	5597	31	10491		40	4274	580	4894	9
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	7:00	8:00	9:00	15:00		16:00	17:00	18:00	18:00			
Crossing Values:	0	114	69	0		178	229	114	114			

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:15:00

To: 8:15:00

Municipality: Burlington
Site #: 1905300005
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 665
 North Entering: 297
 North Peds: 4
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	4	1	3	8
Cars	190	71	28	289
Totals	194	72	31	



Heavys	0
Trucks	9
Cars	359
Totals	368

East Leg Total: 2019
 East Entering: 698
 East Peds: 12
 Peds Cross: \times

Heavys	0
Trucks	15
Cars	736
Totals	751

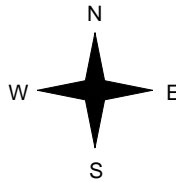


Maple Ave

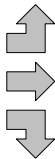
Cars	33	Trucks	3	Heavys	0	Totals	36
Cars	525	Trucks	7	Heavys	0	Totals	532
Cars	127	Trucks	3	Heavys	0	Totals	130
Totals	685	Totals	13	Totals	0		



North Shore Blvd E



Heavys	0
Trucks	4
Cars	194
Totals	198
Heavys	0
Trucks	9
Cars	890
Totals	899
Heavys	0
Trucks	6
Cars	97
Totals	103
Heavys	0
Trucks	19
Cars	1181
Totals	



Lakeshore Rd



Cars	1307	Trucks	14	Heavys	0	Totals	1321
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Peds Cross: \times
 West Peds: 5
 West Entering: 1200
 West Leg Total: 1951

Cars	295	Cars	21	132	389	542
Trucks	10	Trucks	4	2	2	8
Heavys	0	Heavys	0	0	0	0
Totals	305	Totals	25	134	391	



Peds Cross: \times
 South Peds: 6
 South Entering: 550
 South Leg Total: 855

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 16:00:00
To: 17:00:00

Municipality: Burlington
Site #: 1905300005
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 1
Count date: 26-Feb-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 945
North Entering: 620
North Peds: 11
Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	2	0	3	5
Cars	401	149	65	615
Totals	403	149	68	



Heavys	0
Trucks	4
Cars	321
Totals	325

East Leg Total: 2217
East Entering: 1361
East Peds: 15
Peds Cross: \bowtie

Heavys	0
Trucks	13
Cars	1529
Totals	1542

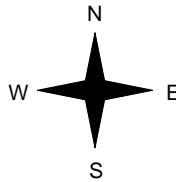


Maple Ave

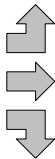
Cars	64	Trucks	3	Heavys	0	Totals	67
Cars	1054	Trucks	10	Heavys	0	Totals	1064
Cars	228	Trucks	2	Heavys	0	Totals	230
Totals	1346	Totals	15	Totals	0		



North Shore Blvd E



Heavys	0
Trucks	1
Cars	167
Totals	168
Heavys	0
Trucks	6
Cars	586
Totals	592
Heavys	0
Trucks	0
Cars	35
Totals	35
Heavys	0
Trucks	7
Cars	788
Totals	795



Lakeshore Rd



Peds Cross: \bowtie
West Peds: 6
West Entering: 795
West Leg Total: 2337

Cars	412	Cars	74	90	194	358
Trucks	2	Trucks	1	0	2	3
Heavys	0	Heavys	0	0	0	0
Totals	414	Totals	75	90	196	



Lakeshore Rd



Peds Cross: \bowtie
South Peds: 8
South Entering: 361
South Leg Total: 775

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Lakeshore Rd Count Date: 26-Feb-19 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	29	76	176	281	5	826	8:00:00	27	129	389	545	6
9:00:00	48	62	193	303	10	684	9:00:00	30	102	249	381	3
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	82	94	276	452	16	789	16:00:00	66	109	162	337	21
17:00:00	68	149	403	620	11	981	17:00:00	75	90	196	361	8
18:00:00	94	132	365	591	11	828	18:00:00	34	61	142	237	13
Totals:	321	513	1413	2247	53	4108		232	491	1138	1861	51
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	126	478	29	633	14	1805	8:00:00	192	859	121	1172	6
9:00:00	105	557	51	713	8	1887	9:00:00	172	921	81	1174	3
15:00:00	0	0	0	0	0	0	15:00:00	0	0	0	0	0
16:00:00	217	899	68	1184	17	1939	16:00:00	179	537	39	755	10
17:00:00	230	1064	67	1361	15	2156	17:00:00	168	592	35	795	6
18:00:00	226	944	48	1218	9	2001	18:00:00	169	581	33	783	8
Totals:	904	3942	263	5109	63	9788		880	3490	309	4679	33
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	7:00	8:00	9:00			15:00	16:00	17:00	18:00		
Crossing Values:	0	0	205	191			0	284	313	277		

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 16:00:00

One Hour Peak

From: 14:15:00

To: 15:15:00

Municipality: Burlington
Site #: 1905300006
Intersection: North Shore Blvd E & QEW West R
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 646

North Entering: 290

North Peds: 0

Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	67	0	223	290
Totals	67	0	223	



Heavys 0

Trucks 0

Cars 356

Totals 356

East Leg Total: 1094

East Entering: 633

East Peds: 0

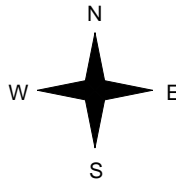
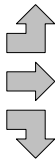
Peds Cross: \times

Heavys	0	Trucks	5	Cars	383	Totals	388
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North Shore Blvd E

Heavys	0	Trucks	0	Cars	44	Totals	44
	0		3		233		236
	0		0		0		0
	0		3		277		



QEW West Ramp Terminal



Cars	312	Trucks	0	Heavys	0	Totals	312
	316		5		0		321
	0		0		0		0
	628		5		0		

North Shore Blvd E



Peds Cross: \times

West Peds: 1

West Entering: 280

West Leg Total: 668

Cars	0
Trucks	0
Heavys	0
Totals	0



Cars	0	0	2	2
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	0	2	

Mohawk Rd



Peds Cross: \times

South Peds: 0

South Entering: 2

South Leg Total: 2

Cars	458	Trucks	3	Heavys	0	Totals	461
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Comments

Ontario Traffic Inc.

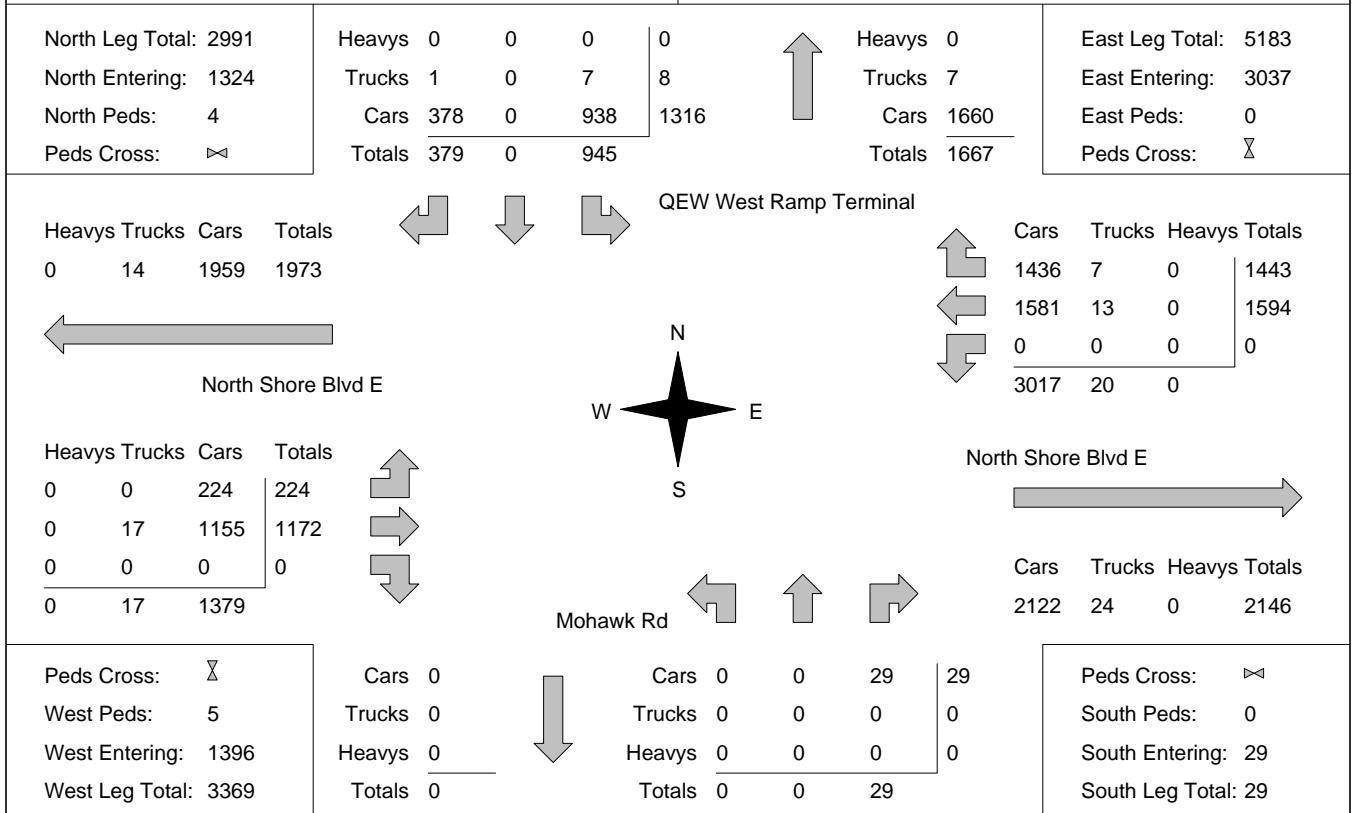
Total Count Diagram

Municipality: Burlington
Site #: 1905300006
Intersection: North Shore Blvd E & QEW West R
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E



Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & QEW West | Count Date: 2-Mar-19 | Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	171	0	79	250	3	258	12:00:00	0	0	8	8	0
13:00:00	194	0	69	263	0	269	13:00:00	0	0	6	6	0
14:00:00	194	0	81	275	0	282	14:00:00	0	0	7	7	0
15:00:00	225	0	71	296	0	300	15:00:00	0	0	4	4	0
16:00:00	161	0	79	240	1	244	16:00:00	0	0	4	4	0
Totals:						1353	Totals:					
945	0	379	1324	4								
East Approach Totals <th rowspan="3" style="text-align: center;">East/West Total Approaches</th> <th colspan="6" style="text-align: center;">West Approach Totals</th>						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	312	274	586	0	832	12:00:00	42	204	0	246	4
13:00:00	0	313	312	625	0	919	13:00:00	43	251	0	294	0
14:00:00	0	306	278	584	0	891	14:00:00	57	250	0	307	0
15:00:00	0	312	277	589	0	885	15:00:00	42	254	0	296	0
16:00:00	0	351	302	653	0	906	16:00:00	40	213	0	253	1
Totals:						4433	Totals:					
0	1594	1443	3037	0								
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	0:00	11:00	12:00				13:00	14:00	15:00	16:00	
Crossing Values:	0	0	0	175				194	194	225	162	

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

From: 11:45:00
To: 12:45:00

Municipality: Burlington
Site #: 1905300007
Intersection: North Shore Blvd E & QEW East R
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 189
North Entering: 0
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys	0
Trucks	3
Cars	186
Totals	189

East Leg Total: 1387
East Entering: 727
East Peds: 0
Peds Cross: \times

Heavys	0	Trucks	6	Cars	634	Totals	640
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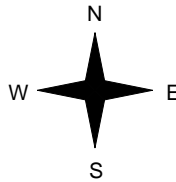


QEW East Ramp Terminal

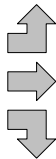
Cars	186	Trucks	3	Heavys	0	Totals	189
Cars	532	Trucks	6	Heavys	0	Totals	538
Cars	0	Trucks	0	Heavys	0	Totals	0
Cars	718	Trucks	9	Heavys	0	Totals	727



North Shore Blvd E



Heavys	0	Trucks	0	Cars	0	Totals	0
Heavys	0	Trucks	4	Cars	359	Totals	363
Heavys	0	Trucks	0	Cars	85	Totals	85
Heavys	0	Trucks	4	Cars	444	Totals	448



QEW East Ramp Terminal

North Shore Blvd E



Cars	655	Trucks	5	Heavys	0	Totals	660
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Peds Cross: \times
West Peds: 0
West Entering: 448
West Leg Total: 1088

Cars	85	Cars	102	0	296	398
Trucks	0	Trucks	0	0	1	1
Heavys	0	Heavys	0	0	0	0
Totals	85	Totals	102	0	297	398



Peds Cross: \times
South Peds: 4
South Entering: 399
South Leg Total: 484

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1905300007
Intersection: North Shore Blvd E & QEW East R
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 944
 North Entering: 0
 North Peds: 4
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	0



Heavys	0
Trucks	9
Cars	935
Totals	944

East Leg Total: 6752
 East Entering: 3554
 East Peds: 1
 Peds Cross: \times

Heavys	0	Trucks	21	Cars	3023	Totals	3044
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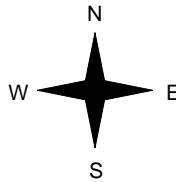


QEW East Ramp Terminal

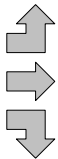
Cars	934	Trucks	9	Heavys	0	Totals	943
Cars	2591	Trucks	20	Heavys	0	Totals	2611
Cars	0	Trucks	0	Heavys	0	Totals	0
Cars	3525	Trucks	29	Heavys	0	Totals	3554



North Shore Blvd E



Heavys	0	Trucks	0	Cars	0	Totals	0
Heavys	0	Trucks	20	Cars	1765	Totals	1785
Heavys	0	Trucks	4	Cars	355	Totals	359
Heavys	0	Trucks	24	Cars	2120	Totals	2144



QEW East Ramp Terminal

North Shore Blvd E



Cars	3173	Trucks	25	Heavys	0	Totals	3198
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Peds Cross: \times
 West Peds: 0
 West Entering: 2144
 West Leg Total: 5188

Cars	355	Cars	432	1	1408	1841
Trucks	4	Trucks	1	0	5	6
Heavys	0	Heavys	0	0	0	0
Totals	359	Totals	433	1	1413	1847



Peds Cross: \times
 South Peds: 6
 South Entering: 1847
 South Leg Total: 2206

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & QEW East F Count Date: 2-Mar-19 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	0	0	0	4	364	12:00:00	79	1	284	364	1
13:00:00	0	0	0	0	0	386	13:00:00	95	0	291	386	4
14:00:00	0	0	0	0	0	393	14:00:00	94	0	299	393	0
15:00:00	0	0	0	0	0	347	15:00:00	76	0	271	347	0
16:00:00	0	0	0	0	0	357	16:00:00	89	0	268	357	1
Totals:	0	0	0	0	4	1847		433	1	1413	1847	6

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	509	188	697	0	1080	12:00:00	0	319	64	383	0
13:00:00	0	536	181	717	0	1166	13:00:00	0	363	86	449	0
14:00:00	0	487	186	673	0	1124	14:00:00	0	373	78	451	0
15:00:00	0	510	186	696	0	1178	15:00:00	0	416	66	482	0
16:00:00	0	569	202	771	1	1150	16:00:00	0	314	65	379	0
Totals:	0	2611	943	3554	1	5698		0	1785	359	2144	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	0:00	0:00	11:00	12:00		13:00	14:00	15:00	16:00
Crossing Values:	0	0	0	80		95	94	76	90

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 16:00:00

One Hour Peak

From: 14:15:00

To: 15:15:00

Municipality: Burlington
Site #: 1905300008
Intersection: North Shore Blvd E & Co-Op Driveway
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 14
 North Entering: 7
 North Peds: 8
 Peds Cross: \times

Heavys	0	0	0
Trucks	0	0	0
Cars	3	4	7
Totals	3	4	



Heavys	0
Trucks	0
Cars	7
Totals	7

East Leg Total: 1434
 East Entering: 749
 East Peds: 0
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	6	742	748



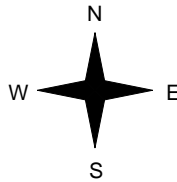
Co-Op Driveway



Cars	Trucks	Heavys	Totals
4	0	0	4
739	6	0	745
743	6	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	3	3
0	5	676	681
0	5	679	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
680	5	0	685

Peds Cross: \times
 West Peds: 0
 West Entering: 684
 West Leg Total: 1432

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1905300008
Intersection: North Shore Blvd E & Co-Op Driveway
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 57
 North Entering: 28
 North Peds: 35
 Peds Cross: ⚡

Heavys	0	0	0	28
Trucks	0	0	0	
Cars	14	14		
Totals	14	14		



Heavys 0
 Trucks 0
 Cars 29
 Totals 29

East Leg Total: 6768
 East Entering: 3559
 East Peds: 0
 Peds Cross: ⚡

Heavys	Trucks	Cars	Totals
0	29	3523	3552



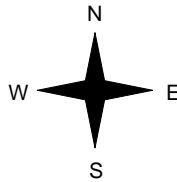
Co-Op Driveway



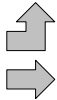
Cars	Trucks	Heavys	Totals
19	0	0	19
3509	29	0	3538
3528		31	0



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	10	10
0	27	3168	3195
0		27	3178



North Shore Blvd E



Cars	Trucks	Heavys	Totals
3182	27	0	3209

Peds Cross: ⚡
 West Peds: 0
 West Entering: 3205
 West Leg Total: 6757

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Co-Op Drive														Count Date: 2-Mar-19		Municipality: Burlington	
North Approach Totals							South Approach Totals										
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	North/South Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds					
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total						
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0					
12:00:00	2	0	3	5	11	5	12:00:00	0	0	0	0	0					
13:00:00	4	0	4	8	9	8	13:00:00	0	0	0	0	0					
14:00:00	3	0	1	4	4	4	14:00:00	0	0	0	0	0					
15:00:00	3	0	5	8	8	8	15:00:00	0	0	0	0	0					
16:00:00	2	0	1	3	3	3	16:00:00	0	0	0	0	0					
Totals:	14	0	14	28	35	28	0	0	0	0	0	0					
East Approach Totals							West Approach Totals										
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	East/West Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds					
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total						
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0					
12:00:00	2	688	4	694	0	1300	12:00:00	0	606	0	606	0					
13:00:00	0	710	5	715	0	1368	13:00:00	2	651	0	653	0					
14:00:00	0	674	4	678	0	1351	14:00:00	3	670	0	673	0					
15:00:00	0	687	5	692	0	1382	15:00:00	4	686	0	690	0					
16:00:00	0	779	1	780	0	1363	16:00:00	1	582	0	583	0					
Totals:	2	3538	19	3559	0	6764	10	3195	0	3205	0						
Calculated Values for Traffic Crossing Major Street																	
Hours Ending:	0:00	0:00	11:00	12:00			13:00	14:00	15:00	16:00							
Crossing Values:	0	0	0	2			4	3	3	2							

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

From: 14:15:00
To: 15:15:00

Municipality: Burlington
Site #: 1905300009
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 44
North Entering: 19
North Peds: 3
Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	8	0	11	19
Totals	8	0	11	



Heavys	0
Trucks	0
Cars	25
Totals	25

East Leg Total: 1420
East Entering: 738
East Peds: 9
Peds Cross: \bowtie

Heavys	0
Trucks	6
Cars	746
Totals	752

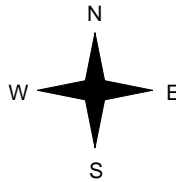


Condo Driveway

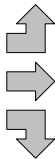
Cars	16	0	0	16
Trucks	689	6	0	695
Heavys	27	0	0	27
Totals	732	6	0	



North Shore Blvd E



Heavys	0
Trucks	0
Cars	9
Totals	9
Heavys	0
Trucks	3
Cars	629
Totals	632
Heavys	0
Trucks	0
Cars	37
Totals	37
Heavys	0
Trucks	3
Cars	675
Totals	675



North Shore Blvd E



Cars	679	3	0	682
Trucks				
Heavys				
Totals	682			

Joseph Brant Hospital

Peds Cross: \bowtie
West Peds: 0
West Entering: 678
West Leg Total: 1430

Cars	64	Cars	49	0	39	88
Trucks	0	Trucks	0	0	0	0
Heavys	0	Heavys	0	0	0	0
Totals	64	Totals	49	0	39	



Peds Cross: \bowtie
South Peds: 0
South Entering: 88
South Leg Total: 152

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1905300009
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 217
 North Entering: 104
 North Peds: 22
 Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	0	0	1	1
Cars	47	1	55	103
Totals	47	1	56	



Heavys	0
Trucks	0
Cars	113
Totals	113

East Leg Total: 6710
 East Entering: 3526
 East Peds: 29
 Peds Cross: \bowtie

Heavys	0
Trucks	31
Cars	3514
Totals	3545

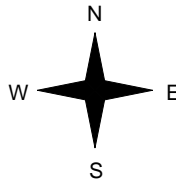


Condo Driveway

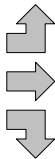
Cars	65	0	0	65
Trucks	3295	31	0	3326
Heavys	134	1	0	135
Totals	3494	32	0	



North Shore Blvd E



Heavys	0
Trucks	0
Cars	48
Totals	48
Heavys	0
Trucks	25
Cars	2959
Totals	2984
Heavys	0
Trucks	0
Cars	158
Totals	158
Heavys	0
Trucks	25
Cars	3165
Totals	3165



Joseph Brant Hospital



North Shore Blvd E



Cars	3158	26	0	3184
Trucks				
Heavys				
Totals	3158	26	0	3184

Peds Cross: \bowtie
 West Peds: 5
 West Entering: 3190
 West Leg Total: 6735

Cars	293	172	0	144	316
Trucks	1	0	0	0	0
Heavys	0	0	0	0	0
Totals	294	172	0	144	



Peds Cross: \bowtie
 South Peds: 3
 South Entering: 316
 South Leg Total: 610

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Joseph Brant Count Date: 2-Mar-19 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	6	0	9	15	6	62	12:00:00	30	0	17	47	1
13:00:00	15	0	9	24	4	87	13:00:00	30	0	33	63	2
14:00:00	15	0	9	24	3	71	14:00:00	22	0	25	47	0
15:00:00	16	0	6	22	5	88	15:00:00	30	0	36	66	0
16:00:00	4	1	14	19	4	112	16:00:00	60	0	33	93	0
Totals:	56	1	47	104	22	420		172	0	144	316	3
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	31	647	12	690	4	1289	12:00:00	10	558	31	599	0
13:00:00	21	673	14	708	7	1361	13:00:00	11	621	21	653	3
14:00:00	24	641	14	679	4	1356	14:00:00	7	639	31	677	2
15:00:00	33	658	15	706	10	1392	15:00:00	10	636	40	686	0
16:00:00	26	707	10	743	4	1318	16:00:00	10	530	35	575	0
Totals:	135	3326	65	3526	29	6716		48	2984	158	3190	5
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	0:00	11:00	12:00		13:00	14:00	15:00	16:00			
Crossing Values:	0	0	0	40		55	43	56	69			

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

From: 14:15:00
To: 15:15:00

Municipality: Burlington
Site #: 1905300010
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 616
North Entering: 327
North Peds: 13
Peds Cross: \times

Heavys	0	0	0	0
Trucks	2	1	4	7
Cars	196	47	77	320
Totals	198	48	81	



Heavys	0
Trucks	3
Cars	286
Totals	289

East Leg Total: 1382
East Entering: 714
East Peds: 17
Peds Cross: \times

Heavys	0
Trucks	5
Cars	741
Totals	746

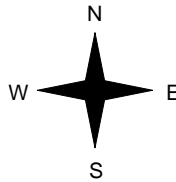


Maple Ave

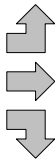
Cars	93	Trucks	2	Heavys	0	Totals	95
Cars	516	Trucks	2	Heavys	0	Totals	518
Cars	99	Trucks	2	Heavys	0	Totals	101
Totals	708	Totals	6	Totals	0		



North Shore Blvd E



Heavys	0
Trucks	1
Cars	142
Totals	143
Heavys	0
Trucks	3
Cars	498
Totals	501
Heavys	0
Trucks	0
Cars	48
Totals	48
Heavys	0
Trucks	4
Cars	688
Totals	688



Lakeshore Rd

Lakeshore Rd



Cars	659	Trucks	9	Heavys	0	Totals	668
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Peds Cross: \times
West Peds: 7
West Entering: 692
West Leg Total: 1438

Cars	194	Cars	29	51	84	164
Trucks	3	Trucks	1	0	2	3
Heavys	0	Heavys	0	0	0	0
Totals	197	Totals	30	51	86	



Peds Cross: \times
South Peds: 10
South Entering: 167
South Leg Total: 364

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1905300010
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 1
Count date: 2-Mar-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 2993
 North Entering: 1616
 North Peds: 55
 Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	7	2	13	22
Cars	886	294	414	1594
Totals	893	296	427	



Heavys	0
Trucks	15
Cars	1362
Totals	1377

East Leg Total: 6749
 East Entering: 3516
 East Peds: 74
 Peds Cross: \bowtie

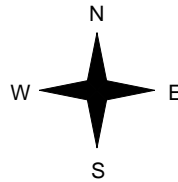
Heavys	Trucks	Cars	Totals
0	30	3525	3555



North Shore Blvd E



Maple Ave



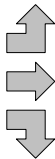
Cars	Trucks	Heavys	Totals
445	11	0	456
2505	14	0	2519
530	11	0	541
3480	36	0	



Lakeshore Rd



Heavys	Trucks	Cars	Totals
0	4	666	670
0	14	2332	2346
0	8	190	198
0	26	3188	



Lakeshore Rd



Cars	Trucks	Heavys	Totals
3195	38	0	3233

Peds Cross: \bowtie
 West Peds: 37
 West Entering: 3214
 West Leg Total: 6769

Cars	1014	Cars	134	251	449	834
Trucks	21	Trucks	9	0	11	20
Heavys	0	Heavys	0	0	0	0
Totals	1035	Totals	143	251	460	



Peds Cross: \bowtie
 South Peds: 40
 South Entering: 854
 South Leg Total: 1889

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Lakeshore Rd Count Date: 2-Mar-19 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0	
12:00:00	76	62	150	288	10	454	12:00:00	26	45	95	166	10	
13:00:00	88	58	177	323	10	498	13:00:00	28	52	95	175	9	
14:00:00	95	67	165	327	9	500	14:00:00	25	60	88	173	5	
15:00:00	89	47	203	339	13	509	15:00:00	29	48	93	170	8	
16:00:00	79	62	198	339	13	509	16:00:00	35	46	89	170	8	
Totals:						2470	Totals:						40

East Approach Totals						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0	
12:00:00	102	512	89	703	14	1295	12:00:00	105	450	37	592	12	
13:00:00	107	514	96	717	16	1394	13:00:00	152	481	44	677	4	
14:00:00	105	477	90	672	9	1347	14:00:00	140	493	42	675	7	
15:00:00	100	492	93	685	17	1382	15:00:00	137	514	46	697	9	
16:00:00	127	524	88	739	18	1312	16:00:00	136	408	29	573	5	
Totals:						6730	Totals:						37

Calculated Values for Traffic Crossing Major Street

Hours Ending:	0:00	0:00	11:00	12:00	13:00	14:00	15:00	16:00
Crossing Values:	0	0	0	190	194	203	192	199

Appendix C – Signal Timing Plans

Intersection Name: Lakeshore @ Maple	TS ID: 132	Line No: 1	Model: ACS/3	IP address: 172.22.38.2	Controller Make: Econolite
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Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by EN
	Y	M	D		
6	2016	11	2	Revert back to original timings	

PHASE DESCRIPTION

Ph1	WBLT - Lakeshore Road	Ph5	EBLT - Lakeshore Road
Ph2	EB - Lakeshore Road	Ph6	WB - Lakeshore Road
Ph3	SBLT - Maple Avenue	Ph7	NBLT - Maple Avenue
Ph4	NB - Maple Avenue	Ph8	SB - Maple Avenue

PHASE IN USE/EXCLUSIVE PED (MM) * - 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use	X	X	X	X	X	X	X	X
Exclusive PED								

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1	Phase:							
Minimum Green	1	2	3	4	5	6	7	8
	6	8	6	8	6	8	6	8
Walk		12		8		12		8
Ped. Clearance		19		24		19		24
Pedestrian Carry Over								
Vehicle Extension	3	3	3	3	3	3	3	3
MAX 1	12	35	12	25	12	35	12	25
MAX 2	12	35	12	25	12	35	12	25
Yellow Change	3	4	3	4	3	4	3	4
Red Clearance	0	2	0	3	0	2	0	3
Phase Minimum:	10	38	10	40	10	38	10	40

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN

*** - 3 - 2, - 3 - 3**

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	110	25	1	1	10	48	10	42	18	40	10	42
2	100	10	1	2	10	38	10	42	10	38	10	42
3	120	110	1	3	15	49	12	44	15	49	12	44
4	100	44	1	4	10	38	10	42	10	38	10	42
10	0	0	1	10	0	0	0	0	0	0	0	0

TIME BASE: ACTION PLAN, DAY PLAN

*** - 5 - 2, - 5 - 3, - 5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	1	07:00	1	1	
1	1	2	09:00	2	1	Schedule 1 = Day Plan 1
1	1	3	15:30	3	1	Schedule 2 = Day Plan 2
1	1	4	19:00	4	1	Schedule 3 = Day Plan 3
1	1	10	22:00	254	1	
2	2	1	07:00	1	1	Day Plan 1 (Weekday)
2	2	10	23:00	254	1	Day Plan 2 (Saturday)
3	3	1	08:30	1	1	Day Plan 3 (Sunday, Holidays)
3	3	10	22:00	254	1	
						Action Plan 10 = free (254)

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS

*** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN

*** - 3 - 2, - 3 - 3**

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	110	5	1	1	11	59		40		70		40
2	100	94	1	2	11	49		40		60		40
3	120	116	1	3	11	69		40		80		40
4	90	7	1	4	13	38		39		38		39
10	0	0	1	10	0	0		0		0		0

TIME BASE: ACTION PLAN, DAY PLAN

*** - 5 - 2, - 5 - 3, - 5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	4	06:30	4	1	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)
1	1	1	07:00	1	1	
1	1	2	09:00	2	1	
1	1	3	15:30	3	1	
1	1	4	19:00	4	1	
1	1	10	22:00	254	1	
2	2	1	07:00	4	1	
2	2	10	23:00	254	1	
3	3	1	8:30	1	1	
3	3	10	22:00	254	1	

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS

*** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name: Northshore Blvd @ QEW West Ra	TS ID: 135	Line No: 3	Model: ACS/3	IP address: 172.22.33.2	Controller Make: Econolite
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Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by MA
	Y	M	D		
1	2017	9	13	Dropped to Local during AM and Off peak period	

PHASE DESCRIPTION

Ph1		Ph5	EBLT - Northshore Blvd
Ph2	EB - Northshore Blvd	Ph6	WB - Northshore Blvd
Ph3		Ph7	
Ph4		Ph8	NB - QEW West Ramp

PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use		X			X	X		X
Exclusive PED								

CONTROLLER TIMING DATA - VEHICLE TIMING *- 2 - 1

Timing Plan: 1	Phase:							
Minimum Green	1	2	3	4	5	6	7	8
		8			6	8		8
Walk		8				8		8
Ped. Clearance		20				20		10
Pedestrian Carry Over								
Vehicle Extension		3			3	3		5
MAX 1		35			10	35		25
MAX 2		35			10	35		25
Yellow Change		4			3	4		4
Red Clearance		2				2		3
Phase Minimum:	1	35	1	1	10	35	1	26

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS *- 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN * - 3 - 2, - 3 - 3

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)								
					1	2	3	4	5	6	7	8	
1	95	0	1	1		62			12	50			33
2	100	56	1	2		72			11	61			28
3	120	2	1	3		92			11	81			28
4	90	1	1	4		62			11	51			28
10	0	0		10		0			0	0			0

TIME BASE: ACTION PLAN, DAY PLAN * - 5 - 2, - 5 - 3, - 5 - 4

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	10	06:30	254	1	
1	1	10	07:00	254	1	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3
1	1	10	09:00	254	1	
1	1	3	15:30	3	1	
1	1	10	19:00	254	1	Day Plan 1 (Weekday)
1	1	10	22:00	254	1	Day Plan 2 (Saturday)
2	2	1	07:00	1	1	Day Plan 3 (Sunday, Holidays)
2	2	10	23:00	254	1	
3	3	1	8:30	1	1	
3	3	10	22:00	254	1	Action Plan 10 = free (254)

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS * - 5 - 5

Events	Exception Day	MON/	DOW/	WOM/	Day Plan
New Year's Day	1 Fixed	1	1	0	3
Family Day	2 Float	2	2	3	3
Good Friday	3 Float	4	6	1	3
Victoria Day	4 Float	5	2	3	3
Canada Day	5 Fixed	7	1	0	3
Civic Day	6 Float	8	2	1	3
Labour Day	7 Float	9	2	1	3
Thanksgiving	8 Float	10	2	2	3
Christmas Day	9 Fixed	12	25	0	3

Appendix D – Start-up Lost Time Field Data

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04			0:00:06
2					0:00:00
3					0:00:00
4	0:00:03	0:00:10			0:00:13
5	0:00:04				0:00:04
6					0:00:00
7	0:00:04				0:00:04
8					0:00:00
9					0:00:00
10	0:00:03				0:00:03
11	0:00:03	0:00:06			0:00:09
12	0:00:02				0:00:02
13					0:00:00
14	0:00:05				0:00:05
15	0:00:02				0:00:02
16	0:00:03				0:00:03
				Grand Total	0:00:51

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:04	0:00:06	0:00:06	0:00:09	0:00:25
2	0:00:02	0:00:02	0:00:04	0:00:05	0:00:13
3	0:00:01	0:00:02	0:00:04	0:00:05	0:00:12
4	0:00:02	0:00:03	0:00:03	0:00:05	0:00:13
5	0:00:01	0:00:03			0:00:04
6	0:00:01	0:00:02	0:00:03	0:00:06	0:00:12
7	0:00:02	0:00:04	0:00:05	0:00:06	0:00:17
8	0:00:02	0:00:03	0:00:04	0:00:04	0:00:13
9	0:00:02	0:00:02	0:00:05		0:00:09
10	0:00:02	0:00:04	0:00:05	0:00:09	0:00:20
11	0:00:01	0:00:01	0:00:07	0:00:09	0:00:18
12	0:00:02	0:00:02	0:00:03	0:00:04	0:00:11
13	0:00:03	0:00:03	0:00:05	0:00:05	0:00:16
14	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
15	0:00:02	0:00:03	0:00:05		0:00:10
16					0:00:00
				Grand Total	0:03:30

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:02	0:00:05			0:00:07
3					0:00:00
4	0:00:05				0:00:05
5					0:00:00
6					0:00:00
7	0:00:02				0:00:02
8					0:00:00
9	0:00:04	0:00:04			0:00:08
10					0:00:00
11					0:00:00
12					0:00:00
13	0:00:03				0:00:03
14	0:00:05				0:00:05
15					0:00:00
16	0:00:03				0:00:03
Grand Total					0:00:33

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:06			0:00:08
2	0:00:01	0:00:03			0:00:04
3	0:00:02	0:00:03	0:00:05		0:00:10
4	0:00:02	0:00:03	0:00:04	0:00:05	0:00:14
5	0:00:02				0:00:02
6	0:00:02	0:00:02	0:00:04	0:00:07	0:00:15
7	0:00:02	0:00:02	0:00:04		0:00:08
8	0:00:03	0:00:04			0:00:07
9	0:00:02	0:00:04			0:00:06
10	0:00:01	0:00:03	0:00:05		0:00:09
11	0:00:01	0:00:02	0:00:03	0:00:04	0:00:10
12	0:00:02	0:00:02			0:00:04
13	0:00:03	0:00:04	0:00:07	0:00:11	0:00:25
14	0:00:03	0:00:03	0:00:04	0:00:05	0:00:15
15	0:00:06				0:00:06
16					0:00:00
				Grand Total	0:02:23

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:04	0:00:05	0:00:09	0:00:10	0:00:28
2	0:00:02	0:00:05	0:00:07	0:00:08	0:00:22
3	0:00:02	0:00:02	0:00:05		0:00:09
4	0:00:02	0:00:02	0:00:05	0:00:06	0:00:15
5	0:00:04	0:00:10	0:00:10		0:00:24
6	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
7	0:00:02	0:00:05	0:00:06		0:00:13
8	0:00:02	0:00:06	0:00:08	0:00:09	0:00:25
9	0:00:02	0:00:05	0:00:07	0:00:07	0:00:21
10	0:00:02	0:00:04			0:00:06
11	0:00:01	0:00:03	0:00:04	0:00:06	0:00:14
12	0:00:02	0:00:02	0:00:03		0:00:07
13	0:00:02	0:00:02	0:00:03	0:00:04	0:00:11
14	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
15	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
16	0:00:02	0:00:03	0:00:04	0:00:06	0:00:15
Grand Total					0:04:29

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05	0:00:07		0:00:14
2	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
3	0:00:02	0:00:02	0:00:04	0:00:06	0:00:14
4	0:00:02	0:00:05	0:00:07	0:00:07	0:00:21
5	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
6	0:00:02	0:00:04	0:00:09	0:00:10	0:00:25
7	0:00:01	0:00:02	0:00:03	0:00:05	0:00:11
8	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
9	0:00:01	0:00:02	0:00:03	0:00:03	0:00:09
10	0:00:02	0:00:02	0:00:02	0:00:04	0:00:10
11	0:00:02	0:00:02	0:00:04	0:00:05	0:00:13
12	0:00:02	0:00:02	0:00:03		0:00:07
13	0:00:02	0:00:03	0:00:04	0:00:07	0:00:16
14	0:00:02	0:00:02	0:00:04	0:00:07	0:00:15
15	0:00:02	0:00:04	0:00:06	0:00:07	0:00:19
16	0:00:01	0:00:02	0:00:02	0:00:03	0:00:08
				Grand Total	0:03:53

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:04	0:00:09	0:00:11		0:00:24
2	0:00:03				0:00:03
3	0:00:02	0:00:05			0:00:07
4	0:00:02				0:00:02
5	0:00:04	0:00:10	0:00:12		0:00:26
6	0:00:02				0:00:02
7	0:00:02	0:00:04	0:00:08		0:00:14
8	0:00:01	0:00:07	0:00:09	0:00:11	0:00:28
9	0:00:04	0:00:07			0:00:11
10	0:00:02	0:00:04	0:00:06	0:00:06	0:00:18
11	0:00:02	0:00:02			0:00:04
12	0:00:02	0:00:05			0:00:07
13	0:00:02	0:00:04	0:00:04	0:00:06	0:00:16
14	0:00:02				0:00:02
15	0:00:02	0:00:02	0:00:04		0:00:08
16	0:00:02	0:00:04			0:00:06
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:02:58

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:05			0:00:08
2	0:00:02	0:00:02	0:00:04	0:00:06	0:00:14
3	0:00:02	0:00:02	0:00:04	0:00:05	0:00:13
4	0:00:02	0:00:02	0:00:04	0:00:04	0:00:12
5	0:00:02	0:00:04	0:00:05	0:00:09	0:00:20
6	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
7	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
8	0:00:02	0:00:02	0:00:04	0:00:06	0:00:14
9	0:00:02	0:00:03	0:00:04	0:00:05	0:00:14
10	0:00:02	0:00:02	0:00:04	0:00:06	0:00:14
11	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
12	0:00:02	0:00:02	0:00:02	0:00:03	0:00:09
13	0:00:02	0:00:08	0:00:10	0:00:11	0:00:31
14	0:00:02	0:00:02	0:00:04	0:00:04	0:00:12
15	0:00:03	0:00:04	0:00:05	0:00:08	0:00:20
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:03:54

Ontario Traffic Inc - Start-Up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	00:00:03	00:00:05	00:00:08		00:00:16
2	00:00:03	00:00:06			00:00:09
3	00:00:02	00:00:05	00:00:09		00:00:16
4	00:00:04	00:00:07	00:00:09	00:00:12	00:00:32
5	00:00:03	00:00:05	00:00:08		00:00:16
6	00:00:03	00:00:05	00:00:07	00:00:09	00:00:24
7	00:00:03				00:00:03
8	00:00:04	00:00:05	00:00:07		00:00:16
9	00:00:02	00:00:04	00:00:08		00:00:14
10	00:00:01	00:00:03	00:00:05	00:00:08	00:00:17
11	00:00:03	00:00:05			00:00:08
12	00:00:02	00:00:06			00:00:08
13	00:00:02	00:00:04	00:00:06	00:00:10	00:00:22
14	00:00:03	00:00:06	00:00:08	00:00:10	00:00:27
15	00:00:02	00:00:05			00:00:07
16	00:00:01	00:00:03	00:00:06	00:00:09	00:00:19
17	00:00:03				00:00:03
Grand Total					00:04:17

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:02	0:00:03	0:00:07		0:00:12
3	0:00:07	00:00:010			0:00:07
4	0:00:03	0:00:03	0:00:05		0:00:11
5	0:00:03	0:00:04	0:00:06		0:00:13
6	0:00:01	0:00:02	0:00:04	0:00:05	0:00:12
7	0:00:04	0:00:06	0:00:07	0:00:08	0:00:25
8	0:00:03	0:00:06	0:00:07		0:00:16
9	0:00:01	0:00:03	0:00:05		0:00:09
10	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
11					0:00:00
12	0:00:02	0:00:03	0:00:05		0:00:10
13	0:00:04	0:00:04			0:00:08
14	0:00:03	0:00:05	0:00:07	0:00:08	0:00:23
15	0:00:02	0:00:03	0:00:04	0:00:06	0:00:15
16					0:00:00
17	0:00:02	0:00:05	0:00:06	0:00:08	0:00:21
				Grand Total	0:03:24

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:02	0:00:02	0:00:04	0:00:04	0:00:12
3	0:00:02	0:00:05	0:00:06	0:00:07	0:00:20
4	0:00:02	0:00:03	0:00:05		0:00:10
5	0:00:03	0:00:04	0:00:05		0:00:12
6	0:00:02	0:00:02	0:00:04	0:00:04	0:00:12
7	0:00:03	0:00:04	0:00:05	0:00:07	0:00:19
8	0:00:02	0:00:04	0:00:06		0:00:12
9	0:00:03	0:00:05			0:00:08
10	0:00:03	0:00:05	0:00:07	0:00:08	0:00:23
11					0:00:00
12	0:00:02	0:00:04	0:00:07		0:00:13
13	0:00:04	0:00:04	0:00:05	0:00:08	0:00:21
14	0:00:02	0:00:05			0:00:07
15	0:00:02	0:00:02	0:00:06	0:00:07	0:00:17
16	0:00:03	0:00:06			0:00:09
17	0:00:04	0:00:06	0:00:07		0:00:17
			Grand Total		0:03:32

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:02	0:00:03	0:00:05	0:00:11
2	0:00:03	0:00:05			0:00:08
3	0:00:02				0:00:02
4	0:00:03	0:00:07			0:00:10
5					0:00:00
6	0:00:02				0:00:02
7	0:00:02	0:00:05			0:00:07
8	0:00:01	0:00:03	0:00:04		0:00:08
9	0:00:02	0:00:04	0:00:06		0:00:12
10	0:00:01				0:00:01
11	0:00:03	0:00:05	0:00:05	0:00:06	0:00:19
12	0:00:03				0:00:03
13	0:00:02	0:00:04	0:00:08		0:00:14
14	0:00:02	0:00:03			0:00:05
15					0:00:00
16	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
17	0:00:02	0:00:04			0:00:06
18					0:00:00
19	0:00:02	0:00:04	0:00:05		0:00:11
20					0:00:00
21	0:00:02	0:00:03	0:00:06		0:00:11
22	0:00:02				0:00:02
23	0:00:01	0:00:02			0:00:03
24					0:00:00
25	0:00:01	0:00:04			0:00:05
26	0:00:01	0:00:03	0:00:06	0:00:08	0:00:18
27	0:00:02	0:00:04			0:00:06
28	0:00:02	0:00:05			0:00:07
29	0:00:01	0:00:03	0:00:05		0:00:09
	Grand Total				0:02:32

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:06	0:00:08		0:00:17
2					0:00:00
3	0:00:01				0:00:01
4	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
5	0:00:03	0:00:05	0:00:06		0:00:14
6	0:00:02	0:00:03	0:00:05		0:00:10
7	0:00:03	0:00:06	0:00:08	0:00:09	0:00:26
8	0:00:01	0:00:03	0:00:04		0:00:08
9					0:00:00
10	0:00:02				0:00:02
11	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
12	0:00:01	0:00:03			0:00:04
13	0:00:02	0:00:04			0:00:06
14	0:00:02	0:00:03	0:00:05		0:00:10
15	0:00:01	0:00:04			0:00:05
16					0:00:00
17	0:00:02	0:00:04			0:00:06
18	0:00:02	0:00:05	0:00:07	0:00:10	0:00:24
19	0:00:02	0:00:03			0:00:05
20	0:00:01	0:00:03	0:00:05		0:00:09
21	0:00:01	0:00:03	0:00:05	0:00:07	0:00:16
22					0:00:00
23	0:00:02	0:00:05	0:00:08		0:00:15
24					0:00:00
25	0:00:02				0:00:02
26	0:00:02	0:00:04	0:00:05	0:00:09	0:00:20
27	0:00:03	0:00:06	0:00:08		0:00:17
28					0:00:00
29	0:00:02				0:00:02
				Grand Total	0:03:38

Ontario Traffic Inc - Start-Up Lost Time

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	00:00:02	00:00:04			00:00:06
2	00:00:03				00:00:03
3	00:00:03	00:00:06	00:00:08	00:00:10	00:00:27
4	00:00:03	00:00:05			00:00:08
5	00:00:02	00:00:04	00:00:07		00:00:13
6	00:00:02	00:00:03	00:00:06		00:00:11
7	00:00:02	00:00:04	00:00:07	00:00:09	00:00:22
8	00:00:02	00:00:04			00:00:06
9	00:00:03	00:00:05	00:00:07		00:00:15
10	00:00:02				00:00:02
11	00:00:04	00:00:07	00:00:10	00:00:12	00:00:33
12	00:00:02	00:00:05			00:00:07
13	00:00:02	00:00:04	00:00:06		00:00:12
14	00:00:01	00:00:03	00:00:06	00:00:09	00:00:19
15	00:00:01	00:00:03			00:00:04
16	00:00:03	00:00:06	00:00:08		00:00:17
17	00:00:02				00:00:02
18	00:00:02				00:00:02
19	00:00:03	00:00:06	00:00:08	00:00:11	00:00:28
20	00:00:03	00:00:06			00:00:09
21	00:00:01				00:00:01
22	00:00:02	00:00:05	00:00:07	00:00:10	00:00:24
23	00:00:03	00:00:06			00:00:09
24	00:00:02	00:00:05	00:00:07		00:00:14
25	00:00:03	00:00:04			00:00:07
26	00:00:03				00:00:03
27	00:00:02	00:00:05	00:00:08	00:00:10	00:00:25
28	00:00:02	00:00:04			00:00:06
29	00:00:03	00:00:05	00:00:07		00:00:15
Grand Total					0:04:54

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05	0:00:08	0:00:10	0:00:25
2	0:00:02	0:00:04			0:00:06
3	0:00:03	0:00:06			0:00:09
4	0:00:03	0:00:06	0:00:08	0:00:09	0:00:26
5					0:00:00
6	0:00:02				0:00:02
7	0:00:04				0:00:04
8	0:00:03	0:00:04	0:00:08	0:00:10	0:00:25
9	0:00:03				0:00:03
10	0:00:04				0:00:04
11	0:00:03	0:00:05	0:00:07		0:00:15
12	0:00:03	0:00:05			0:00:08
13	0:00:03	0:00:04	0:00:06	0:00:08	0:00:21
14	0:00:01	0:00:03	0:00:06		0:00:10
15	0:00:04	0:00:06	0:00:08	0:00:10	0:00:28
16	0:00:03	0:00:06	0:00:08		0:00:17
			Grand Total		0:03:23

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:06	0:00:08		0:00:16
2	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
3	0:00:01				0:00:01
4	0:00:02	0:00:04			0:00:06
5	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
6	0:00:01	0:00:03			0:00:04
7	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
8	0:00:02				0:00:02
9	0:00:02	0:00:02	0:00:05	0:00:05	0:00:14
10	0:00:01	0:00:02	0:00:05		0:00:08
11	0:00:04	0:00:06			0:00:10
12	0:00:01	0:00:02			0:00:03
13	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
14	0:00:02	0:00:05	0:00:06	0:00:07	0:00:20
15	0:00:02	0:00:03			0:00:05
16	0:00:02	0:00:03	0:00:05	0:00:05	0:00:15
			Grand Total		0:02:51

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:08			0:00:11
2	0:00:02				0:00:02
3	0:00:03				0:00:03
4	0:00:03				0:00:03
5					0:00:00
6	0:00:02				0:00:02
7					0:00:00
8					0:00:00
9	0:00:03				0:00:03
10					0:00:00
11	0:00:02				0:00:02
12	0:00:04				0:00:04
13	0:00:02				0:00:02
14					0:00:00
15					0:00:00
16					0:00:00
Grand Total					0:00:32

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:03	0:00:04	0:00:05	0:00:14
2	0:00:01	0:00:03	0:00:03	0:00:05	0:00:12
3	0:00:01	0:00:02	0:00:05	0:00:06	0:00:14
4	0:00:02	0:00:02	0:00:03	0:00:04	0:00:11
5	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
6	0:00:02	0:00:02			0:00:04
7	0:00:01	0:00:02	0:00:02	0:00:04	0:00:09
8	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
9	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
10	0:00:02	0:00:03			0:00:05
11	0:00:03	0:00:03	0:00:05	0:00:07	0:00:18
12	0:00:01	0:00:02	0:00:02	0:00:04	0:00:09
13	0:00:03	0:00:03	0:00:05	0:00:05	0:00:16
14	0:00:03	0:00:05	0:00:06	0:00:08	0:00:22
15	0:00:02	0:00:02	0:00:05	0:00:06	0:00:15
16	0:00:04	0:00:04	0:00:06	0:00:07	0:00:21
				Grand Total	0:03:45

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
2	0:00:01	0:00:07			0:00:08
3	0:00:01	0:00:03	0:00:05	0:00:07	0:00:16
4					0:00:00
5	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
6	0:00:02	0:00:04	0:00:06		0:00:12
7	0:00:02	0:00:02			0:00:04
8	0:00:02	0:00:04			0:00:06
9	0:00:01	0:00:02	0:00:03	0:00:05	0:00:11
10	0:00:01	0:00:04	0:00:06	0:00:09	0:00:20
11	0:00:04	0:00:05	0:00:08	0:00:09	0:00:26
12	0:00:01	0:00:05	0:00:06		0:00:12
13	0:00:01	0:00:02	0:00:03	0:00:03	0:00:09
14	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
15	0:00:01	0:00:02	0:00:02	0:00:03	0:00:08
16	0:00:01	0:00:01	0:00:01	0:00:03	0:00:06
17	0:00:01	0:00:02	0:00:04	0:00:06	0:00:13
18	0:00:02	0:00:04			0:00:06
			Grand Total		0:03:19

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:02	0:00:05	0:00:08	0:00:17
2	0:00:02	0:00:03	0:00:04	0:00:06	0:00:15
3	0:00:02	0:00:04	0:00:06	0:00:11	0:00:23
4	0:00:03	0:00:04	0:00:06	0:00:09	0:00:22
5	0:00:02	0:00:03	0:00:04	0:00:05	0:00:14
6	0:00:01	0:00:02	0:00:07	0:00:08	0:00:18
7	0:00:01	0:00:05	0:00:07		0:00:13
8	0:00:03	0:00:08	0:00:10	0:00:11	0:00:32
9	0:00:02	0:00:04	0:00:08	0:00:09	0:00:23
10	0:00:02	0:00:03	0:00:03	0:00:05	0:00:13
11	0:00:01	0:00:03	0:00:04	0:00:07	0:00:15
12	0:00:02	0:00:09	0:00:10	0:00:12	0:00:33
13	0:00:01	0:00:02	0:00:03	0:00:05	0:00:11
14	0:00:01	0:00:03	0:00:04	0:00:06	0:00:14
15	0:00:02	0:00:06	0:00:08	0:00:11	0:00:27
16	0:00:01	0:00:02	0:00:03	0:00:04	0:00:10
17	0:00:02	0:00:03	0:00:05	0:00:08	0:00:18
18	0:00:02				0:00:02
Grand Total					0:05:00

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05	0:00:07		0:00:14
2	0:00:02	0:00:04	0:00:09	0:00:11	0:00:26
3	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
4	0:00:02	0:00:04	0:00:06		0:00:12
5	0:00:02	0:00:07	0:00:10	0:00:11	0:00:30
6	0:00:02	0:00:04	0:00:06		0:00:12
7	0:00:02	0:00:03	0:00:04	0:00:06	0:00:15
8	0:00:01	0:00:02			0:00:03
9	0:00:02	0:00:05	0:00:07	0:00:07	0:00:21
10	0:00:02	0:00:02	0:00:04	0:00:05	0:00:13
11	0:00:01	0:00:02			0:00:03
12	0:00:02	0:00:02	0:00:04	0:00:06	0:00:14
13	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
14					0:00:00
15					0:00:00
16	0:00:02	0:00:04			0:00:06
17	0:00:01	0:00:02			0:00:03
18	0:00:02	0:00:03	0:00:04		0:00:09
			Grand Total		0:03:40

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:02	0:00:04	0:00:04	0:00:12
2	0:00:01	0:00:02	0:00:03	0:00:03	0:00:09
3	0:00:02	0:00:05	0:00:07	0:00:10	0:00:24
4	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
5	0:00:02	0:00:03	0:00:04	0:00:07	0:00:16
6	0:00:02	0:00:05	0:00:07	0:00:07	0:00:21
7	0:00:02	0:00:05	0:00:07	0:00:07	0:00:21
8	0:00:04	0:00:06	0:00:08	0:00:10	0:00:28
9	0:00:01	0:00:02	0:00:03	0:00:05	0:00:11
10	0:00:01	0:00:01	0:00:01	0:00:02	0:00:05
11	0:00:02	0:00:03	0:00:04	0:00:05	0:00:14
12	0:00:01	0:00:04	0:00:06	0:00:08	0:00:19
13	0:00:01	0:00:02	0:00:07	0:00:07	0:00:17
14	0:00:01	0:00:03	0:00:04	0:00:05	0:00:13
15	0:00:02	0:00:05	0:00:08	0:00:09	0:00:24
16	0:00:01	0:00:03	0:00:05	0:00:07	0:00:16
17	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
18	0:00:02	0:00:03	0:00:03	0:00:04	0:00:12
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:04:59

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
2	0:00:04	0:00:07	0:00:09	0:00:11	0:00:31
3	0:00:03	0:00:06	0:00:09	0:00:10	0:00:28
4	0:00:05	0:00:07	0:00:08	0:00:10	0:00:30
5	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
6	0:00:02	0:00:04	0:00:07		0:00:13
7	0:00:04	0:00:06	0:00:08	0:00:11	0:00:29
8	0:00:04	0:00:06	0:00:09	0:00:12	0:00:31
9	0:00:04	0:00:06	0:00:08	0:00:10	0:00:28
10	0:00:03	0:00:05	0:00:08	0:00:11	0:00:27
11	0:00:04	0:00:06	0:00:08		0:00:18
12	0:00:04	0:00:06	0:00:07	0:00:10	0:00:27
13	0:00:03	0:00:05	0:00:07		0:00:15
14	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
15	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
				Grand Total	0:06:13

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:03	0:00:06			0:00:09
3	0:00:03				0:00:03
4					0:00:00
5	0:00:03	0:00:06	0:00:09		0:00:18
6	0:00:04				0:00:04
7	0:00:03	0:00:05			0:00:08
8	0:00:02	0:00:04	0:00:05	0:00:06	0:00:17
9	0:00:02				0:00:02
10	0:00:03	0:00:04			0:00:07
11					0:00:00
12	0:00:05	0:00:07	0:00:09		0:00:21
13	0:00:04	0:00:04			0:00:08
14	0:00:03	0:00:06	0:00:07	0:00:08	0:00:24
15					0:00:00
				Grand Total	0:02:01

Ontario Traffic Inc - Start-Up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	00:00:02	00:00:05			00:00:07
2	00:00:02	00:00:04	00:00:06	00:00:09	00:00:21
3	00:00:02	00:00:03	00:00:06	00:00:08	00:00:19
4	00:00:03	00:00:06			00:00:09
5	00:00:02	00:00:03	00:00:05	00:00:07	00:00:17
6	00:00:01	00:00:03			00:00:04
7	00:00:03				00:00:03
8	00:00:02	00:00:03			00:00:05
9	00:00:03	00:00:03	00:00:05	00:00:08	00:00:19
10	00:00:01	00:00:02	00:00:04		00:00:07
11	00:00:02	00:00:03	00:00:04	00:00:07	00:00:16
12	00:00:01	00:00:03			00:00:04
13	00:00:02	00:00:03	00:00:05	00:00:05	00:00:15
14	00:00:02	00:00:03			00:00:05
15					00:00:00
Grand Total					00:02:31

Ontario Traffic Inc - Start-Up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	00:00:04	00:00:05	00:00:07	00:00:08	00:00:24
2	00:00:03	00:00:06	00:00:08		00:00:17
3	00:00:02	00:00:03			00:00:05
4	00:00:02				00:00:02
5	00:00:02	00:00:04	00:00:05	00:00:06	00:00:17
6	00:00:01	00:00:02			00:00:03
7	00:00:03	00:00:04	00:00:06	00:00:08	00:00:21
8	00:00:02	00:00:03	00:00:05	00:00:09	00:00:19
9	00:00:01	00:00:03	00:00:04	00:00:05	00:00:13
10	00:00:02				00:00:02
11	00:00:03	00:00:05	00:00:06		00:00:14
12	00:00:03	00:00:05			00:00:08
13	00:00:02	00:00:04			00:00:06
14	00:00:02	00:00:03	00:00:05	00:00:07	00:00:17
15	00:00:03	00:00:06			00:00:09
16	00:00:02	00:00:03	00:00:05		00:00:10
			Grand Total		00:03:07

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:06	0:00:08		0:00:17
2					0:00:00
3	0:00:03	0:00:05	0:00:07	0:00:08	0:00:23
4	0:00:02	0:00:04	0:00:05	0:00:06	0:00:17
5	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
6	0:00:03	0:00:05			0:00:08
7	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
8	0:00:02	0:00:03	0:00:05		0:00:10
9	0:00:02				0:00:02
10	0:00:03	0:00:06			0:00:09
11					0:00:00
12	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
13	0:00:02	0:00:04	0:00:06		0:00:12
14					0:00:00
15	0:00:03	0:00:05	0:00:07	0:00:08	0:00:23
16	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
Grand Total					0:03:22

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:04	0:00:07	0:00:09	0:00:11	0:00:31
2	0:00:01	0:00:05	0:00:07		0:00:13
3	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
4	0:00:03	0:00:06	0:00:08	0:00:10	0:00:27
5	0:00:04	0:00:06	0:00:09	0:00:12	0:00:31
6	0:00:03	0:00:05	0:00:07		0:00:15
7	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
8	0:00:02	0:00:04	0:00:06		0:00:12
9	0:00:03	0:00:04	0:00:07	0:00:10	0:00:24
10	0:00:01	0:00:04			0:00:05
11	0:00:02	0:00:04	0:00:07	0:00:08	0:00:21
12	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
13	0:00:04				0:00:04
14	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
15	0:00:02	0:00:04	0:00:07		0:00:13
16	0:00:03	0:00:05	0:00:08	0:00:11	0:00:27
Grand Total					0:05:08

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:01				0:00:01
3	0:00:02				0:00:02
4	0:00:03	0:00:06	0:00:09		0:00:18
5	0:00:02				0:00:02
6	0:00:02	0:00:06	0:00:09		0:00:17
7	0:00:02				0:00:02
8					0:00:00
9					0:00:00
10	0:00:03				0:00:03
11	0:00:01	0:00:04			0:00:05
12	0:00:04	0:00:06			0:00:10
				Grand Total	0:01:00

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:03	0:00:04		0:00:09
2	0:00:01	0:00:02	0:00:04	0:00:06	0:00:13
3	0:00:04	0:00:05	0:00:07	0:00:09	0:00:25
4	0:00:03	0:00:04	0:00:06	0:00:07	0:00:20
5	0:00:02				0:00:02
6	0:00:01	0:00:02	0:00:04	0:00:05	0:00:12
7	0:00:03	0:00:06	0:00:06	0:00:08	0:00:23
8	0:00:01	0:00:02	0:00:04	0:00:06	0:00:13
9	0:00:02	0:00:03	0:00:04	0:00:06	0:00:15
10	0:00:02	0:00:03			0:00:05
11	0:00:02	0:00:04	0:00:05	0:00:06	0:00:17
12	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
			Grand Total		0:02:54

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02				0:00:02
2					0:00:00
3					0:00:00
4	0:00:02				0:00:02
5					0:00:00
6					0:00:00
7					0:00:00
8	0:00:02				0:00:02
9					0:00:00
10					0:00:00
11					0:00:00
12					0:00:00
				Grand Total	0:00:06

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:03			0:00:05
2	0:00:02	0:00:05	0:00:07		0:00:14
3	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
4	0:00:03	0:00:03	0:00:05	0:00:06	0:00:17
5	0:00:03				0:00:03
6	0:00:02	0:00:06			0:00:08
7	0:00:03	0:00:04	0:00:07		0:00:14
8	0:00:01	0:00:02	0:00:05		0:00:08
9	0:00:02	0:00:03	0:00:05	0:00:05	0:00:15
10					0:00:00
11	0:00:02	0:00:03	0:00:04	0:00:07	0:00:16
12	0:00:01	0:00:02	0:00:03	0:00:04	0:00:10
			Grand Total		0:02:07

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05	0:00:06		0:00:13
2	0:00:03	0:00:12	0:00:13	0:00:13	0:00:41
3	0:00:01	0:00:05	0:00:09		0:00:15
4	0:00:02	0:00:04			0:00:06
5	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
6					0:00:00
7					0:00:00
8	0:00:02	0:00:06	0:00:08	0:00:10	0:00:26
9	0:00:02	0:00:05	0:00:07		0:00:14
10	0:00:02	0:00:05	0:00:06	0:00:07	0:00:20
11	0:00:02	0:00:06	0:00:08	0:00:08	0:00:24
12	0:00:01	0:00:06			0:00:07
13	0:00:03	0:00:03	0:00:04	0:00:05	0:00:15
14	0:00:02	0:00:07	0:00:09	0:00:11	0:00:29
15					0:00:00
16	0:00:01	0:00:03			0:00:04
				Grand Total	0:03:53

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
2	0:00:02	0:00:02	0:00:05	0:00:06	0:00:15
3	0:00:02	0:00:02	0:00:02	0:00:04	0:00:10
4	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
5	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
6	0:00:01	0:00:02	0:00:02	0:00:02	0:00:07
7	0:00:02	0:00:03	0:00:06		0:00:11
8	0:00:03	0:00:03	0:00:05	0:00:05	0:00:16
9	0:00:01				0:00:01
10	0:00:01	0:00:02	0:00:04	0:00:07	0:00:14
11	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
12	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
13	0:00:01	0:00:02	0:00:04	0:00:06	0:00:13
14	0:00:03	0:00:06	0:00:08		0:00:17
15	0:00:01	0:00:02	0:00:03	0:00:06	0:00:12
16	0:00:02	0:00:04	0:00:06	0:00:07	0:00:19
Grand Total					0:03:52

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06		0:00:12
2	0:00:05	0:00:06	0:00:09	0:00:10	0:00:30
3	0:00:01	0:00:09	0:00:11	0:00:13	0:00:34
4	0:00:02	0:00:05	0:00:09		0:00:16
5	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
6	0:00:02	0:00:02	0:00:04	0:00:06	0:00:14
7	0:00:02	0:00:02	0:00:04		0:00:08
8					0:00:00
9	0:00:01	0:00:01	0:00:02	0:00:03	0:00:07
10	0:00:01	0:00:02	0:00:05	0:00:08	0:00:16
11	0:00:02				0:00:02
12	0:00:01	0:00:02	0:00:04	0:00:06	0:00:13
13	0:00:02	0:00:02	0:00:04	0:00:06	0:00:14
14	0:00:02				0:00:02
15	0:00:02	0:00:04			0:00:06
16	0:00:02	0:00:02	0:00:03	0:00:03	0:00:10
Grand Total					0:03:28

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:05	0:00:10	0:00:12	0:00:30
2	0:00:01	0:00:01	0:00:01	0:00:03	0:00:06
3	0:00:01	0:00:01	0:00:02	0:00:04	0:00:08
4	0:00:03	0:00:03	0:00:04	0:00:06	0:00:16
5	0:00:01	0:00:01	0:00:01	0:00:02	0:00:05
6	0:00:02	0:00:02	0:00:03	0:00:04	0:00:11
7	0:00:03	0:00:04	0:00:06	0:00:08	0:00:21
8	0:00:01	0:00:01	0:00:03	0:00:03	0:00:08
9	0:00:01	0:00:03	0:00:04	0:00:05	0:00:13
10	0:00:01	0:00:03	0:00:05	0:00:06	0:00:15
11	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
12	0:00:02	0:00:03	0:00:03	0:00:05	0:00:13
13	0:00:02	0:00:02	0:00:05		0:00:09
14	0:00:03				0:00:03
15	0:00:02				0:00:02
16	0:00:02	0:00:02	0:00:03	0:00:05	0:00:12
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
				Grand Total	0:03:18

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:04				0:00:04
2	0:00:05	0:00:07	0:00:09	0:00:11	0:00:32
3	0:00:04	0:00:06			0:00:10
4	0:00:03	0:00:06	0:00:08	0:00:10	0:00:27
5	0:00:03				0:00:03
6	0:00:04				0:00:04
7	0:00:04	0:00:08			0:00:12
8	0:00:04	0:00:07			0:00:11
9	0:00:03	0:00:05	0:00:08		0:00:16
10	0:00:04				0:00:04
11	0:00:03	0:00:05	0:00:08		0:00:16
12	0:00:03	0:00:05			0:00:08
13	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
14	0:00:02	0:00:05			0:00:07
15	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
			Grand Total		0:03:24

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02				0:00:02
2	0:00:03	0:00:04	0:00:05		0:00:12
3	0:00:03	0:00:05			0:00:08
4	0:00:03	0:00:06	0:00:06	0:00:08	0:00:23
5	0:00:03				0:00:03
6					0:00:00
7	0:00:05				0:00:05
8	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
9	0:00:03	0:00:03	0:00:06	0:00:08	0:00:20
10	0:00:03				0:00:03
11	0:00:02				0:00:02
12	0:00:02				0:00:02
13	0:00:03	0:00:05	0:00:06	0:00:08	0:00:22
14					0:00:00
15					0:00:00
				Grand Total	0:01:59

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:02	0:00:04		0:00:08
2	0:00:03	0:00:03	0:00:05	0:00:07	0:00:18
3	0:00:03	0:00:04			0:00:07
4	0:00:01	0:00:03	0:00:04	0:00:07	0:00:15
5	0:00:01	0:00:01	0:00:02	0:00:04	0:00:08
6	0:00:01	0:00:02	0:00:03	0:00:05	0:00:11
7	0:00:03	0:00:03	0:00:05	0:00:05	0:00:16
8					0:00:00
9	0:00:02	0:00:05			0:00:07
10	0:00:02	0:00:02	0:00:04	0:00:05	0:00:13
11	0:00:02	0:00:02	0:00:05	0:00:07	0:00:16
12					0:00:00
13	0:00:02	0:00:04	0:00:04	0:00:06	0:00:16
14	0:00:02	0:00:05	0:00:05		0:00:12
15					0:00:00
				Grand Total	0:02:27

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:02	0:00:03	0:00:05	0:00:11
2	0:00:04				0:00:04
3	0:00:01	0:00:05	0:00:06	0:00:09	0:00:21
4	0:00:03	0:00:06	0:00:08	0:00:10	0:00:27
5	0:00:03	0:00:04	0:00:06	0:00:07	0:00:20
6	0:00:02	0:00:06	0:00:09	0:00:11	0:00:28
7	0:00:03	0:00:05			0:00:08
8	0:00:02	0:00:03	0:00:06		0:00:11
9	0:00:03	0:00:06			0:00:09
10	0:00:02	0:00:05	0:00:06	0:00:09	0:00:22
11	0:00:02	0:00:06			0:00:08
12	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
13	0:00:02	0:00:04	0:00:06		0:00:12
14	0:00:03	0:00:05	0:00:08	0:00:11	0:00:27
15	0:00:03	0:00:06			0:00:09
16	0:00:03	0:00:06	0:00:08	0:00:09	0:00:26
17	0:00:03				0:00:03
18	0:00:03	0:00:07			0:00:10
19	0:00:01	0:00:02			0:00:03
20	0:00:04	0:00:07	0:00:09		0:00:20
21	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
22	0:00:01	0:00:03	0:00:06	0:00:09	0:00:19
23	0:00:03	0:00:05			0:00:08
24	0:00:01	0:00:04	0:00:06		0:00:11
25	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
26	0:00:03	0:00:05	0:00:06	0:00:07	0:00:21
27	0:00:02	0:00:05	0:00:07	0:00:08	0:00:22
28	0:00:02	0:00:05			0:00:07
Grand Total					0:05:56

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05	0:00:06	0:00:08	0:00:21
2	0:00:04	0:00:06	0:00:08		0:00:18
3	0:00:04	0:00:07			0:00:11
4	0:00:03				0:00:03
5	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
6	0:00:02	0:00:03	0:00:04	0:00:06	0:00:15
7	0:00:02				0:00:02
8	0:00:03	0:00:05	0:00:08		0:00:16
9	0:00:01	0:00:04			0:00:05
10	0:00:02	0:00:04	0:00:07		0:00:13
11	0:00:02	0:00:05	0:00:06	0:00:07	0:00:20
12	0:00:03	0:00:06	0:00:08	0:00:10	0:00:27
13	0:00:02	0:00:04	0:00:06		0:00:12
14	0:00:04	0:00:06			0:00:10
15	0:00:03	0:00:06	0:00:09		0:00:18
16	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
17	0:00:03	0:00:06			0:00:09
18	0:00:02	0:00:03			0:00:05
19	0:00:02	0:00:04	0:00:06	0:00:07	0:00:19
20	0:00:01	0:00:03			0:00:04
21	0:00:03	0:00:04	0:00:06		0:00:13
22	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
23	0:00:02	0:00:05			0:00:07
24	0:00:04	0:00:07			0:00:11
25	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
26	0:00:03	0:00:06	0:00:08		0:00:17
27	0:00:01	0:00:04			0:00:05
28	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
			Grand Total		0:05:15

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:06	0:00:09	0:00:10	0:00:28
2	0:00:03				0:00:03
3	0:00:03	0:00:07	0:00:10	0:00:11	0:00:31
4	0:00:03	0:00:07			0:00:10
5	0:00:03	0:00:06	0:00:08		0:00:17
6	0:00:02	0:00:05			0:00:07
7	0:00:02	0:00:04	0:00:09	0:00:11	0:00:26
8	0:00:03	0:00:07	0:00:09		0:00:19
9	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
10	0:00:02	0:00:05			0:00:07
11	0:00:03	0:00:05	0:00:08		0:00:16
12	0:00:02	0:00:04	0:00:05		0:00:11
13	0:00:03	0:00:06			0:00:09
14	0:00:01	0:00:03	0:00:05		0:00:09
15	0:00:02	0:00:06	0:00:08	0:00:10	0:00:26
16	0:00:03	0:00:06			0:00:09
17	0:00:02	0:00:05			0:00:07
18	0:00:03	0:00:05	0:00:08	0:00:09	0:00:25
19	0:00:04	0:00:08	0:00:10	0:00:12	0:00:34
20	0:00:02	0:00:06			0:00:08
21	0:00:03				0:00:03
22	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
23	0:00:03				0:00:03
24	0:00:02	0:00:05	0:00:07		0:00:14
25	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
26	0:00:03	0:00:06	0:00:09		0:00:18
27	0:00:02	0:00:05			0:00:07
28	0:00:03	0:00:05			0:00:08
Grand Total					0:06:04

Appendix E – Saturation Flow Rate Field Data

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 16:30-17:30

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1			6.3			
2				10.3		
3		3.2				
4			5.4			
5				10.4		
6		4.1				
7					12.1	
8					12.1	
9		3.4				
10	1.4					
11			5.7			
12				9.1		
13			6.3			
14		3.8				
15			5.5			
16				9.7		
17				10.0		
18					10.7	
19				10.0		
20	2.4					
21			5.9			
22			6.2			
23				9.9		

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24					10.8	
25					10.9	
26		3.0				
27						12.4
28						15.6
29			6.7			
30				8.2		
31				8.1		

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 16:30-17:30

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21			6.3			
22		5.2				
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26						
27						
28						
29						
30						
31						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 16:30-17:30

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4	2.4					
5						
6				9.9		
7						
8						
9		5.1				
10						
11					10.3	
12						
13		3.3				
14						
15		3.8				
16						
17			7.0			
18						
19						
20	2.2					
21						
22		3.2				

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
23	1.8					
24			7.0			
25						
26						
27						
28						
29						
30						
31						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 08:00-09:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1		4.5				
2		5.4				
3						
4						
5						
6						
7						
8				7.4		
9						
10						
11						
12		3.4				
13						
14						
15	2.8					
16						
17	2.4					
18					10.2	
19						
20						
21						
22				9.2		
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						11.4
25	2.4					
26						
27						12.4
28						
29						
30	1.7					
31						
32						
33						
34						
35	1.9					
36						
37						
38						
39						
40				9.4		
41				7.7		
42					12.1	
43						
44			6.8			
45					12.7	
46						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 08:00-09:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5				6.5		
6						
7						
8						
9						
10		3.4				
11						
12						
13		2.9				
14						
15						
16						
17						
18						
19						
20						
21						
22						10.6
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26						
27			5.8			
28						
29						
30						
31						
32						
33	4.0					
34						
35						
36						
37						
38						
39	2.8					
40			5.3			
41						
42						
43						
44						
45						
46						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 08:00-09:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8			7.2			
9						
10						
11						
12		4.7				
13						
14						
15	1.8					
16						
17						
18						
19		4.4				
20		4.6				
21			9.4			
22						12.6
23	3.2					

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26						
27						
28		4.2				
29						
30						
31						
32						
33						
34						
35						
36						
37						
38				9.5		
39						
40			8.7			
41						
42			6.3			
43	2.7					
44						
45						
46		5.7				

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Saturday, March 2, 2019
Time: 12:00-13:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1					9.4	
2						
3						
4	1.4					
5						
6						
7						
8						
9		2.4				
10						13.5
11						
12	1.8					
13		4.7				
14					12.1	
15						
16						
17						
18		4.3				
19						
20						12.4
21						
22						
23		6.3				

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26						
27						
28						
29		4.6				
30		3.4				
31						
32						
33						
34						
35					10.1	
36				8.0		
37						
38						
39	3.3					
40	2.8					
41						
42						
43						
44						
45						
46						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Saturday, March 2, 2019
Time: 12:00-13:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4		2.6				
5						
6						
7	1.2					
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19	1.4					
20						
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26		2.3				
27						
28						
29						
30	1.5					
31						
32						
33						
34						
35						
36						
37						
38	1.4					
39						
40						
41						
42						
43						
44						
45						
46						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Saturday, March 2, 2019
Time: 12:00-13:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1			7.6			
2	2.9					
3						
4						
5						
6						
7						
8						
9	2.7					
10	2.4					
11						
12						
13						
14						
15		4.3				
16						
17						
18						
19						
20						
21						
22						
23		5.1				
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41		4.4				
42						
43						
44						
45						
46						
47						
48		4.7				

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 08:00-09:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1	1.6					
2	1.6					
3						
4		3.8				
5						
6						
7						
8						
9						
10						
11						
12						
13						
14		3.3				
15						
16						
17						
18						
19						
20	2.2					
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24		2.7				
25						
26			5.4			
27						
28						
29						
30				6.2		
31						
32						
33						
34						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 08:00-09:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8				6.6		
9		1.4				
10						
11						
12			4.7			
13						
14						
15						
16				5.9		
17						
18						
19		2.0				
20						
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25		2.8				
26						
27						
28						
29						
30						
31						
32						
33						
34						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 08:00-09:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1	1.5					
2						
3						
4						
5						
6			6.6			
7						
8						
9	1.7					
10		4.2				
11						
12						
13				10.6		
14						
15						
16						
17						11.2
18						
19						
20	2.2					
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26						
27						
28						
29						
30		6.5				
31					7.9	
32		4.3				
33						
34						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 16:30-17:30

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1	1.4					
2		3.8				
3			5.7			
4			6.1			
5					10.3	
6			5.8			
7				9.2		
8						
9				9.6		
10		4.2				
11						
12			5.9			
13					10.7	
14				10.1		
15			6.4			
16				9.0		
17					11.7	
18		4.8				
19			6.5			
20						
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25		4.6				
26				9.1		
27						
28			6.3			
29				8.9		
30			7.1			
31					10.4	

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 16:30-17:30

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6		2.3				
7						
8						
9						
10						
11						
12						
13						
14						
15	1.5					
16						
17						
18						
19						
20						
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25			2.9			
26						
27						
28						
29						
30						
31						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal
Date: Tuesday, February 26, 2019
Time: 16:30-17:30

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1		4.6				
2	2.1					
3					8.6	
4			5.3			
5		4.0				
6					10.7	
7				7.8		
8						
9						10.6
10					9.5	
11	2.8					
12			5.9			
13						
14						
15						
16						14.7
17					13.2	
18		8.4				
19				7.0		
20						
21						
22		4.3				
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25			4.9			
26				7.4		
27					12.5	
28						13.0
29					10.6	
30				9.5		
31						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: Saturday, March 2, 2019

Time: 12:00-13:00

All measurements are reported as
00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7			4.6			
8						
9						
10						
11						
12						
13					8.3	
14				5.5		
15						
16						
17						
18						
19						
20						
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26		3.5				
27		4.3				
28	2.2					
29						
30						
31						
32						
33						
34						
35						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: Saturday, March 2, 2019

Time: 12:00-13:00

All measurements are reported as
00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20		2.5				
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal
Date: Saturday, March 2, 2019
Time: 12:00-13:00

All measurements are reported as
 00 (full seconds) . 0 (1/10th of a second)

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12		3.2				
13						
14						
15						
16						
17						
18		5.4				
19						
20						
21						
22						
23						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
24						
25						
26						
27						
28		4.4				
29						
30						
31						
32						
33						
34						
35						

Appendix F – Existing Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Saturday Peak Hour

Appendix F – Existing Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Existing Conditions (2019)

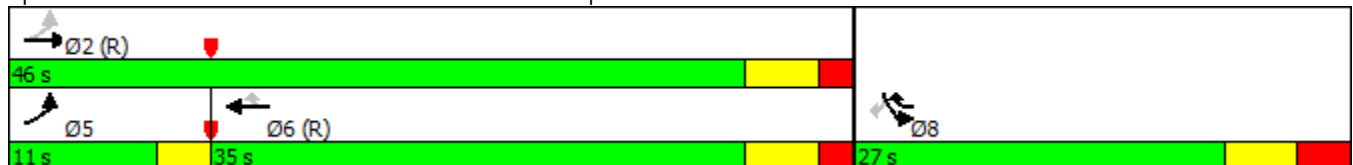


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	92	348	395	412	262	44
Future Volume (vph)	92	348	395	412	262	44
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	45.6	42.6	35.0	61.7	24.0	24.0
Actuated g/C Ratio	0.62	0.58	0.48	0.85	0.33	0.33
v/c Ratio	0.20	0.39	0.55	0.36	0.57	0.10
Control Delay	6.5	9.6	17.7	1.0	25.5	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	9.6	17.7	1.0	25.5	6.3
LOS	A	A	B	A	C	A
Approach Delay		9.0	9.2		22.7	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 11.8
 Intersection LOS: B
 Intersection Capacity Utilization 55.9%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	99	374	449	468	291	49
v/c Ratio	0.20	0.39	0.55	0.36	0.57	0.10
Control Delay	6.5	9.6	17.7	1.0	25.5	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	9.6	17.7	1.0	25.5	6.3
Queue Length 50th (m)	4.8	24.9	43.8	0.0	32.5	0.0
Queue Length 95th (m)	9.9	41.0	69.9	3.4	55.5	6.5
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	509	968	811	1288	512	478
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	0.19	0.39	0.55	0.36	0.57	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	92	348	395	412	262	44
Future Volume (vph)	92	348	395	412	262	44
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1592	1659	1692	1438	1560	1355
Flt Permitted	0.35	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	580	1659	1692	1438	1560	1355
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	99	374	449	468	291	49
RTOR Reduction (vph)	0	0	0	97	0	33
Lane Group Flow (vph)	99	374	449	371	291	16
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	31.0	51.0	20.0	20.0
Effective Green, g (s)	42.6	42.6	34.4	57.8	24.0	24.0
Actuated g/C Ratio	0.58	0.58	0.47	0.79	0.33	0.33
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	457	968	797	1138	512	445
v/s Ratio Prot	0.03	c0.23	c0.27	0.10	c0.19	
v/s Ratio Perm	0.10			0.15		0.01
v/c Ratio	0.22	0.39	0.56	0.33	0.57	0.04
Uniform Delay, d1	7.6	8.2	13.9	2.1	20.2	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	1.2	2.9	0.8	4.5	0.2
Delay (s)	7.9	9.3	16.8	2.9	24.7	16.8
Level of Service	A	A	B	A	C	B
Approach Delay (s)		9.0	9.7		23.6	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Existing Conditions (2019)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	523	87	593	214	886
Future Volume (vph)	523	87	593	214	886
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	68.0	68.0	67.5	23.6	95.0
Actuated g/C Ratio	0.72	0.72	0.71	0.25	1.00
v/c Ratio	0.26	0.11	0.30	0.60	0.70
Control Delay	5.5	1.4	5.9	37.7	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	1.4	5.9	37.7	2.9
LOS	A	A	A	D	A
Approach Delay	4.9		5.9	9.7	
Approach LOS	A		A	A	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 51.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Existing Conditions (2019)



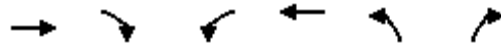
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	608	101	674	235	974
v/c Ratio	0.26	0.11	0.30	0.60	0.70
Control Delay	5.5	1.4	5.9	37.7	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	1.4	5.9	37.7	2.9
Queue Length 50th (m)	18.1	0.0	21.0	37.7	0.0
Queue Length 95th (m)	27.1	4.2	31.9	58.2	0.0
Internal Link Dist (m)	288.3		57.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2300	961	2283	464	1396
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.11	0.30	0.51	0.70

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Existing Conditions (2019)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	523	87	0	593	214	886
Future Volume (vph)	523	87	0	593	214	886
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3215	1304		3215	1575	1396
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3215	1304		3215	1575	1396
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	608	101	0	674	235	974
RTOR Reduction (vph)	0	29	0	0	0	0
Lane Group Flow (vph)	608	72	0	674	235	974
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	63.4	63.4		63.4	18.6	95.0
Effective Green, g (s)	68.0	68.0		67.5	23.6	95.0
Actuated g/C Ratio	0.72	0.72		0.71	0.25	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2301	933		2284	391	1396
v/s Ratio Prot	0.19			0.21	0.15	
v/s Ratio Perm		0.06				c0.70
v/c Ratio	0.26	0.08		0.30	0.60	0.70
Uniform Delay, d1	4.7	4.1		5.0	31.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2		0.3	2.6	2.9
Delay (s)	5.0	4.2		5.4	34.1	2.9
Level of Service	A	A		A	C	A
Approach Delay (s)	4.9			5.4	9.0	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

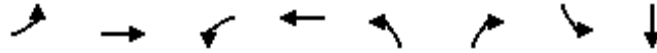
AM Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1409	865	1	1	4
Future Volume (Veh/h)	0	1409	865	1	1	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	0	1483	983	1	1	4
Pedestrians			2		3	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.94				0.96	0.94
vC, conflicting volume	987				1730	495
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	855				1441	330
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	743				121	628
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	0	742	742	655	329	5
Volume Left	0	0	0	0	0	1
Volume Right	0	0	0	0	1	4
cSH	1700	1700	1700	1700	1700	341
Volume to Capacity	0.00	0.44	0.44	0.39	0.19	0.01
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.3
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	15.7
Lane LOS						C
Approach Delay (s)	0.0			0.0		15.7
Approach LOS						C
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			48.9%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1165	45	752	102	22	13	0
Future Volume (vph)	11	1165	45	752	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	78.5	78.5	87.9	85.9	16.3	16.3	15.9	15.9
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.14	0.14
v/c Ratio	0.03	0.59	0.15	0.29	0.53	0.09	0.05	0.03
Control Delay	6.9	10.0	3.8	2.1	51.7	0.7	38.2	0.2
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	10.3	3.8	2.1	51.7	0.7	38.2	0.2
LOS	A	B	A	A	D	A	D	A
Approach Delay		10.2		2.2				19.9
Approach LOS		B		A				B

Intersection Summary

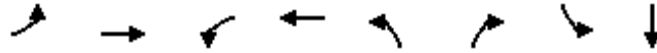
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 9.4
 Intersection Capacity Utilization 70.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1488	47	804	111	24	14	13
v/c Ratio	0.03	0.59	0.15	0.29	0.53	0.09	0.05	0.03
Control Delay	6.9	10.0	3.8	2.1	51.7	0.7	38.2	0.2
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	10.3	3.8	2.1	51.7	0.7	38.2	0.2
Queue Length 50th (m)	0.7	75.9	0.9	9.5	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.2	118.0	m2.5	11.2	37.7	0.0	7.8	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	476	2518	324	2812	452	489	572	652
Starvation Cap Reductn	0	378	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.70	0.15	0.29	0.25	0.05	0.02	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
Existing Conditions (2019)



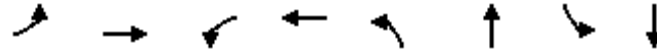
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1165	234	45	752	11	102	0	22	13	0	12
Future Volume (vph)	11	1165	234	45	752	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.97		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1822	3516		1789	3600		1789		1379	1803	1633	
Flt Permitted	0.35	1.00		0.12	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	668	3516		230	3600		1411		1379	1803	1633	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1239	249	47	792	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1479	0	47	804	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.9	73.9		83.0	83.0		14.0		14.0	14.0	14.0	
Effective Green, g (s)	77.7	77.7		85.9	85.9		16.3		16.3	15.9	15.9	
Actuated g/C Ratio	0.71	0.71		0.78	0.78		0.15		0.15	0.14	0.14	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	471	2483		292	2811		209		204	260	236	
v/s Ratio Prot		c0.42		0.01	c0.22						0.00	
v/s Ratio Perm	0.02			0.11			c0.08		0.00	0.01		
v/c Ratio	0.03	0.60		0.16	0.29		0.53		0.02	0.05	0.01	
Uniform Delay, d1	4.8	8.2		5.7	3.4		43.3		40.0	40.6	40.3	
Progression Factor	1.00	1.00		0.95	0.50		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.1		0.2	0.2		2.6		0.0	0.1	0.0	
Delay (s)	4.9	9.2		5.6	1.9		45.9		40.0	40.7	40.3	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		9.2			2.1			44.9			40.5	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Existing Conditions (2019)

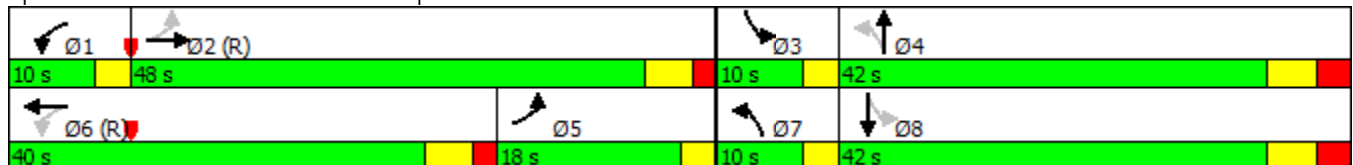


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	198	899	130	589	25	134	31	72
Future Volume (vph)	198	899	130	589	25	134	31	72
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	-1.8	2.2	-0.6	3.4
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	53.5	50.5	46.4	43.4	48.7	38.7	47.5	37.6
Actuated g/C Ratio	0.49	0.46	0.42	0.39	0.44	0.35	0.43	0.34
v/c Ratio	0.43	0.66	0.54	0.50	0.06	0.90	0.17	0.26
Control Delay	18.7	17.7	29.7	27.6	15.5	43.6	17.7	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	17.7	29.7	27.6	15.5	43.6	17.7	7.8
LOS	B	B	C	C	B	D	B	A
Approach Delay		17.9		28.0		42.4		8.8
Approach LOS		B		C		D		A

Intersection Summary

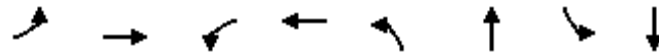
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 24.6
 Intersection LOS: C
 Intersection Capacity Utilization 78.8%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	213	1078	146	702	29	618	38	325
v/c Ratio	0.43	0.66	0.54	0.50	0.06	0.90	0.17	0.26
Control Delay	18.7	17.7	29.7	27.6	15.5	43.6	17.7	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	17.7	29.7	27.6	15.5	43.6	17.7	7.8
Queue Length 50th (m)	28.3	99.2	21.1	63.2	3.1	97.6	4.2	6.5
Queue Length 95th (m)	29.0	123.2	35.1	80.4	7.5	#145.7	9.0	12.9
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	499	1632	270	1410	455	702	224	1269
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	0.43	0.66	0.54	0.50	0.06	0.88	0.17	0.26

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	899	103	130	589	36	25	134	391	31	72	194
Future Volume (vph)	198	899	103	130	589	36	25	134	391	31	72	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		-1.8	2.2		-0.6	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1788	3537		1789	3564		1571	1672		1674	3156	
Flt Permitted	0.32	1.00		0.13	1.00		0.52	1.00		0.11	1.00	
Satd. Flow (perm)	609	3537		248	3564		858	1672		191	3156	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	213	967	111	146	662	40	29	158	460	38	88	237
RTOR Reduction (vph)	0	8	0	0	4	0	0	97	0	0	156	0
Lane Group Flow (vph)	213	1070	0	146	698	0	29	521	0	38	169	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	48.4	45.4		37.9	37.9		38.0	33.9		38.2	34.0	
Effective Green, g (s)	52.3	49.3		42.2	42.2		45.9	38.7		44.7	37.6	
Actuated g/C Ratio	0.48	0.45		0.38	0.38		0.42	0.35		0.41	0.34	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	492	1585		260	1367		415	588		182	1078	
v/s Ratio Prot	c0.07	c0.30		c0.06	0.20		0.01	c0.31		c0.01	0.05	
v/s Ratio Perm	0.13			0.16			0.02			0.07		
v/c Ratio	0.43	0.68		0.56	0.51		0.07	0.89		0.21	0.16	
Uniform Delay, d1	25.6	24.0		25.8	26.0		19.1	33.6		24.9	25.2	
Progression Factor	0.65	0.66		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.9		2.8	1.4		0.1	15.0		0.6	0.1	
Delay (s)	17.1	17.7		28.6	27.4		19.1	48.6		25.4	25.2	
Level of Service	B	B		C	C		B	D		C	C	
Approach Delay (s)		17.6			27.6			47.2			25.3	
Approach LOS		B			C			D			C	

Intersection Summary

HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.4
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	35.4	54.5	79.0	36.0	58.0	15.4
Average Queue (m)	12.8	24.9	34.1	14.4	30.7	5.6
95th Queue (m)	26.4	44.2	61.0	28.3	51.2	12.9
Link Distance (m)		156.0	303.8	303.8	168.4	168.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	1				
Queuing Penalty (veh)	0	1				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (m)	31.5	35.0	3.4	46.6	46.7	84.5	19.9
Average Queue (m)	13.9	14.6	0.1	16.3	16.9	40.1	0.7
95th Queue (m)	26.3	30.4	2.4	36.3	37.4	67.1	16.3
Link Distance (m)	303.8	303.8		74.2	74.2	154.5	154.5
Upstream Blk Time (%)						0	0
Queuing Penalty (veh)						0	0
Storage Bay Dist (m)			70.0				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B15	B15	B15	WB	WB	SB
Directions Served	T	T	T	T		T	TR	LR
Maximum Queue (m)	19.6	23.2	28.3	56.6	11.5	5.8	6.9	8.9
Average Queue (m)	1.1	2.0	1.2	3.0	0.7	0.2	0.3	1.4
95th Queue (m)	8.9	12.5	13.7	25.7	12.3	2.9	4.0	6.6
Link Distance (m)	21.5	21.5	74.2	74.2	74.2	93.8	93.8	79.4
Upstream Blk Time (%)	0	0		0	0			
Queuing Penalty (veh)	1	2		1	0			
Storage Bay Dist (m)								
Storage Blk Time (%)	0							
Queuing Penalty (veh)	0							

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	18.2	91.4	95.1	20.3	45.1	47.3	31.9	52.5	16.7	11.6
Average Queue (m)	2.5	42.0	50.7	8.1	16.8	18.7	19.6	7.0	3.7	3.0
95th Queue (m)	11.1	81.8	89.7	17.4	36.2	39.4	33.8	28.5	12.1	10.3
Link Distance (m)		93.8	93.8		249.5	249.5		122.7	67.3	67.3
Upstream Blk Time (%)		0	0							
Queuing Penalty (veh)		1	3							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		5					4	0		
Queuing Penalty (veh)		1					1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	56.7	91.6	94.0	32.3	122.3	107.9	82.9	173.5	21.1	23.9	44.7
Average Queue (m)	27.7	48.0	52.5	26.9	68.2	52.2	10.3	90.3	5.5	9.6	18.2
95th Queue (m)	49.5	85.4	89.5	40.2	119.7	102.4	47.4	159.2	15.3	21.3	34.5
Link Distance (m)		249.5	249.5		163.7	163.7		266.5		279.2	279.2
Upstream Blk Time (%)					0			0			
Queuing Penalty (veh)					0			0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				25	20		0	10			
Queuing Penalty (veh)				73	26		0	3			

Network Summary

Network wide Queuing Penalty: 113

Appendix F – Existing Conditions – Synchro & SimTraffic Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↗	↗	↗	↗	↘	↘
Traffic Volume (vph)	106	255	638	923	171	90
Future Volume (vph)	106	255	638	923	171	90
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.22	0.20	0.60	0.74	0.63	0.29
Control Delay	5.4	5.0	8.3	6.3	51.9	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	5.0	8.3	6.3	51.9	9.1
LOS	A	A	A	A	D	A
Approach Delay		5.1	7.1		37.1	
Approach LOS		A	A		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 11.0
 Intersection LOS: B
 Intersection Capacity Utilization 77.6%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	108	260	679	982	214	113
v/c Ratio	0.22	0.20	0.60	0.74	0.63	0.29
Control Delay	5.4	5.0	8.3	6.3	51.9	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	5.0	8.3	6.3	51.9	9.1
Queue Length 50th (m)	5.3	16.0	33.0	119.3	46.0	0.0
Queue Length 95th (m)	9.4	24.2	62.4	36.7	62.4	10.4
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	489	1273	1133	1330	341	390
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	0.20	0.60	0.74	0.63	0.29

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	106	255	638	923	171	90
Future Volume (vph)	106	255	638	923	171	90
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1623	1709	1709	1427	1575	1396
Flt Permitted	0.29	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	497	1709	1709	1427	1575	1396
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	108	260	679	982	214	112
RTOR Reduction (vph)	0	0	0	85	0	89
Lane Group Flow (vph)	108	260	679	897	214	24
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	489	1273	1133	1279	341	302
v/s Ratio Prot	0.02	c0.15	0.40	c0.15	0.14	
v/s Ratio Perm	0.15			0.48		0.02
v/c Ratio	0.22	0.20	0.60	0.70	0.63	0.08
Uniform Delay, d1	12.7	4.6	11.3	2.4	42.6	37.5
Progression Factor	1.00	1.00	0.55	6.76	1.00	1.00
Incremental Delay, d2	0.2	0.4	1.9	2.6	8.5	0.5
Delay (s)	12.9	5.0	8.1	18.6	51.1	38.0
Level of Service	B	A	A	B	D	D
Approach Delay (s)		7.3	14.3		46.6	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Existing Conditions (2019)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	368	58	1370	191	428
Future Volume (vph)	368	58	1370	191	428
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	95.0	95.0	95.0	25.0	
Total Split (%)	79.2%	79.2%	79.2%	20.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	93.4	93.4	93.2	22.1	120.0
Actuated g/C Ratio	0.78	0.78	0.78	0.18	1.00
v/c Ratio	0.15	0.06	0.60	0.72	0.33
Control Delay	1.9	0.1	4.2	61.1	0.6
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	1.9	0.1	4.3	61.1	0.6
LOS	A	A	A	E	A
Approach Delay	1.7		4.3	19.3	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 7.7
 Intersection Capacity Utilization 61.5%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Existing Conditions (2019)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	391	62	1522	210	470
v/c Ratio	0.15	0.06	0.60	0.72	0.33
Control Delay	1.9	0.1	4.2	61.1	0.6
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	1.9	0.1	4.3	61.1	0.6
Queue Length 50th (m)	5.5	0.0	53.5	46.6	0.0
Queue Length 95th (m)	7.3	m0.0	18.7	#74.8	0.0
Internal Link Dist (m)	291.5		59.3	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2525	1119	2520	301	1409
Starvation Cap Reductn	0	0	168	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.06	0.65	0.70	0.33

Intersection Summary

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

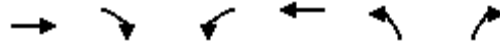
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Existing Conditions (2019)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	368	58	0	1370	191	428
Future Volume (vph)	368	58	0	1370	191	428
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3247	1421		3247	1575	1409
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3247	1421		3247	1575	1409
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	391	62	0	1522	210	470
RTOR Reduction (vph)	0	14	0	0	0	0
Lane Group Flow (vph)	391	48	0	1522	210	470
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.9	89.9		89.9	17.1	120.0
Effective Green, g (s)	93.4	93.4		93.2	22.1	120.0
Actuated g/C Ratio	0.78	0.78		0.78	0.18	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2527	1106		2521	290	1409
v/s Ratio Prot	0.12			c0.47	c0.13	
v/s Ratio Perm		0.03				0.33
v/c Ratio	0.15	0.04		0.60	0.72	0.33
Uniform Delay, d1	3.4	3.1		5.6	46.1	0.0
Progression Factor	0.52	0.02		0.56	1.00	1.00
Incremental Delay, d2	0.1	0.1		0.9	8.7	0.6
Delay (s)	1.9	0.1		4.0	54.7	0.6
Level of Service	A	A		A	D	A
Approach Delay (s)	1.6			4.0	17.3	
Approach LOS	A			A	B	

Intersection Summary

HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

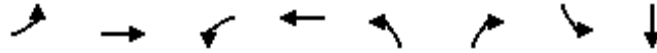
PM Peak Period
 Existing Conditions (2019)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	789	1658	4	2	1
Future Volume (Veh/h)	7	789	1658	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	8	887	1783	4	2	1
Pedestrians					3	
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)		111	118			
pX, platoon unblocked	0.78				0.79	0.78
vC, conflicting volume	1790				2248	896
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1441				1936	290
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				96	100
cM capacity (veh/h)	369				45	552
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	8	444	444	1189	598	3
Volume Left	8	0	0	0	0	2
Volume Right	0	0	0	0	4	1
cSH	369	1700	1700	1700	1700	65
Volume to Capacity	0.02	0.26	0.26	0.70	0.35	0.05
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	1.1
Control Delay (s)	15.0	0.0	0.0	0.0	0.0	63.0
Lane LOS	B					F
Approach Delay (s)	0.1			0.0		63.0
Approach LOS						F
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			56.0%		ICU Level of Service	B
Analysis Period (min)			15			

Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Existing Conditions (2019)

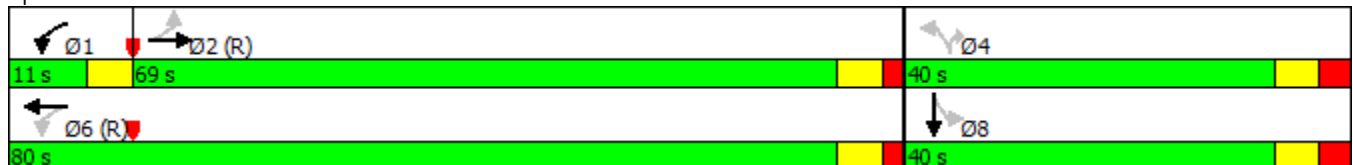


Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	726	39	1496	154	59	10	0
Future Volume (vph)	11	726	39	1496	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	82.2	82.2	93.2	91.2	23.7	23.7	20.5	20.5
Actuated g/C Ratio	0.68	0.68	0.78	0.76	0.20	0.20	0.17	0.17
v/c Ratio	0.08	0.34	0.08	0.61	0.59	0.17	0.04	0.04
Control Delay	8.5	6.6	3.9	5.0	51.5	9.6	38.4	0.2
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	8.5	6.6	3.9	5.1	51.5	9.6	38.4	0.2
LOS	A	A	A	A	D	A	D	A
Approach Delay		6.7		5.0				17.7
Approach LOS		A		A				B

Intersection Summary

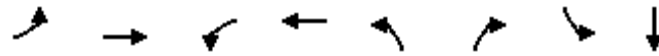
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 8.5
 Intersection Capacity Utilization 63.8%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 4: JBH Access & Northshore Blvd



Queues
4: JBH Access & Northshore Blvd

PM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	839	44	1702	167	64	11	13
v/c Ratio	0.08	0.34	0.08	0.61	0.59	0.17	0.04	0.04
Control Delay	8.5	6.6	3.9	5.0	51.5	9.6	38.4	0.2
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	8.5	6.6	3.9	5.1	51.5	9.6	38.4	0.2
Queue Length 50th (m)	0.7	28.2	1.8	43.5	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.9	40.5	m3.8	55.4	54.2	10.5	6.9	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	147	2475	541	2768	447	543	430	504
Starvation Cap Reductn	0	0	0	211	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	0.08	0.34	0.08	0.67	0.37	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	726	54	39	1496	19	154	0	59	10	0	12
Future Volume (vph)	11	726	54	39	1496	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1825	3606		1789	3642		1821		1604	1512	1610	
Flt Permitted	0.11	1.00		0.30	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	215	3606		557	3642		1436		1604	1512	1610	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	781	58	44	1681	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	836	0	44	1702	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	78.5	78.5		87.7	87.7		19.3		19.3	19.3	19.3	
Effective Green, g (s)	81.4	81.4		91.2	91.2		23.7		23.7	20.5	20.5	
Actuated g/C Ratio	0.68	0.68		0.76	0.76		0.20		0.20	0.17	0.17	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	145	2446		512	2767		283		316	258	275	
v/s Ratio Prot		0.23		0.01	c0.47						0.00	
v/s Ratio Perm	0.06			0.06			c0.12		0.01	0.01		
v/c Ratio	0.08	0.34		0.09	0.61		0.59		0.04	0.04	0.01	
Uniform Delay, d1	6.6	8.1		4.0	6.5		43.7		38.9	41.6	41.3	
Progression Factor	0.77	0.71		0.90	0.56		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.4		0.1	0.9		3.3		0.1	0.1	0.0	
Delay (s)	6.2	6.1		3.6	4.5		47.0		39.0	41.6	41.3	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		6.1			4.5			44.8			41.5	
Approach LOS		A			A			D			D	

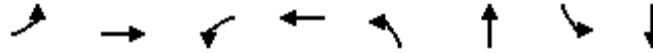
Intersection Summary

HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Existing Conditions (2019)

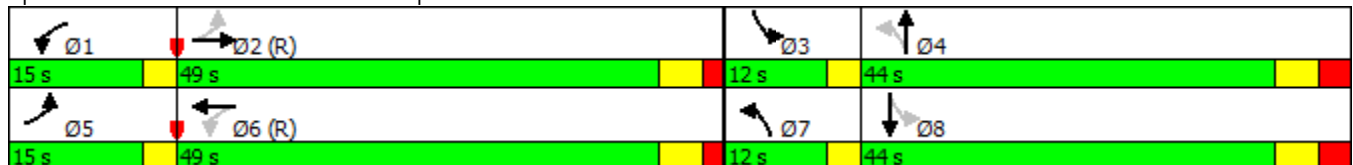


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	168	592	230	1076	75	90	68	149
Future Volume (vph)	168	592	230	1076	75	90	68	149
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	15.0	49.0	15.0	49.0	12.0	44.0	12.0	44.0
Total Split (%)	12.5%	40.8%	12.5%	40.8%	10.0%	36.7%	10.0%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.4	-4.4	-3.8	-3.8	-3.9	-3.9
Total Lost Time (s)	-2.0	1.0	-1.4	1.6	-0.8	3.2	-0.9	3.1
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	84.1	66.3	83.5	65.8	38.7	25.3	38.8	25.3
Actuated g/C Ratio	0.70	0.55	0.70	0.55	0.32	0.21	0.32	0.21
v/c Ratio	0.48	0.36	0.42	0.62	0.33	0.72	0.28	0.67
Control Delay	28.3	15.3	10.4	23.5	29.1	38.6	28.1	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	15.3	10.4	23.5	29.1	38.6	28.1	25.6
LOS	C	B	B	C	C	D	C	C
Approach Delay		18.0		21.3		36.6		25.9
Approach LOS		B		C		D		C

Intersection Summary

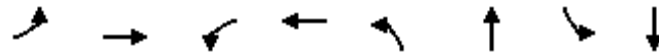
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 23.1
 Intersection LOS: C
 Intersection Capacity Utilization 80.9%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	704	247	1229	82	311	74	600
v/c Ratio	0.48	0.36	0.42	0.62	0.33	0.72	0.28	0.67
Control Delay	28.3	15.3	10.4	23.5	29.1	38.6	28.1	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	15.3	10.4	23.5	29.1	38.6	28.1	25.6
Queue Length 50th (m)	22.4	32.4	20.0	104.0	13.2	47.2	11.8	36.5
Queue Length 95th (m)	50.3	47.4	38.8	167.1	21.6	71.0	19.9	50.3
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	421	1983	600	1977	259	635	269	1275
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	0.45	0.36	0.41	0.62	0.32	0.49	0.28	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	592	35	230	1076	67	75	90	196	68	149	403
Future Volume (vph)	168	592	35	230	1076	67	75	90	196	68	149	403
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	3582		1824	3601		1807	1679		1752	3206	
Flt Permitted	0.13	1.00		0.31	1.00		0.16	1.00		0.21	1.00	
Satd. Flow (perm)	252	3582		602	3601		310	1679		379	3206	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	665	39	247	1157	72	82	98	213	74	162	438
RTOR Reduction (vph)	0	3	0	0	3	0	0	78	0	0	220	0
Lane Group Flow (vph)	189	701	0	247	1226	0	82	233	0	74	380	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	72.4	60.7		72.6	60.8		28.5	21.5		28.5	21.5	
Effective Green, g (s)	80.5	65.7		79.9	65.2		35.3	25.3		35.4	25.4	
Actuated g/C Ratio	0.67	0.55		0.67	0.54		0.29	0.21		0.29	0.21	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	387	1961		565	1956		225	353		236	678	
v/s Ratio Prot	c0.07	0.20		0.06	c0.34		c0.03	c0.14		0.03	0.12	
v/s Ratio Perm	0.26			0.23			0.07			0.06		
v/c Ratio	0.49	0.36		0.44	0.63		0.36	0.66		0.31	0.56	
Uniform Delay, d1	12.7	15.3		8.6	19.0		32.5	43.4		32.2	42.3	
Progression Factor	2.70	0.84		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.5		0.5	1.5		1.0	4.4		0.8	1.1	
Delay (s)	35.2	13.4		9.1	20.5		33.5	47.8		33.0	43.4	
Level of Service	D	B		A	C		C	D		C	D	
Approach Delay (s)		18.0			18.6			44.8			42.2	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	41.6	68.7	75.2	94.6	66.4	24.0
Average Queue (m)	22.2	24.3	42.6	45.0	31.3	9.6
95th Queue (m)	39.2	65.1	68.8	79.6	56.7	18.5
Link Distance (m)		151.1	306.5	306.5	164.8	164.8
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	5	2				
Queuing Penalty (veh)	12	2				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	L
Maximum Queue (m)	19.6	20.1	36.2	40.6	81.6
Average Queue (m)	7.0	3.2	16.5	19.8	43.4
95th Queue (m)	17.2	12.4	32.2	35.6	73.9
Link Distance (m)	306.5	306.5	75.2	75.2	160.1
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B15	SB
Directions Served	L	T	T	LR
Maximum Queue (m)	9.1	12.1	1.0	7.2
Average Queue (m)	1.7	0.9	0.0	0.6
95th Queue (m)	7.4	6.5	1.0	4.2
Link Distance (m)		19.9	75.2	91.5
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (m)	5.0			
Storage Blk Time (%)	3	0		
Queuing Penalty (veh)	13	0		

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	12.9	40.9	47.2	16.4	57.3	56.4	32.2	74.4	20.4	7.8
Average Queue (m)	2.1	16.0	19.5	5.0	25.9	28.6	25.8	18.8	3.1	2.0
95th Queue (m)	8.0	33.9	37.7	12.5	46.8	47.9	37.5	55.5	12.5	7.3
Link Distance (m)		99.4	99.4		242.6	242.6		137.1	65.8	65.8
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0			0		16	0		
Queuing Penalty (veh)		0			0		9	1		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	55.6	59.2	62.4	32.4	168.1	167.1	32.2	86.1	33.4	55.2	110.0
Average Queue (m)	24.9	32.2	34.6	27.7	138.3	128.4	13.3	40.2	10.9	22.2	53.6
95th Queue (m)	45.3	53.3	55.4	39.4	191.1	188.5	25.7	71.7	24.6	42.5	90.3
Link Distance (m)		242.6	242.6		163.5	163.5		224.6		176.9	176.9
Upstream Blk Time (%)					18	13					
Queuing Penalty (veh)					0	0					
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				10	43			0		0	
Queuing Penalty (veh)				53	99			0		0	

Network Summary

Network wide Queuing Penalty: 190

Appendix F – Existing Conditions – Synchro & SimTraffic Reports

3. Saturday Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Existing Conditions (2019)

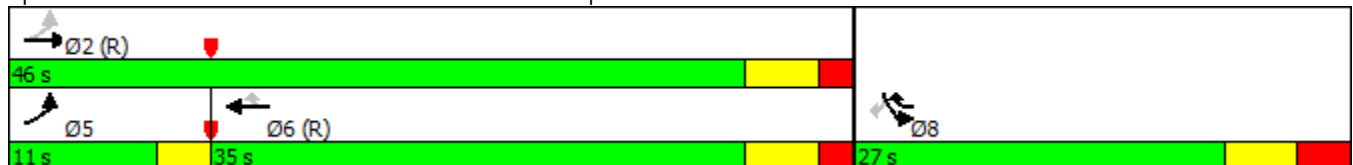


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	44	252	360	312	223	67
Future Volume (vph)	44	252	360	312	223	67
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.5	-4.5	-5.0	-5.0
Total Lost Time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	48.0	45.0	38.7	65.7	25.0	25.0
Actuated g/C Ratio	0.66	0.62	0.53	0.90	0.34	0.34
v/c Ratio	0.07	0.26	0.42	0.24	0.50	0.15
Control Delay	4.7	7.2	13.4	0.6	23.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	7.2	13.4	0.6	23.0	5.3
LOS	A	A	B	A	C	A
Approach Delay		6.8	7.4		18.9	
Approach LOS		A	A		B	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 10.2
 Intersection Capacity Utilization 51.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues

Saturday Peak Period

1: Northshore Blvd & QEW West Ramp

Existing Conditions (2019)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	47	271	375	325	269	81
v/c Ratio	0.07	0.26	0.42	0.24	0.50	0.15
Control Delay	4.7	7.2	13.4	0.6	23.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	7.2	13.4	0.6	23.0	5.3
Queue Length 50th (m)	2.0	15.0	32.3	0.0	28.8	0.0
Queue Length 95th (m)	4.9	25.6	54.6	2.5	44.4	6.9
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	658	1043	897	1339	539	525
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	0.07	0.26	0.42	0.24	0.50	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
 Existing Conditions (2019)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	44	252	360	312	223	67
Future Volume (vph)	44	252	360	312	223	67
Ideal Flow (vphpl)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
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	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1623	1692	1692	1452	1575	1378
Flt Permitted	0.45	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	771	1692	1692	1452	1575	1378
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.83	0.83
Adj. Flow (vph)	47	271	375	325	269	81
RTOR Reduction (vph)	0	0	0	49	0	53
Lane Group Flow (vph)	47	271	375	276	269	28
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	33.0	53.0	20.0	20.0
Effective Green, g (s)	45.0	45.0	37.5	62.0	25.0	25.0
Actuated g/C Ratio	0.62	0.62	0.51	0.85	0.34	0.34
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	580	1043	869	1233	539	471
v/s Ratio Prot	0.01	c0.16	c0.22	0.08	c0.17	
v/s Ratio Perm	0.04			0.11		0.02
v/c Ratio	0.08	0.26	0.43	0.22	0.50	0.06
Uniform Delay, d1	5.8	6.4	11.1	1.0	19.0	16.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.6	1.6	0.4	3.3	0.2
Delay (s)	5.8	7.0	12.7	1.4	22.3	16.3
Level of Service	A	A	B	A	C	B
Approach Delay (s)		6.8	7.4		20.9	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	3.5
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Existing Conditions (2019)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	390	85	570	102	297
Future Volume (vph)	390	85	570	102	297
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-2.9	-2.9	-3.3	-4.8	
Total Lost Time (s)	3.1	3.1	2.7	2.2	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	72.5	72.5	72.9	17.2	95.0
Actuated g/C Ratio	0.76	0.76	0.77	0.18	1.00
v/c Ratio	0.17	0.08	0.24	0.41	0.24
Control Delay	3.6	1.1	3.8	37.8	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	1.1	3.8	37.8	0.4
LOS	A	A	A	D	A
Approach Delay	3.1		3.8	10.0	
Approach LOS	A		A	A	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 5.4
 Intersection Capacity Utilization 44.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Existing Conditions (2019)



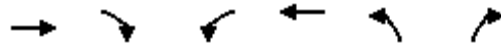
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	424	92	594	116	338
v/c Ratio	0.17	0.08	0.24	0.41	0.24
Control Delay	3.6	1.1	3.8	37.8	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	1.1	3.8	37.8	0.4
Queue Length 50th (m)	8.9	0.0	13.0	19.0	0.0
Queue Length 95th (m)	16.5	3.7	23.1	32.0	0.0
Internal Link Dist (m)	288.3		59.3	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2452	1101	2465	460	1409
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.08	0.24	0.25	0.24

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Existing Conditions (2019)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	390	85	0	570	102	297
Future Volume (vph)	390	85	0	570	102	297
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	3.1	3.1		2.7	2.2	-0.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3215	1416		3215	1575	1409
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3215	1416		3215	1575	1409
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.88	0.88
Adj. Flow (vph)	424	92	0	594	116	338
RTOR Reduction (vph)	0	22	0	0	0	0
Lane Group Flow (vph)	424	70	0	594	116	338
Confl. Peds. (#/hr)		4	4			
Heavy Vehicles (%)	1%	0%	1%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	69.6	69.6		69.6	12.4	95.0
Effective Green, g (s)	72.5	72.5		72.9	17.2	95.0
Actuated g/C Ratio	0.76	0.76		0.77	0.18	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2453	1080		2467	285	1409
v/s Ratio Prot	0.13			0.18	c0.07	
v/s Ratio Perm		0.05				c0.24
v/c Ratio	0.17	0.07		0.24	0.41	0.24
Uniform Delay, d1	3.1	2.8		3.2	34.4	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		0.2	1.0	0.4
Delay (s)	3.2	2.9		3.4	35.3	0.4
Level of Service	A	A		A	D	A
Approach Delay (s)	3.2			3.4	9.3	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	5.3
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

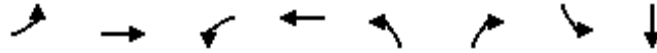
Saturday Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	684	756	4	4	3
Future Volume (Veh/h)	3	684	756	4	4	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	3	752	796	4	4	3
Pedestrians					8	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.96				0.97	0.96
vC, conflicting volume	808				1188	408
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	719				1043	302
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	850				219	667
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	3	376	376	531	269	7
Volume Left	3	0	0	0	0	4
Volume Right	0	0	0	0	4	3
cSH	850	1700	1700	1700	1700	307
Volume to Capacity	0.00	0.22	0.22	0.31	0.16	0.02
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	0.5
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	17.0
Lane LOS	A					C
Approach Delay (s)	0.0			0.0		17.0
Approach LOS						C
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			31.0%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

Saturday Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	9	642	27	703	49	39	11	0
Future Volume (vph)	9	642	27	703	49	39	11	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-3.5	-3.5	-2.2	-2.2	0.0	0.0
Total Lost Time (s)	2.2	2.2	0.5	2.5	4.8	4.8	7.0	7.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	88.0	88.0	95.4	93.9	12.3	12.3	10.1	10.1
Actuated g/C Ratio	0.80	0.80	0.87	0.85	0.11	0.11	0.09	0.09
v/c Ratio	0.02	0.26	0.04	0.25	0.35	0.20	0.07	0.03
Control Delay	4.8	4.4	1.0	1.3	50.4	6.5	45.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	4.4	1.0	1.3	50.4	6.5	45.0	0.1
LOS	A	A	A	A	D	A	D	A
Approach Delay		4.4		1.3				25.8
Approach LOS		A		A				C

Intersection Summary

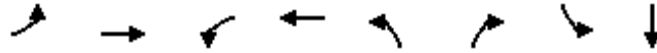
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 50.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

Saturday Peak Period
Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	10	763	29	765	56	45	12	9
v/c Ratio	0.02	0.26	0.04	0.25	0.35	0.20	0.07	0.03
Control Delay	4.8	4.4	1.0	1.3	50.4	6.5	45.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	4.4	1.0	1.3	50.4	6.5	45.0	0.1
Queue Length 50th (m)	0.5	24.2	0.4	7.4	11.4	0.0	2.4	0.0
Queue Length 95th (m)	2.2	36.4	1.0	8.6	22.1	4.7	8.0	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	555	2900	674	3104	462	507	542	643
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	0.02	0.26	0.04	0.25	0.12	0.09	0.02	0.01

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

Saturday Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	9	642	37	27	703	16	49	0	39	11	0	8
Future Volume (vph)	9	642	37	27	703	16	49	0	39	11	0	8
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		0.5	2.5		4.8		4.8	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1821	3620		1825	3636		1825		1438	1807	1633	
Flt Permitted	0.36	1.00		0.34	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	693	3620		650	3636		1444		1438	1807	1633	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	721	42	29	748	17	56	0	45	12	0	9
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	41	0	8	0
Lane Group Flow (vph)	10	761	0	29	764	0	56	0	4	12	1	0
Confl. Peds. (#/hr)	3					3			9	9		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	80.8	80.8		88.5	88.5		8.5		8.5	8.5	8.5	
Effective Green, g (s)	84.6	84.6		92.0	92.0		10.7		10.7	8.5	8.5	
Actuated g/C Ratio	0.77	0.77		0.84	0.84		0.10		0.10	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	532	2784		620	3041		140		139	139	126	
v/s Ratio Prot		c0.21		0.00	c0.21						0.00	
v/s Ratio Perm	0.01			0.04			c0.04		0.00	0.01		
v/c Ratio	0.02	0.27		0.05	0.25		0.40		0.03	0.09	0.01	
Uniform Delay, d1	3.0	3.7		1.6	1.9		46.6		45.0	47.1	46.8	
Progression Factor	1.00	1.00		0.53	0.51		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.0	0.2		1.9		0.1	0.3	0.0	
Delay (s)	3.0	4.0		0.9	1.2		48.5		45.1	47.4	46.9	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		3.9			1.1			47.0			47.2	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.7
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Existing Conditions (2019)

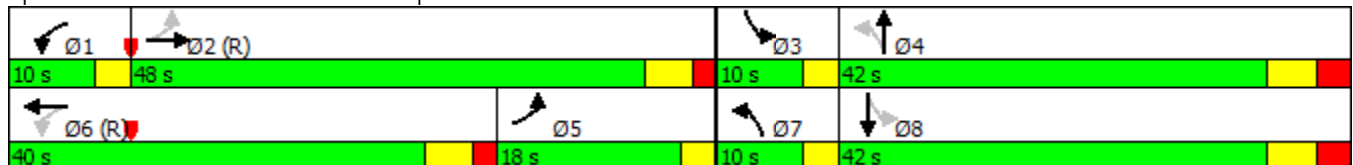


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	143	501	101	518	30	51	81	48
Future Volume (vph)	143	501	101	518	30	51	81	48
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-4.1	-4.1	-3.2	-3.2	-5.0	-5.0	-4.1	-4.1
Total Lost Time (s)	-1.1	1.9	-0.2	2.8	-2.0	2.0	-1.1	2.9
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	73.6	70.6	66.3	63.3	27.9	15.9	27.0	17.0
Actuated g/C Ratio	0.67	0.64	0.60	0.58	0.25	0.14	0.25	0.15
v/c Ratio	0.22	0.26	0.20	0.32	0.11	0.48	0.30	0.40
Control Delay	7.0	6.4	11.6	13.2	29.1	24.1	33.7	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	6.4	11.6	13.2	29.1	24.1	33.7	11.7
LOS	A	A	B	B	C	C	C	B
Approach Delay		6.5		13.0		25.0		17.1
Approach LOS		A		B		C		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48
 Intersection Signal Delay: 12.4
 Intersection LOS: B
 Intersection Capacity Utilization 68.7%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

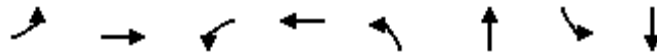


Queues

Saturday Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Existing Conditions (2019)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	154	591	109	659	34	154	86	262
v/c Ratio	0.22	0.26	0.20	0.32	0.11	0.48	0.30	0.40
Control Delay	7.0	6.4	11.6	13.2	29.1	24.1	33.7	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	6.4	11.6	13.2	29.1	24.1	33.7	11.7
Queue Length 50th (m)	2.4	16.5	9.5	36.2	5.5	12.9	14.5	5.2
Queue Length 95th (m)	23.0	45.8	19.7	54.4	12.0	29.9	25.2	15.8
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	695	2313	541	2040	323	669	283	1245
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	0.22	0.26	0.20	0.32	0.11	0.23	0.30	0.21

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Existing Conditions (2019)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	143	501	48	101	518	95	30	51	86	81	48	198
Future Volume (vph)	143	501	48	101	518	95	30	51	86	81	48	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-1.1	1.9		-0.2	2.8		-2.0	2.0		-1.1	2.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		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)	1819	3595		1787	3531		1768	1686		1746	3123	
Flt Permitted	0.40	1.00		0.37	1.00		0.49	1.00		0.40	1.00	
Satd. Flow (perm)	768	3595		705	3531		904	1686		740	3123	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.94	0.94	0.94
Adj. Flow (vph)	154	539	52	109	557	102	34	57	97	86	51	211
RTOR Reduction (vph)	0	4	0	0	9	0	0	75	0	0	178	0
Lane Group Flow (vph)	154	587	0	109	650	0	34	79	0	86	84	0
Confl. Peds. (#/hr)	13		10	10		13	7		17	17		7
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	3%	0%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	68.4	65.4		58.9	58.9		15.7	11.5		18.5	12.9	
Effective Green, g (s)	72.5	69.5		62.1	62.1		25.1	16.5		24.2	17.0	
Actuated g/C Ratio	0.66	0.63		0.56	0.56		0.23	0.15		0.22	0.15	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	688	2271		513	1993		278	252		251	482	
v/s Ratio Prot	0.04	c0.16		0.02	c0.18		0.01	c0.05		c0.03	0.03	
v/s Ratio Perm	0.11			0.10			0.02			0.05		
v/c Ratio	0.22	0.26		0.21	0.33		0.12	0.31		0.34	0.17	
Uniform Delay, d1	8.0	8.9		11.3	12.8		33.4	41.7		35.4	40.4	
Progression Factor	0.64	0.65		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3		0.2	0.4		0.2	0.7		0.8	0.2	
Delay (s)	5.3	6.1		11.5	13.2		33.6	42.4		36.2	40.6	
Level of Service	A	A		B	B		C	D		D	D	
Approach Delay (s)		5.9			13.0			40.8			39.5	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.6
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	20.8	44.4	65.2	26.3	49.9	16.9
Average Queue (m)	7.9	18.9	30.8	9.4	27.1	6.7
95th Queue (m)	17.2	35.8	54.0	20.4	44.6	13.1
Link Distance (m)		156.0	303.8	303.8	168.4	168.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)		0				
Queuing Penalty (veh)		0				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	L
Maximum Queue (m)	21.4	22.7	37.2	36.5	45.3
Average Queue (m)	8.5	6.8	11.5	10.5	21.6
95th Queue (m)	19.6	18.8	29.3	27.3	38.2
Link Distance (m)	303.8	303.8	75.7	75.7	154.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (m)	7.2	5.3	8.9
Average Queue (m)	0.5	0.2	1.5
95th Queue (m)	3.9	2.9	7.0
Link Distance (m)		19.8	79.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	5.0		
Storage Blk Time (%)	0	0	
Queuing Penalty (veh)	1	0	

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	9.1	38.3	45.2	13.2	34.4	35.4	28.4	15.9	10.7	9.0
Average Queue (m)	1.2	12.8	15.7	3.9	11.1	11.9	11.3	5.0	2.5	1.9
95th Queue (m)	6.1	32.0	36.8	11.3	27.4	28.2	23.8	12.7	8.9	7.9
Link Distance (m)		93.8	93.8		249.5	249.5		122.7	67.3	67.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0					1			
Queuing Penalty (veh)		0					0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	38.5	40.7	46.6	32.3	70.0	60.6	19.4	53.5	31.9	21.6	44.2
Average Queue (m)	16.6	16.0	19.8	14.9	31.7	24.6	6.2	21.4	13.9	7.9	18.5
95th Queue (m)	32.8	36.6	41.8	32.1	59.6	50.2	15.8	41.3	27.5	18.5	33.2
Link Distance (m)		249.5	249.5		163.7	163.7		266.5		279.2	279.2
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				1		8					
Queuing Penalty (veh)				2		8					

Network Summary

Network wide Queuing Penalty: 11

Appendix G – 2024 Future Background Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Saturday Peak Hour

Appendix G – 2024 Future Background Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2024)

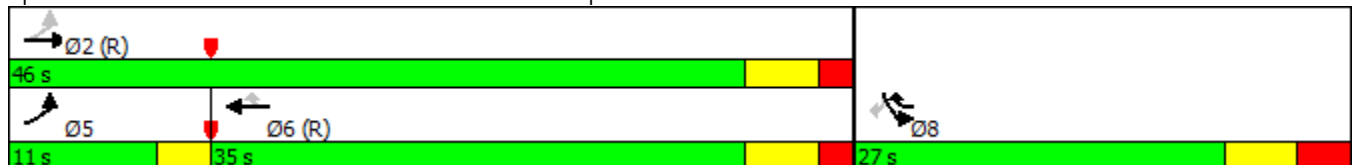


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Traffic Volume (vph)	102	369	422	459	290	49
Future Volume (vph)	102	369	422	459	290	49
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	45.6	42.6	34.9	61.6	24.0	24.0
Actuated g/C Ratio	0.62	0.58	0.48	0.84	0.33	0.33
v/c Ratio	0.24	0.43	0.62	0.42	0.66	0.12
Control Delay	7.0	10.3	19.6	1.3	28.6	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	10.3	19.6	1.3	28.6	6.2
LOS	A	B	B	A	C	A
Approach Delay		9.5	10.0		25.4	
Approach LOS		A	B		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 13.0
 Intersection LOS: B
 Intersection Capacity Utilization 59.9%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	110	397	480	522	322	54
v/c Ratio	0.24	0.43	0.62	0.42	0.66	0.12
Control Delay	7.0	10.3	19.6	1.3	28.6	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	10.3	19.6	1.3	28.6	6.2
Queue Length 50th (m)	5.4	27.3	49.3	0.0	37.3	0.0
Queue Length 95th (m)	10.9	45.1	78.4	3.6	63.5	6.8
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	465	925	773	1242	490	462
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	0.24	0.43	0.62	0.42	0.66	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	102	369	422	459	290	49
Future Volume (vph)	102	369	422	459	290	49
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1522	1586	1617	1375	1491	1296
Flt Permitted	0.32	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	509	1586	1617	1375	1491	1296
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	110	397	480	522	322	54
RTOR Reduction (vph)	0	0	0	109	0	36
Lane Group Flow (vph)	110	397	480	413	322	18
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	30.9	50.9	20.0	20.0
Effective Green, g (s)	42.6	42.6	34.3	57.7	24.0	24.0
Actuated g/C Ratio	0.58	0.58	0.47	0.79	0.33	0.33
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	417	925	759	1086	490	426
v/s Ratio Prot	0.03	c0.25	c0.30	0.12	c0.22	
v/s Ratio Perm	0.12			0.18		0.01
v/c Ratio	0.26	0.43	0.63	0.38	0.66	0.04
Uniform Delay, d1	7.9	8.4	14.6	2.3	21.0	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.5	4.0	1.0	6.7	0.2
Delay (s)	8.3	9.9	18.6	3.3	27.7	16.9
Level of Service	A	A	B	A	C	B
Approach Delay (s)		9.5	10.6		26.2	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2024)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	563	96	645	236	981
Future Volume (vph)	563	96	645	236	981
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	66.8	66.8	66.3	24.8	95.0
Actuated g/C Ratio	0.70	0.70	0.70	0.26	1.00
v/c Ratio	0.30	0.12	0.34	0.66	0.81
Control Delay	6.2	1.4	6.7	39.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	1.4	6.7	39.4	5.4
LOS	A	A	A	D	A
Approach Delay	5.5		6.7	12.0	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 8.8
 Intersection Capacity Utilization 52.6%
 Analysis Period (min) 15

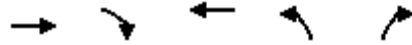
Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2024)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	655	112	733	259	1078
v/c Ratio	0.30	0.12	0.34	0.66	0.81
Control Delay	6.2	1.4	6.7	39.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	1.4	6.7	39.4	5.4
Queue Length 50th (m)	22.0	0.0	26.0	41.4	0.0
Queue Length 95th (m)	29.8	4.3	35.8	65.5	0.0
Internal Link Dist (m)	288.3		57.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2159	909	2143	443	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.12	0.34	0.58	0.81

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2024)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	563	96	0	645	236	981
Future Volume (vph)	563	96	0	645	236	981
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1247		3073	1506	1334
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1247		3073	1506	1334
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	655	112	0	733	259	1078
RTOR Reduction (vph)	0	33	0	0	0	0
Lane Group Flow (vph)	655	79	0	733	259	1078
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	62.2	62.2		62.2	19.8	95.0
Effective Green, g (s)	66.8	66.8		66.3	24.8	95.0
Actuated g/C Ratio	0.70	0.70		0.70	0.26	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2160	876		2144	393	1334
v/s Ratio Prot	0.21			0.24	0.17	
v/s Ratio Perm		0.06				c0.81
v/c Ratio	0.30	0.09		0.34	0.66	0.81
Uniform Delay, d1	5.3	4.5		5.7	31.3	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2		0.4	4.0	5.4
Delay (s)	5.7	4.7		6.1	35.3	5.4
Level of Service	A	A		A	D	A
Approach Delay (s)	5.5			6.1	11.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

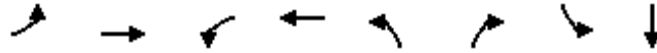
AM Peak Period
Future Background (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1544	946	1	1	4
Future Volume (Veh/h)	0	1544	946	1	1	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	0	1625	1075	1	1	4
Pedestrians			2		3	
Lane Width (m)			3.3		3.3	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.92				0.96	0.92
vC, conflicting volume	1079				1893	541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	922				1544	341
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	691				102	610
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	0	812	812	717	359	5
Volume Left	0	0	0	0	0	1
Volume Right	0	0	0	0	1	4
cSH	1700	1700	1700	1700	1700	306
Volume to Capacity	0.00	0.48	0.48	0.42	0.21	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	16.9
Lane LOS						C
Approach Delay (s)	0.0			0.0		16.9
Approach LOS						C
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			52.7%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1300	45	833	102	22	13	0
Future Volume (vph)	11	1300	45	833	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	78.0	78.0	87.5	85.5	16.7	16.7	16.3	16.3
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.15	0.15
v/c Ratio	0.03	0.68	0.18	0.33	0.54	0.09	0.05	0.04
Control Delay	7.2	12.1	7.5	2.3	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	12.5	7.5	2.3	52.0	0.7	37.8	0.2
LOS	A	B	A	A	D	A	D	A
Approach Delay		12.5		2.5				19.7
Approach LOS		B		A				B

Intersection Summary

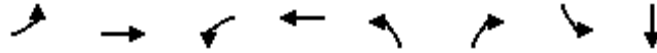
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 10.6
 Intersection Capacity Utilization 73.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1632	47	889	111	24	14	13
v/c Ratio	0.03	0.68	0.18	0.33	0.54	0.09	0.05	0.04
Control Delay	7.2	12.1	7.5	2.3	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	12.5	7.5	2.3	52.0	0.7	37.8	0.2
Queue Length 50th (m)	0.7	95.5	0.9	10.7	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.3	150.1	m4.0	12.4	37.6	0.0	7.7	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	416	2397	275	2675	432	470	546	606
Starvation Cap Reductn	0	276	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.77	0.17	0.33	0.26	0.05	0.03	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕		↔	↕		↔		↕	↔	↕	↔
Traffic Volume (vph)	11	1300	234	45	833	11	102	0	22	13	0	12
Future Volume (vph)	11	1300	234	45	833	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1743	3370		1711	3443		1711		1319	1724	1561	
Flt Permitted	0.32	1.00		0.10	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	587	3370		171	3443		1349		1319	1724	1561	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1383	249	47	877	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1624	0	47	889	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.4	73.4		82.6	82.6		14.4		14.4	14.4	14.4	
Effective Green, g (s)	77.2	77.2		85.5	85.5		16.7		16.7	16.3	16.3	
Actuated g/C Ratio	0.70	0.70		0.78	0.78		0.15		0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	411	2365		246	2676		204		200	255	231	
v/s Ratio Prot		c0.48		0.01	c0.26						0.00	
v/s Ratio Perm	0.02			0.13			c0.08		0.00	0.01		
v/c Ratio	0.03	0.69		0.19	0.33		0.54		0.02	0.05	0.01	
Uniform Delay, d1	5.0	9.4		7.4	3.7		43.1		39.7	40.2	40.0	
Progression Factor	1.00	1.00		1.99	0.48		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.6		0.3	0.3		2.9		0.0	0.1	0.0	
Delay (s)	5.1	11.1		15.0	2.1		46.1		39.7	40.3	40.0	
Level of Service	A	B		B	A		D		D	D	D	
Approach Delay (s)		11.0			2.7			44.9			40.2	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			10.2			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			10.3			
Intersection Capacity Utilization			73.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2024)

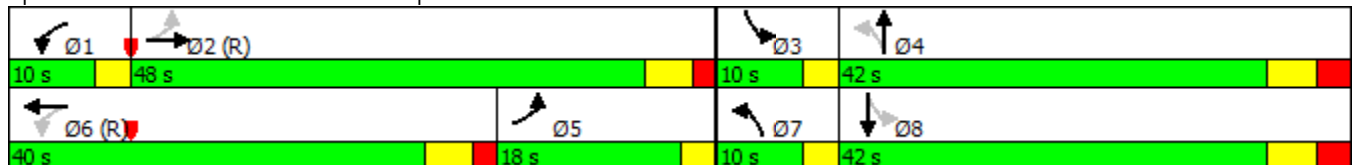


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↷	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	214	1012	137	651	26	142	33	76
Future Volume (vph)	214	1012	137	651	26	142	33	76
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	-1.8	2.2	-0.6	3.4
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	50.4	47.4	42.9	39.9	52.2	42.2	51.0	41.0
Actuated g/C Ratio	0.46	0.43	0.39	0.36	0.47	0.38	0.46	0.37
v/c Ratio	0.55	0.82	0.61	0.62	0.07	0.93	0.19	0.27
Control Delay	23.3	22.2	33.9	31.8	15.2	46.5	17.6	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	22.2	33.9	31.8	15.2	46.5	17.6	7.5
LOS	C	C	C	C	B	D	B	A
Approach Delay		22.3		32.1		45.1		8.6
Approach LOS		C		C		D		A

Intersection Summary

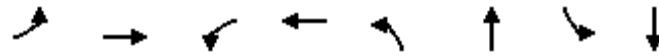
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 27.9
 Intersection LOS: C
 Intersection Capacity Utilization 82.9%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	230	1205	154	774	31	653	40	352
v/c Ratio	0.55	0.82	0.61	0.62	0.07	0.93	0.19	0.27
Control Delay	23.3	22.2	33.9	31.8	15.2	46.5	17.6	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	22.2	33.9	31.8	15.2	46.5	17.6	7.5
Queue Length 50th (m)	27.4	119.5	22.4	72.4	3.4	112.2	4.5	6.9
Queue Length 95th (m)	38.4	135.2	37.1	91.6	7.9	#167.8	9.4	13.5
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	422	1464	254	1241	453	704	215	1287
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	0.55	0.82	0.61	0.62	0.07	0.93	0.19	0.27

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	214	1012	109	137	651	38	26	142	413	33	76	212
Future Volume (vph)	214	1012	109	137	651	38	26	142	413	33	76	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		-1.8	2.2		-0.6	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3386		1711	3408		1502	1598		1601	3013	
Flt Permitted	0.25	1.00		0.15	1.00		0.50	1.00		0.10	1.00	
Satd. Flow (perm)	453	3386		266	3408		798	1598		167	3013	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	230	1088	117	154	731	43	31	167	486	40	93	259
RTOR Reduction (vph)	0	8	0	0	4	0	0	92	0	0	162	0
Lane Group Flow (vph)	230	1197	0	154	770	0	31	561	0	40	190	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	45.2	42.2		34.3	34.3		41.5	37.4		41.7	37.5	
Effective Green, g (s)	49.1	46.1		38.6	38.6		49.4	42.2		48.2	41.1	
Actuated g/C Ratio	0.45	0.42		0.35	0.35		0.45	0.38		0.44	0.37	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	419	1419		244	1195		415	613		174	1125	
v/s Ratio Prot	c0.09	c0.35		0.07	c0.23		0.01	c0.35		c0.02	0.06	
v/s Ratio Perm	0.15			0.16			0.03			0.08		
v/c Ratio	0.55	0.84		0.63	0.64		0.07	0.92		0.23	0.17	
Uniform Delay, d1	29.7	28.7		28.1	29.9		17.1	32.2		23.8	23.0	
Progression Factor	0.64	0.64		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	4.8		5.2	2.7		0.1	18.4		0.7	0.1	
Delay (s)	20.1	23.1		33.4	32.6		17.2	50.6		24.5	23.1	
Level of Service	C	C		C	C		B	D		C	C	
Approach Delay (s)		22.6			32.7			49.0			23.2	
Approach LOS		C			C			D			C	

Intersection Summary

HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.4
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	41.7	70.3	79.0	40.6	72.1	21.8
Average Queue (m)	14.8	29.5	39.5	16.8	38.2	6.4
95th Queue (m)	28.9	54.2	66.8	32.3	63.2	15.4
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	2				
Queuing Penalty (veh)	0	2				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (m)	37.0	37.9	3.1	50.3	53.9	116.9	80.5
Average Queue (m)	16.7	17.4	0.1	19.0	19.7	45.9	5.8
95th Queue (m)	31.4	33.2	2.2	40.7	42.3	84.7	54.9
Link Distance (m)	304.4	304.4		74.3	74.3	155.3	155.3
Upstream Blk Time (%)					0	0	1
Queuing Penalty (veh)					0	0	0
Storage Bay Dist (m)			70.0				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B15	B15	B15	WB	WB	SB
Directions Served	T	T	T	T		T	TR	LR
Maximum Queue (m)	22.5	32.0	26.7	61.3	9.9	8.7	6.9	9.6
Average Queue (m)	1.4	3.6	1.8	5.3	0.6	0.4	0.3	1.3
95th Queue (m)	10.1	18.7	18.6	34.5	12.6	3.9	4.0	6.5
Link Distance (m)	21.6	21.6	74.3	74.3	74.3	95.2	95.2	80.4
Upstream Blk Time (%)	0	1	0	0	0			
Queuing Penalty (veh)	2	6	0	1	0			
Storage Bay Dist (m)								
Storage Blk Time (%)	0							
Queuing Penalty (veh)	0							

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	24.7	97.6	99.4	25.7	47.3	49.5	31.4	34.6	12.8	11.6
Average Queue (m)	2.6	49.9	58.0	8.9	21.5	24.0	19.9	4.9	2.7	2.8
95th Queue (m)	13.8	94.1	100.8	19.6	40.5	44.5	33.1	20.2	9.5	9.8
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)		0	1							
Queuing Penalty (veh)		4	8							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)	0	8					4	0		
Queuing Penalty (veh)	0	1					1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	80.1	117.1	123.4	32.3	166.9	157.5	98.0	223.7	18.1	30.1	51.3
Average Queue (m)	35.7	62.6	68.2	29.7	108.3	93.4	14.0	113.1	5.0	9.9	21.1
95th Queue (m)	64.4	107.1	113.4	39.2	185.5	172.9	63.5	205.2	13.4	23.3	39.0
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)					13	6		0			
Queuing Penalty (veh)					0	0		0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				50	18		0	22		0	
Queuing Penalty (veh)				163	25		0	6		0	

Network Summary

Network wide Queuing Penalty: 219

Appendix G – 2024 Future Background Conditions – Synchro & SimTraffic Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	117	271	678	1025	189	99
Future Volume (vph)	117	271	678	1025	189	99
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.27	0.23	0.67	0.86	0.72	0.32
Control Delay	6.3	5.2	9.8	11.2	57.7	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.2	9.8	11.2	57.7	9.1
LOS	A	A	A	B	E	A
Approach Delay		5.5	10.7		40.9	
Approach LOS		A	B		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 85.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	119	277	721	1090	236	124
v/c Ratio	0.27	0.23	0.67	0.86	0.72	0.32
Control Delay	6.3	5.2	9.8	11.2	57.7	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.2	9.8	11.2	57.7	9.1
Queue Length 50th (m)	5.9	17.3	34.7	161.8	52.0	0.0
Queue Length 95th (m)	10.2	26.2	114.5	73.6	69.3	10.7
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	443	1217	1083	1268	326	386
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	0.27	0.23	0.67	0.86	0.72	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	117	271	678	1025	189	99
Future Volume (vph)	117	271	678	1025	189	99
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1634	1634	1364	1506	1334
Flt Permitted	0.27	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	437	1634	1634	1364	1506	1334
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	119	277	721	1090	236	124
RTOR Reduction (vph)	0	0	0	79	0	97
Lane Group Flow (vph)	119	277	721	1011	236	27
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	442	1217	1083	1223	326	289
v/s Ratio Prot	0.03	c0.17	0.44	c0.18	0.16	
v/s Ratio Perm	0.18			0.56		0.02
v/c Ratio	0.27	0.23	0.67	0.83	0.72	0.09
Uniform Delay, d1	14.5	4.7	12.2	3.3	43.7	37.6
Progression Factor	1.00	1.00	0.59	3.62	1.00	1.00
Incremental Delay, d2	0.3	0.4	2.3	4.6	13.1	0.6
Delay (s)	14.8	5.1	9.5	16.6	56.8	38.2
Level of Service	B	A	A	B	E	D
Approach Delay (s)		8.0	13.8		50.4	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2024)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	396	64	1492	211	476
Future Volume (vph)	396	64	1492	211	476
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	95.0	95.0	95.0	25.0	
Total Split (%)	79.2%	79.2%	79.2%	20.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	92.9	92.9	92.7	22.6	120.0
Actuated g/C Ratio	0.77	0.77	0.77	0.19	1.00
v/c Ratio	0.18	0.06	0.69	0.82	0.39
Control Delay	2.0	0.1	4.5	69.8	0.8
Queue Delay	0.0	0.0	0.2	0.0	0.0
Total Delay	2.0	0.1	4.6	69.8	0.8
LOS	A	A	A	E	A
Approach Delay	1.7		4.6	22.0	
Approach LOS	A		A	C	

Intersection Summary

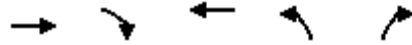
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 8.7
 Intersection Capacity Utilization 66.6%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2024)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	421	68	1658	232	523
v/c Ratio	0.18	0.06	0.69	0.82	0.39
Control Delay	2.0	0.1	4.5	69.8	0.8
Queue Delay	0.0	0.0	0.2	0.0	0.0
Total Delay	2.0	0.1	4.6	69.8	0.8
Queue Length 50th (m)	5.8	0.0	55.6	52.7	0.0
Queue Length 95th (m)	7.7	m0.0	18.5	#92.0	0.0
Internal Link Dist (m)	291.5		59.3	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2401	1067	2396	288	1348
Starvation Cap Reductn	0	0	154	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.06	0.74	0.81	0.39

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2024)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	396	64	0	1492	211	476
Future Volume (vph)	396	64	0	1492	211	476
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3104	1359		3104	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3104	1359		3104	1506	1348
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	421	68	0	1658	232	523
RTOR Reduction (vph)	0	15	0	0	0	0
Lane Group Flow (vph)	421	53	0	1658	232	523
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.4	89.4		89.4	17.6	120.0
Effective Green, g (s)	92.9	92.9		92.7	22.6	120.0
Actuated g/C Ratio	0.77	0.77		0.77	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2403	1052		2397	283	1348
v/s Ratio Prot	0.14			c0.53	c0.15	
v/s Ratio Perm		0.04				0.39
v/c Ratio	0.18	0.05		0.69	0.82	0.39
Uniform Delay, d1	3.5	3.2		6.7	46.7	0.0
Progression Factor	0.50	0.00		0.47	1.00	1.00
Incremental Delay, d2	0.1	0.1		1.2	16.7	0.8
Delay (s)	1.9	0.1		4.3	63.4	0.8
Level of Service	A	A		A	E	A
Approach Delay (s)	1.7			4.3	20.1	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

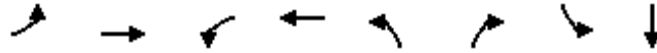
PM Peak Period
 Future Background (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	865	1810	4	2	1
Future Volume (Veh/h)	7	865	1810	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	8	972	1946	4	2	1
Pedestrians					3	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	118			
pX, platoon unblocked	0.70				0.71	0.70
vC, conflicting volume	1953				2453	978
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1495				2084	94
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				94	100
cM capacity (veh/h)	316				32	660
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	8	486	486	1297	653	3
Volume Left	8	0	0	0	0	2
Volume Right	0	0	0	0	4	1
cSH	316	1700	1700	1700	1700	47
Volume to Capacity	0.03	0.29	0.29	0.76	0.38	0.06
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	1.5
Control Delay (s)	16.7	0.0	0.0	0.0	0.0	86.4
Lane LOS	C					F
Approach Delay (s)	0.1			0.0		86.4
Approach LOS						F
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			60.2%		ICU Level of Service	B
Analysis Period (min)			15			

Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2024)

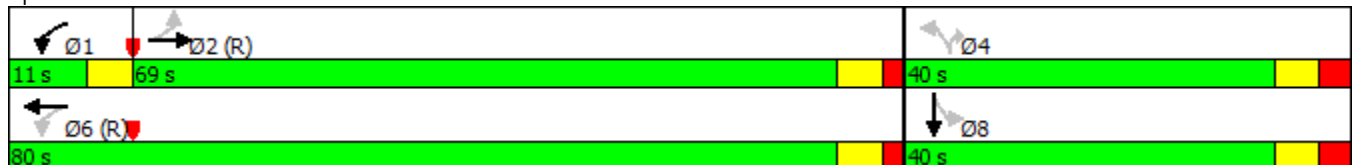


Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	802	39	1648	154	59	10	0
Future Volume (vph)	11	802	39	1648	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	81.5	81.5	92.6	90.6	24.3	24.3	21.1	21.1
Actuated g/C Ratio	0.68	0.68	0.77	0.76	0.20	0.20	0.18	0.18
v/c Ratio	0.12	0.39	0.09	0.71	0.60	0.18	0.04	0.04
Control Delay	10.2	7.2	3.9	6.2	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	10.2	7.2	3.9	6.4	51.7	9.5	37.7	0.2
LOS	B	A	A	A	D	A	D	A
Approach Delay		7.3		6.3				17.4
Approach LOS		A		A				B

Intersection Summary

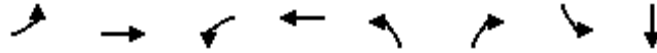
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 68.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 4: JBH Access & Northshore Blvd



Queues
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	920	44	1873	167	64	11	13
v/c Ratio	0.12	0.39	0.09	0.71	0.60	0.18	0.04	0.04
Control Delay	10.2	7.2	3.9	6.2	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	10.2	7.2	3.9	6.4	51.7	9.5	37.7	0.2
Queue Length 50th (m)	0.7	32.2	1.9	50.1	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.8	46.2	m3.4	62.2	54.1	10.4	6.8	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	103	2349	476	2628	427	521	411	484
Starvation Cap Reductn	0	0	0	187	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	0.12	0.39	0.09	0.77	0.39	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	802	54	39	1648	19	154	0	59	10	0	12
Future Volume (vph)	11	802	54	39	1648	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1745	3451		1710	3483		1741		1533	1445	1539	
Flt Permitted	0.08	1.00		0.27	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	153	3451		478	3483		1373		1533	1445	1539	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	862	58	44	1852	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	917	0	44	1873	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	77.9	77.9		87.1	87.1		19.9		19.9	19.9	19.9	
Effective Green, g (s)	80.8	80.8		90.6	90.6		24.3		24.3	21.1	21.1	
Actuated g/C Ratio	0.67	0.67		0.75	0.75		0.20		0.20	0.18	0.18	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	103	2323		450	2629		278		310	254	270	
v/s Ratio Prot		0.27		0.01	c0.54						0.00	
v/s Ratio Perm	0.08			0.07			c0.12		0.01	0.01		
v/c Ratio	0.12	0.39		0.10	0.71		0.60		0.04	0.04	0.01	
Uniform Delay, d1	6.9	8.7		4.3	7.8		43.4		38.5	41.1	40.8	
Progression Factor	0.73	0.70		0.85	0.54		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.5		0.1	1.3		3.6		0.1	0.1	0.0	
Delay (s)	7.3	6.6		3.8	5.5		47.1		38.5	41.1	40.8	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		6.6			5.5			44.7			41.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2024)

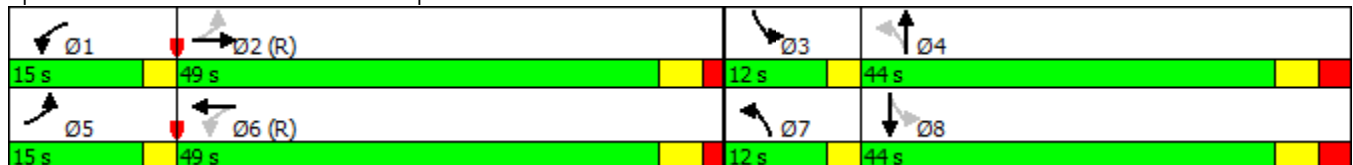


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	182	652	243	1192	79	95	72	157
Future Volume (vph)	182	652	243	1192	79	95	72	157
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	15.0	49.0	15.0	49.0	12.0	44.0	12.0	44.0
Total Split (%)	12.5%	40.8%	12.5%	40.8%	10.0%	36.7%	10.0%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.4	-4.4	-3.8	-3.8	-3.9	-3.9
Total Lost Time (s)	-2.0	1.0	-1.4	1.6	-0.8	3.2	-0.9	3.1
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	81.9	63.7	81.3	63.1	40.9	27.4	41.0	27.5
Actuated g/C Ratio	0.68	0.53	0.68	0.53	0.34	0.23	0.34	0.23
v/c Ratio	0.60	0.43	0.51	0.75	0.36	0.74	0.30	0.71
Control Delay	44.0	17.2	12.9	28.7	28.4	39.2	26.9	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	17.2	12.9	28.7	28.4	39.2	26.9	27.7
LOS	D	B	B	C	C	D	C	C
Approach Delay		22.8		26.2		37.0		27.6
Approach LOS		C		C		D		C

Intersection Summary

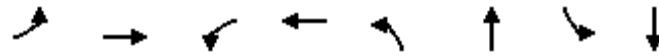
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 26.8
 Intersection LOS: C
 Intersection Capacity Utilization 85.6%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	204	775	261	1358	86	328	78	644
v/c Ratio	0.60	0.43	0.51	0.75	0.36	0.74	0.30	0.71
Control Delay	44.0	17.2	12.9	28.7	28.4	39.2	26.9	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	17.2	12.9	28.7	28.4	39.2	26.9	27.7
Queue Length 50th (m)	35.3	37.7	22.9	135.0	13.5	51.1	12.2	43.0
Queue Length 95th (m)	61.9	52.2	44.1	#216.4	21.5	75.0	19.9	56.5
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	358	1821	525	1814	247	610	268	1222
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	0.57	0.43	0.50	0.75	0.35	0.54	0.29	0.53

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	652	37	243	1192	71	79	95	207	72	157	435
Future Volume (vph)	182	652	37	243	1192	71	79	95	207	72	157	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3425		1744	3445		1727	1604		1675	3063	
Flt Permitted	0.09	1.00		0.27	1.00		0.15	1.00		0.21	1.00	
Satd. Flow (perm)	161	3425		504	3445		273	1604		379	3063	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	204	733	42	261	1282	76	86	103	225	78	171	473
RTOR Reduction (vph)	0	3	0	0	3	0	0	76	0	0	209	0
Lane Group Flow (vph)	204	772	0	261	1355	0	86	252	0	78	435	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	70.4	58.1		70.2	58.0		30.8	23.7		30.6	23.6	
Effective Green, g (s)	78.3	63.1		77.7	62.4		37.5	27.5		37.6	27.5	
Actuated g/C Ratio	0.65	0.53		0.65	0.52		0.31	0.23		0.31	0.23	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	333	1800		497	1791		217	367		236	701	
v/s Ratio Prot	c0.09	0.23		0.07	c0.39		c0.04	c0.16		0.03	0.14	
v/s Ratio Perm	0.31			0.27			0.09			0.07		
v/c Ratio	0.61	0.43		0.53	0.76		0.40	0.69		0.33	0.62	
Uniform Delay, d1	23.6	17.4		10.2	22.8		31.3	42.3		30.9	41.6	
Progression Factor	1.99	0.83		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	0.7		1.0	3.0		1.2	5.2		0.8	1.7	
Delay (s)	49.9	15.2		11.2	25.8		32.5	47.5		31.7	43.3	
Level of Service	D	B		B	C		C	D		C	D	
Approach Delay (s)		22.5			23.5			44.4			42.0	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	40.8	71.4	76.2	106.9	82.5	27.8
Average Queue (m)	23.8	26.5	46.1	54.2	37.0	10.3
95th Queue (m)	40.6	72.5	69.4	96.8	64.5	20.7
Link Distance (m)		151.8	307.2	307.2	165.7	165.7
Upstream Blk Time (%)		2				
Queuing Penalty (veh)		0				
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	6	2				
Queuing Penalty (veh)	15	2				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	L
Maximum Queue (m)	21.8	14.2	41.4	49.1	95.0
Average Queue (m)	6.8	3.1	18.3	20.9	50.1
95th Queue (m)	17.6	10.7	35.2	40.3	84.6
Link Distance (m)	307.2	307.2	75.4	75.4	160.9
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (m)	9.1	6.3	9.7
Average Queue (m)	1.3	0.3	1.2
95th Queue (m)	6.6	3.2	6.1
Link Distance (m)		20.0	92.5
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	5.0		
Storage Blk Time (%)	3	0	
Queuing Penalty (veh)	12	0	

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	14.8	42.8	48.8	15.1	62.7	80.8	32.2	75.6	19.8	11.6
Average Queue (m)	2.5	17.2	21.1	4.8	29.1	33.8	25.2	20.1	3.2	2.4
95th Queue (m)	9.7	35.6	40.6	12.5	53.7	65.2	37.0	57.8	12.7	8.6
Link Distance (m)		100.9	100.9		244.6	244.6		138.3	66.9	66.9
Upstream Blk Time (%)						0				
Queuing Penalty (veh)						0				
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0			0		14	0		
Queuing Penalty (veh)		0			0		9	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	68.4	68.2	68.2	32.4	169.4	171.2	36.5	95.3	28.8	72.7	120.4
Average Queue (m)	29.0	36.6	39.4	29.1	168.3	167.5	14.2	43.5	10.7	24.4	64.4
95th Queue (m)	53.5	60.6	61.3	39.1	175.5	179.7	28.9	78.7	23.1	50.4	105.3
Link Distance (m)		244.6	244.6		164.2	164.2		225.6		178.2	178.2
Upstream Blk Time (%)					63	51					
Queuing Penalty (veh)					0	0					
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				14	50			0		0	
Queuing Penalty (veh)				83	123			0		0	

Network Summary

Network wide Queuing Penalty: 244

Appendix G – 2024 Future Background Conditions – Synchro & SimTraffic Reports

3. Saturday Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Future Background (2024)

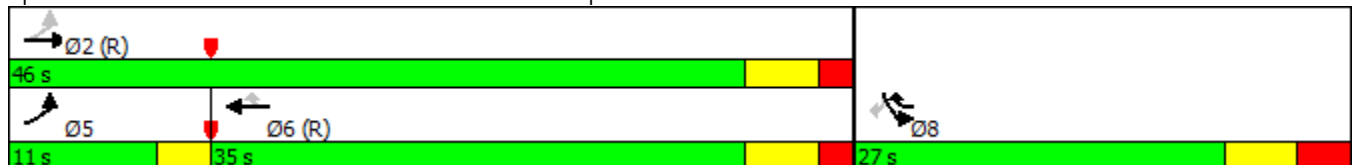


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	49	268	384	350	246	74
Future Volume (vph)	49	268	384	350	246	74
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.5	-4.5	-5.0	-5.0
Total Lost Time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	48.0	45.0	38.6	65.6	25.0	25.0
Actuated g/C Ratio	0.66	0.62	0.53	0.90	0.34	0.34
v/c Ratio	0.09	0.29	0.47	0.28	0.57	0.17
Control Delay	4.8	7.5	14.4	0.7	25.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	7.5	14.4	0.7	25.0	5.3
LOS	A	A	B	A	C	A
Approach Delay		7.1	7.9		20.4	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 10.9
 Intersection Capacity Utilization 53.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

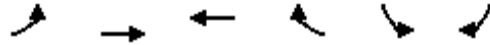


Queues

Saturday Peak Period

1: Northshore Blvd & QEW West Ramp

Future Background (2024)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	53	288	400	365	296	89
v/c Ratio	0.09	0.29	0.47	0.28	0.57	0.17
Control Delay	4.8	7.5	14.4	0.7	25.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	7.5	14.4	0.7	25.0	5.3
Queue Length 50th (m)	2.2	16.3	35.8	0.0	32.7	0.0
Queue Length 95th (m)	5.4	27.8	61.1	2.7	50.2	7.1
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	612	996	854	1285	515	509
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	0.09	0.29	0.47	0.28	0.57	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
 Future Background (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	268	384	350	246	74
Future Volume (vph)	49	268	384	350	246	74
Ideal Flow (vphpl)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
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	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1617	1617	1389	1506	1318
Flt Permitted	0.43	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	700	1617	1617	1389	1506	1318
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.83	0.83
Adj. Flow (vph)	53	288	400	365	296	89
RTOR Reduction (vph)	0	0	0	56	0	59
Lane Group Flow (vph)	53	288	400	310	296	30
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	32.9	52.9	20.0	20.0
Effective Green, g (s)	45.0	45.0	37.4	61.9	25.0	25.0
Actuated g/C Ratio	0.62	0.62	0.51	0.85	0.34	0.34
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	537	996	828	1177	515	451
v/s Ratio Prot	0.01	c0.18	c0.25	0.09	c0.20	
v/s Ratio Perm	0.05			0.13		0.02
v/c Ratio	0.10	0.29	0.48	0.26	0.57	0.07
Uniform Delay, d1	5.9	6.5	11.5	1.1	19.6	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.7	2.0	0.5	4.6	0.3
Delay (s)	6.0	7.3	13.5	1.6	24.3	16.4
Level of Service	A	A	B	A	C	B
Approach Delay (s)		7.1	7.9		22.5	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	3.5
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2024)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	420	94	621	113	331
Future Volume (vph)	420	94	621	113	331
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-2.9	-2.9	-3.3	-4.8	
Total Lost Time (s)	3.1	3.1	2.7	2.2	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	71.5	71.5	71.9	18.2	95.0
Actuated g/C Ratio	0.75	0.75	0.76	0.19	1.00
v/c Ratio	0.20	0.10	0.28	0.44	0.28
Control Delay	4.1	1.1	4.3	38.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	1.1	4.3	38.0	0.5
LOS	A	A	A	D	A
Approach Delay	3.5		4.3	10.0	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 5.7
 Intersection Capacity Utilization 44.8%
 Analysis Period (min) 15

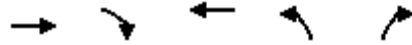
Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2024)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	457	102	647	128	376
v/c Ratio	0.20	0.10	0.28	0.44	0.28
Control Delay	4.1	1.1	4.3	38.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	1.1	4.3	38.0	0.5
Queue Length 50th (m)	10.4	0.0	15.5	20.9	0.0
Queue Length 95th (m)	19.2	4.2	27.7	34.5	0.0
Internal Link Dist (m)	288.3		59.3	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2312	1044	2325	440	1348
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.10	0.28	0.29	0.28

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2024)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	420	94	0	621	113	331
Future Volume (vph)	420	94	0	621	113	331
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	3.1	3.1		2.7	2.2	-0.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1354		3073	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1354		3073	1506	1348
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.88	0.88
Adj. Flow (vph)	457	102	0	647	128	376
RTOR Reduction (vph)	0	25	0	0	0	0
Lane Group Flow (vph)	457	77	0	647	128	376
Confl. Peds. (#/hr)		4	4			
Heavy Vehicles (%)	1%	0%	1%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	68.6	68.6		68.6	13.4	95.0
Effective Green, g (s)	71.5	71.5		71.9	18.2	95.0
Actuated g/C Ratio	0.75	0.75		0.76	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2312	1019		2325	288	1348
v/s Ratio Prot	0.15			0.21	c0.08	
v/s Ratio Perm		0.06				c0.28
v/c Ratio	0.20	0.08		0.28	0.44	0.28
Uniform Delay, d1	3.4	3.1		3.6	33.9	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		0.3	1.1	0.5
Delay (s)	3.6	3.2		3.9	35.0	0.5
Level of Service	A	A		A	D	A
Approach Delay (s)	3.5			3.9	9.3	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	5.3
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

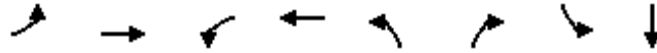
Saturday Peak Period
 Future Background (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗↗	↖↗		↘↘	
Traffic Volume (veh/h)	3	748	827	4	4	3
Future Volume (Veh/h)	3	748	827	4	4	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	3	822	871	4	4	3
Pedestrians					8	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.95				0.96	0.95
vC, conflicting volume	883				1298	446
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777				1117	317
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	803				195	647
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	3	411	411	581	294	7
Volume Left	3	0	0	0	0	4
Volume Right	0	0	0	0	4	3
cSH	803	1700	1700	1700	1700	279
Volume to Capacity	0.00	0.24	0.24	0.34	0.17	0.03
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	0.6
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	18.3
Lane LOS	A					C
Approach Delay (s)	0.0			0.0		18.3
Approach LOS						C
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			33.0%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	9	706	27	774	49	39	11	0
Future Volume (vph)	9	706	27	774	49	39	11	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-3.5	-3.5	-2.2	-2.2	0.0	0.0
Total Lost Time (s)	2.2	2.2	0.5	2.5	4.8	4.8	7.0	7.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	87.8	87.8	95.2	93.7	12.5	12.5	10.3	10.3
Actuated g/C Ratio	0.80	0.80	0.87	0.85	0.11	0.11	0.09	0.09
v/c Ratio	0.02	0.30	0.05	0.28	0.36	0.21	0.07	0.03
Control Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
LOS	A	A	A	A	D	A	D	A
Approach Delay		4.7		1.4				25.6
Approach LOS		A		A				C

Intersection Summary

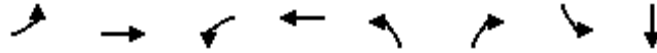
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 51.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	10	835	29	840	56	45	12	9
v/c Ratio	0.02	0.30	0.05	0.28	0.36	0.21	0.07	0.03
Control Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
Queue Length 50th (m)	0.5	27.8	0.4	8.3	11.4	0.0	2.4	0.0
Queue Length 95th (m)	2.2	42.0	1.0	9.6	22.1	4.7	8.0	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	492	2766	606	2961	441	486	518	597
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	0.02	0.30	0.05	0.28	0.13	0.09	0.02	0.02

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗		↗	↗	↘	↘
Traffic Volume (vph)	9	706	37	27	774	16	49	0	39	11	0	8
Future Volume (vph)	9	706	37	27	774	16	49	0	39	11	0	8
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		0.5	2.5		4.8		4.8	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1741	3463		1745	3477		1745		1375	1728	1561	
Flt Permitted	0.34	1.00		0.31	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	616	3463		572	3477		1381		1375	1728	1561	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	793	42	29	823	17	56	0	45	12	0	9
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	41	0	8	0
Lane Group Flow (vph)	10	833	0	29	840	0	56	0	4	12	1	0
Confl. Peds. (#/hr)	3						3		9	9		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	80.6	80.6		88.3	88.3		8.7		8.7	8.7	8.7	
Effective Green, g (s)	84.4	84.4		91.8	91.8		10.9		10.9	8.7	8.7	
Actuated g/C Ratio	0.77	0.77		0.83	0.83		0.10		0.10	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	472	2657		554	2901		136		136	136	123	
v/s Ratio Prot		c0.24		0.00	c0.24						0.00	
v/s Ratio Perm	0.02			0.04			c0.04		0.00	0.01		
v/c Ratio	0.02	0.31		0.05	0.29		0.41		0.03	0.09	0.01	
Uniform Delay, d1	3.0	3.9		1.7	2.0		46.5		44.8	47.0	46.7	
Progression Factor	1.00	1.00		0.52	0.50		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.0	0.2		2.0		0.1	0.3	0.0	
Delay (s)	3.1	4.2		0.9	1.2		48.6		44.9	47.3	46.7	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		4.2			1.2			46.9			47.0	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.32	A
Actuated Cycle Length (s)	110.0	Sum of lost time (s)
Intersection Capacity Utilization	51.9%	9.7
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		A

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Background (2024)

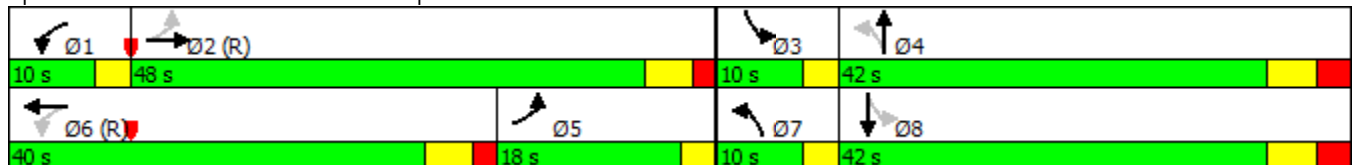


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	156	549	107	567	32	54	86	51
Future Volume (vph)	156	549	107	567	32	54	86	51
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-4.1	-4.1	-3.2	-3.2	-5.0	-5.0	-4.1	-4.1
Total Lost Time (s)	-1.1	1.9	-0.2	2.8	-2.0	2.0	-1.1	2.9
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	72.5	69.5	65.5	62.5	28.7	16.7	27.8	17.8
Actuated g/C Ratio	0.66	0.63	0.60	0.57	0.26	0.15	0.25	0.16
v/c Ratio	0.26	0.30	0.24	0.37	0.12	0.51	0.33	0.42
Control Delay	8.5	7.2	12.5	14.3	28.5	25.9	33.7	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	7.2	12.5	14.3	28.5	25.9	33.7	11.2
LOS	A	A	B	B	C	C	C	B
Approach Delay		7.4		14.1		26.4		16.7
Approach LOS		A		B		C		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 13.2
 Intersection LOS: B
 Intersection Capacity Utilization 69.7%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

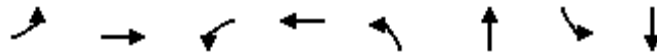


Queues

Saturday Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Background (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	168	645	115	718	36	163	91	286
v/c Ratio	0.26	0.30	0.24	0.37	0.12	0.51	0.33	0.42
Control Delay	8.5	7.2	12.5	14.3	28.5	25.9	33.7	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	7.2	12.5	14.3	28.5	25.9	33.7	11.2
Queue Length 50th (m)	5.0	30.2	10.3	41.8	5.8	15.0	15.3	5.4
Queue Length 95th (m)	26.4	53.5	21.5	63.1	12.3	32.5	26.0	16.3
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	638	2175	489	1927	307	641	272	1209
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	0.26	0.30	0.24	0.37	0.12	0.25	0.33	0.24

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Background (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	549	51	107	567	100	32	54	91	86	51	218
Future Volume (vph)	156	549	51	107	567	100	32	54	91	86	51	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-1.1	1.9		-0.2	2.8		-2.0	2.0		-1.1	2.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		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)	1740	3438		1709	3379		1691	1614		1670	2982	
Flt Permitted	0.38	1.00		0.34	1.00		0.46	1.00		0.39	1.00	
Satd. Flow (perm)	694	3438		619	3379		810	1614		689	2982	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.94	0.94	0.94
Adj. Flow (vph)	168	590	55	115	610	108	36	61	102	91	54	232
RTOR Reduction (vph)	0	4	0	0	9	0	0	72	0	0	194	0
Lane Group Flow (vph)	168	641	0	115	709	0	36	91	0	91	92	0
Confl. Peds. (#/hr)	13		10	10		13	7		17	17		7
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	3%	0%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	67.2	64.2		58.1	58.1		16.5	12.3		19.3	13.7	
Effective Green, g (s)	71.3	68.3		61.3	61.3		25.9	17.3		25.0	17.8	
Actuated g/C Ratio	0.65	0.62		0.56	0.56		0.24	0.16		0.23	0.16	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	631	2134		464	1883		264	253		243	482	
v/s Ratio Prot	0.05	c0.19		0.03	c0.21		0.01	c0.06		c0.03	0.03	
v/s Ratio Perm	0.13			0.11			0.02			0.05		
v/c Ratio	0.27	0.30		0.25	0.38		0.14	0.36		0.37	0.19	
Uniform Delay, d1	9.0	9.7		11.9	13.6		32.9	41.4		34.9	39.9	
Progression Factor	0.66	0.66		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.3	0.6		0.2	0.9		1.0	0.2	
Delay (s)	6.1	6.7		12.2	14.2		33.1	42.3		35.9	40.1	
Level of Service	A	A		B	B		C	D		D	D	
Approach Delay (s)		6.6			13.9			40.6			39.1	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.6
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	26.9	44.6	67.7	25.8	62.6	18.0
Average Queue (m)	8.4	20.4	32.4	10.1	33.7	6.9
95th Queue (m)	19.5	37.8	57.9	20.9	55.5	14.5
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	0	0				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	L
Maximum Queue (m)	25.8	24.1	37.1	35.3	43.8
Average Queue (m)	10.3	7.7	12.8	11.4	22.5
95th Queue (m)	22.1	19.7	29.9	28.2	38.3
Link Distance (m)	304.4	304.4	75.9	75.9	155.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (m)	7.1	1.8	9.7
Average Queue (m)	0.6	0.1	1.5
95th Queue (m)	4.3	1.8	6.9
Link Distance (m)		20.0	80.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	5.0		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	1		

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	9.7	53.8	54.1	12.6	37.9	41.1	29.1	12.8	13.6	10.9
Average Queue (m)	1.2	15.2	18.7	3.9	13.1	14.0	11.1	4.7	3.2	1.9
95th Queue (m)	6.1	37.7	42.6	11.1	31.3	32.2	23.4	10.9	10.7	8.0
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0					0			
Queuing Penalty (veh)		0					0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	49.0	47.1	53.1	32.3	74.3	64.0	19.7	52.2	38.1	21.5	49.4
Average Queue (m)	19.3	18.4	22.5	16.5	35.2	28.0	6.6	21.9	14.8	7.5	19.1
95th Queue (m)	37.7	41.4	46.8	33.8	64.1	55.4	16.4	42.2	30.2	18.1	37.7
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				1	10						
Queuing Penalty (veh)				2	11						

Network Summary

Network wide Queuing Penalty: 15

Appendix H – 2029 Future Background Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Saturday Peak Hour

Appendix H – 2029 Future Background Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2029)

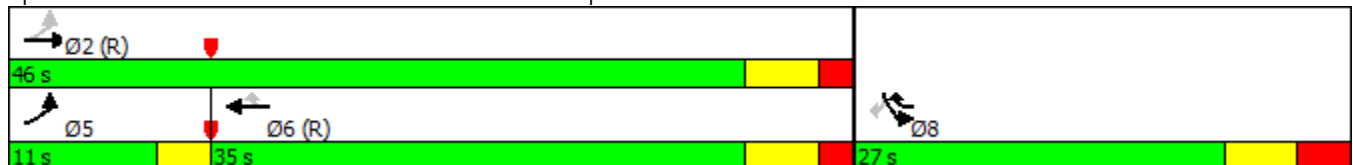


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	112	389	446	506	320	54
Future Volume (vph)	112	389	446	506	320	54
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	45.6	42.6	34.8	61.6	24.0	24.0
Actuated g/C Ratio	0.62	0.58	0.48	0.84	0.33	0.33
v/c Ratio	0.28	0.45	0.66	0.46	0.73	0.13
Control Delay	7.3	10.6	20.7	1.4	32.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	10.6	20.7	1.4	32.1	6.1
LOS	A	B	C	A	C	A
Approach Delay		9.8	10.5		28.3	
Approach LOS		A	B		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 13.9
 Intersection LOS: B
 Intersection Capacity Utilization 63.9%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	120	418	507	575	356	60
v/c Ratio	0.28	0.45	0.66	0.46	0.73	0.13
Control Delay	7.3	10.6	20.7	1.4	32.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	10.6	20.7	1.4	32.1	6.1
Queue Length 50th (m)	5.9	29.3	53.7	0.0	42.5	0.0
Queue Length 95th (m)	11.7	48.3	84.6	3.6	#79.3	7.1
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	445	925	771	1249	490	466
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	0.27	0.45	0.66	0.46	0.73	0.13

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2029)



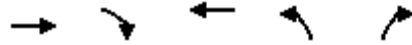
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	112	389	446	506	320	54
Future Volume (vph)	112	389	446	506	320	54
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1522	1586	1617	1375	1491	1296
Flt Permitted	0.29	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	470	1586	1617	1375	1491	1296
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	120	418	507	575	356	60
RTOR Reduction (vph)	0	0	0	121	0	40
Lane Group Flow (vph)	120	418	507	454	356	20
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	30.8	50.8	20.0	20.0
Effective Green, g (s)	42.6	42.6	34.2	57.6	24.0	24.0
Actuated g/C Ratio	0.58	0.58	0.47	0.79	0.33	0.33
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	401	925	757	1084	490	426
v/s Ratio Prot	0.04	c0.26	c0.31	0.13	c0.24	
v/s Ratio Perm	0.14			0.20		0.02
v/c Ratio	0.30	0.45	0.67	0.42	0.73	0.05
Uniform Delay, d1	8.2	8.6	15.0	2.4	21.6	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.6	4.7	1.2	9.1	0.2
Delay (s)	8.7	10.2	19.7	3.6	30.7	16.9
Level of Service	A	B	B	A	C	B
Approach Delay (s)		9.9	11.2		28.7	
Approach LOS		A	B		C	

Intersection Summary

HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	603	106	691	261	1083
Future Volume (vph)	603	106	691	261	1083
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	65.9	65.9	65.4	25.7	95.0
Actuated g/C Ratio	0.69	0.69	0.69	0.27	1.00
v/c Ratio	0.33	0.14	0.37	0.71	0.89
Control Delay	6.6	1.4	7.2	41.1	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	1.4	7.2	41.1	10.6
LOS	A	A	A	D	B
Approach Delay	5.8		7.2	16.6	
Approach LOS	A		A	B	

Intersection Summary

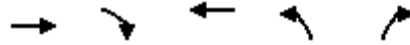
Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 11.3
 Intersection Capacity Utilization 54.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	701	123	785	287	1190
v/c Ratio	0.33	0.14	0.37	0.71	0.89
Control Delay	6.6	1.4	7.2	41.1	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	1.4	7.2	41.1	10.6
Queue Length 50th (m)	25.6	0.0	30.4	45.7	0.0
Queue Length 95th (m)	32.2	4.5	39.0	73.3	#19.6
Internal Link Dist (m)	288.3		57.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2131	902	2115	443	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.37	0.65	0.89

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2029)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	603	106	0	691	261	1083
Future Volume (vph)	603	106	0	691	261	1083
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1247		3073	1506	1334
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1247		3073	1506	1334
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	701	123	0	785	287	1190
RTOR Reduction (vph)	0	38	0	0	0	0
Lane Group Flow (vph)	701	85	0	785	287	1190
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	61.3	61.3		61.3	20.7	95.0
Effective Green, g (s)	65.9	65.9		65.4	25.7	95.0
Actuated g/C Ratio	0.69	0.69		0.69	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2131	865		2115	407	1334
v/s Ratio Prot	0.23			0.26	0.19	
v/s Ratio Perm		0.07				c0.89
v/c Ratio	0.33	0.10		0.37	0.71	0.89
Uniform Delay, d1	5.8	4.8		6.2	31.2	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2		0.5	5.5	9.4
Delay (s)	6.2	5.0		6.7	36.7	9.4
Level of Service	A	A		A	D	A
Approach Delay (s)	6.0			6.7	14.7	
Approach LOS	A			A	B	

Intersection Summary

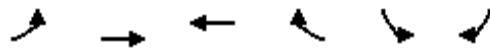
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

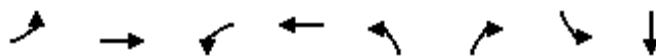
AM Peak Period
Future Background (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1686	1023	1	1	4
Future Volume (Veh/h)	0	1686	1023	1	1	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	0	1775	1163	1	1	4
Pedestrians			2		3	
Lane Width (m)			3.3		3.3	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.91				0.95	0.91
vC, conflicting volume	1167				2056	585
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	994				1656	357
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	642				86	588
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	0	888	888	775	389	5
Volume Left	0	0	0	0	0	1
Volume Right	0	0	0	0	1	4
cSH	1700	1700	1700	1700	1700	271
Volume to Capacity	0.00	0.52	0.52	0.46	0.23	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	18.5
Lane LOS						C
Approach Delay (s)	0.0			0.0		18.5
Approach LOS						C
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			56.6%		ICU Level of Service	B
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1442	45	910	102	22	13	0
Future Volume (vph)	11	1442	45	910	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	78.0	78.0	87.5	85.5	16.7	16.7	16.3	16.3
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.15	0.15
v/c Ratio	0.03	0.74	0.20	0.36	0.54	0.09	0.05	0.04
Control Delay	7.3	13.8	11.9	2.7	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	14.4	11.9	2.7	52.0	0.7	37.8	0.2
LOS	A	B	B	A	D	A	D	A
Approach Delay		14.3		3.2				19.7
Approach LOS		B		A				B

Intersection Summary

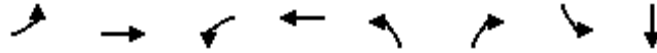
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 11.9
 Intersection LOS: B
 Intersection Capacity Utilization 77.8%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1783	47	970	111	24	14	13
v/c Ratio	0.03	0.74	0.20	0.36	0.54	0.09	0.05	0.04
Control Delay	7.3	13.8	11.9	2.7	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	14.4	11.9	2.7	52.0	0.7	37.8	0.2
Queue Length 50th (m)	0.7	114.5	0.9	11.7	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.3	180.1	m5.5	21.9	37.6	0.0	7.7	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	383	2402	246	2676	432	470	546	588
Starvation Cap Reductn	0	254	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.83	0.19	0.36	0.26	0.05	0.03	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1442	234	45	910	11	102	0	22	13	0	12
Future Volume (vph)	11	1442	234	45	910	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1743	3377		1711	3444		1711		1319	1724	1561	
Flt Permitted	0.30	1.00		0.07	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	542	3377		129	3444		1349		1319	1724	1561	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1534	249	47	958	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1776	0	47	970	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.4	73.4		82.6	82.6		14.4		14.4	14.4	14.4	
Effective Green, g (s)	77.2	77.2		85.5	85.5		16.7		16.7	16.3	16.3	
Actuated g/C Ratio	0.70	0.70		0.78	0.78		0.15		0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	380	2370		216	2676		204		200	255	231	
v/s Ratio Prot		c0.53		0.02	c0.28						0.00	
v/s Ratio Perm	0.02			0.15			c0.08		0.00	0.01		
v/c Ratio	0.03	0.75		0.22	0.36		0.54		0.02	0.05	0.01	
Uniform Delay, d1	5.0	10.3		9.6	3.8		43.1		39.7	40.2	40.0	
Progression Factor	1.00	1.00		3.29	0.57		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2	2.2		0.4	0.3		2.9		0.0	0.1	0.0	
Delay (s)	5.2	12.5		32.1	2.5		46.1		39.7	40.3	40.0	
Level of Service	A	B		C	A		D		D	D	D	
Approach Delay (s)		12.5			3.8			44.9			40.2	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2029)

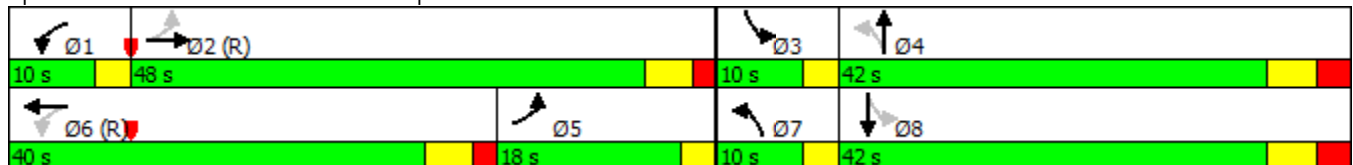


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	226	1136	145	715	28	149	35	80
Future Volume (vph)	226	1136	145	715	28	149	35	80
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	-1.8	2.2	-0.6	3.4
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	48.9	45.9	41.3	38.3	53.8	43.8	52.6	42.7
Actuated g/C Ratio	0.44	0.42	0.38	0.35	0.49	0.40	0.48	0.39
v/c Ratio	0.63	0.95	0.65	0.71	0.07	0.95	0.20	0.28
Control Delay	27.4	31.5	36.8	34.9	15.2	49.7	17.8	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	31.5	36.8	34.9	15.2	49.7	17.8	7.5
LOS	C	C	D	C	B	D	B	A
Approach Delay		30.9		35.2		48.2		8.6
Approach LOS		C		D		D		A

Intersection Summary

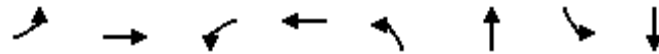
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 32.9
 Intersection LOS: C
 Intersection Capacity Utilization 88.7%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	243	1346	163	848	33	688	43	370
v/c Ratio	0.63	0.95	0.65	0.71	0.07	0.95	0.20	0.28
Control Delay	27.4	31.5	36.8	34.9	15.2	49.7	17.8	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	31.5	36.8	34.9	15.2	49.7	17.8	7.5
Queue Length 50th (m)	29.9	142.6	23.9	81.7	3.6	~135.1	4.8	7.3
Queue Length 95th (m)	m38.9	#187.1	#39.2	102.4	8.3	#183.9	9.9	13.8
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	387	1421	251	1191	459	726	215	1335
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	0.63	0.95	0.65	0.71	0.07	0.95	0.20	0.28

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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	1136	115	145	715	40	28	149	436	35	80	223
Future Volume (vph)	226	1136	115	145	715	40	28	149	436	35	80	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		-1.8	2.2		-0.6	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3389		1711	3410		1502	1598		1601	3014	
Flt Permitted	0.19	1.00		0.16	1.00		0.49	1.00		0.10	1.00	
Satd. Flow (perm)	343	3389		279	3410		781	1598		160	3014	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	243	1222	124	163	803	45	33	175	513	43	98	272
RTOR Reduction (vph)	0	7	0	0	4	0	0	90	0	0	166	0
Lane Group Flow (vph)	243	1339	0	163	844	0	33	598	0	43	204	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	43.8	40.8		32.8	32.8		43.1	39.0		43.3	39.1	
Effective Green, g (s)	47.7	44.7		37.1	37.1		51.0	43.8		49.8	42.7	
Actuated g/C Ratio	0.43	0.41		0.34	0.34		0.46	0.40		0.45	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	383	1377		241	1150		420	636		174	1169	
v/s Ratio Prot	c0.11	c0.40		0.07	c0.25		0.01	c0.37		c0.02	0.07	
v/s Ratio Perm	0.17			0.16			0.03			0.09		
v/c Ratio	0.63	0.97		0.68	0.73		0.08	0.94		0.25	0.17	
Uniform Delay, d1	32.9	32.0		29.1	32.1		16.2	31.8		23.7	22.1	
Progression Factor	0.64	0.65		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	14.5		7.3	4.2		0.1	21.8		0.7	0.1	
Delay (s)	23.6	35.2		36.4	36.3		16.3	53.6		24.4	22.2	
Level of Service	C	D		D	D		B	D		C	C	
Approach Delay (s)		33.4			36.3			51.9			22.4	
Approach LOS		C			D			D			C	

Intersection Summary

HCM 2000 Control Delay	36.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.4
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	40.1	72.4	81.2	43.4	73.7	18.0
Average Queue (m)	16.5	31.4	39.6	17.6	40.1	6.6
95th Queue (m)	31.3	58.0	69.9	33.5	65.9	14.5
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	2				
Queuing Penalty (veh)	0	3				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (m)	37.8	37.6	3.6	47.1	47.0	159.8	162.5
Average Queue (m)	17.8	17.5	0.1	19.0	20.4	60.2	29.2
95th Queue (m)	32.5	33.3	2.7	40.0	42.0	128.3	130.8
Link Distance (m)	304.4	304.4		74.3	74.3	155.3	155.3
Upstream Blk Time (%)						1	3
Queuing Penalty (veh)						0	0
Storage Bay Dist (m)			70.0				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B15	B15	B15	WB	WB	SB
Directions Served	T	T	T	T		T	TR	LR
Maximum Queue (m)	25.0	37.8	58.4	76.4	51.6	2.7	2.7	9.0
Average Queue (m)	2.8	5.5	4.3	9.1	2.7	0.1	0.1	1.2
95th Queue (m)	15.8	24.7	29.8	46.5	26.9	1.6	1.6	6.1
Link Distance (m)	21.6	21.6	74.3	74.3	74.3	95.2	95.2	80.4
Upstream Blk Time (%)	1	2	0	0	0			
Queuing Penalty (veh)	6	17	0	2	1			
Storage Bay Dist (m)								
Storage Blk Time (%)	1							
Queuing Penalty (veh)	0							

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	27.8	99.5	101.3	22.1	47.2	50.4	31.7	42.1	14.8	11.0
Average Queue (m)	2.9	55.5	63.1	8.1	25.0	27.8	19.1	7.1	3.5	2.7
95th Queue (m)	15.5	101.0	106.5	18.2	43.0	47.0	32.1	26.2	11.3	9.6
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)		1	2							
Queuing Penalty (veh)		12	18							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)	0	9					3	0		
Queuing Penalty (veh)	0	1					1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	133.5	191.6	193.7	32.3	174.0	175.4	107.4	260.4	22.1	25.4	53.8
Average Queue (m)	56.1	113.5	119.6	31.6	151.0	143.5	27.0	182.8	6.9	10.5	23.8
95th Queue (m)	133.2	203.5	208.2	35.9	207.0	207.7	96.0	312.5	17.2	21.7	42.3
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)		0	0		56	28		22			
Queuing Penalty (veh)		2	3		0	0		0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	0	4		76	12		0	46			
Queuing Penalty (veh)	0	9		273	18		1	13			

Network Summary

Network wide Queuing Penalty: 381

Appendix H – 2029 Future Background Conditions – Synchro & SimTraffic Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	129	286	716	1131	208	110
Future Volume (vph)	129	286	716	1131	208	110
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.32	0.24	0.70	0.95	0.80	0.35
Control Delay	7.4	5.3	10.3	20.3	63.5	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	5.3	10.3	20.3	63.5	9.0
LOS	A	A	B	C	E	A
Approach Delay		6.0	16.4		44.6	
Approach LOS		A	B		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 18.8
 Intersection Capacity Utilization 93.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service F

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	132	292	762	1203	260	138
v/c Ratio	0.32	0.24	0.70	0.95	0.80	0.35
Control Delay	7.4	5.3	10.3	20.3	63.5	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	5.3	10.3	20.3	63.5	9.0
Queue Length 50th (m)	6.6	18.5	36.6	205.9	58.4	0.0
Queue Length 95th (m)	11.2	27.7	m110.1	m#341.8	76.7	11.1
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	417	1217	1083	1261	326	397
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	0.32	0.24	0.70	0.95	0.80	0.35

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	129	286	716	1131	208	110
Future Volume (vph)	129	286	716	1131	208	110
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1634	1634	1364	1506	1334
Flt Permitted	0.25	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	401	1634	1634	1364	1506	1334
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	132	292	762	1203	260	138
RTOR Reduction (vph)	0	0	0	72	0	108
Lane Group Flow (vph)	132	292	762	1131	260	30
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	418	1217	1083	1223	326	289
v/s Ratio Prot	c0.03	0.18	0.47	c0.20	0.17	
v/s Ratio Perm	0.21			0.63		0.02
v/c Ratio	0.32	0.24	0.70	0.92	0.80	0.10
Uniform Delay, d1	16.6	4.8	12.8	4.8	44.5	37.7
Progression Factor	1.00	1.00	0.59	2.81	1.00	1.00
Incremental Delay, d2	0.4	0.5	2.4	8.9	18.1	0.7
Delay (s)	17.0	5.2	9.9	22.4	62.6	38.4
Level of Service	B	A	A	C	E	D
Approach Delay (s)		8.9	17.6		54.2	
Approach LOS		A	B		D	

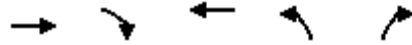
Intersection Summary

HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	423	71	1614	233	525
Future Volume (vph)	423	71	1614	233	525
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	95.0	95.0	95.0	25.0	
Total Split (%)	79.2%	79.2%	79.2%	20.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	92.5	92.5	92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77	0.77	0.19	1.00
v/c Ratio	0.19	0.07	0.75	0.89	0.43
Control Delay	2.0	0.1	4.6	78.9	1.0
Queue Delay	0.0	0.0	0.3	12.5	0.0
Total Delay	2.0	0.1	4.9	91.4	1.0
LOS	A	A	A	F	A
Approach Delay	1.7		4.9	28.8	
Approach LOS	A		A	C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 10.7
 Intersection Capacity Utilization 71.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	450	76	1793	256	577
v/c Ratio	0.19	0.07	0.75	0.89	0.43
Control Delay	2.0	0.1	4.6	78.9	1.0
Queue Delay	0.0	0.0	0.3	12.5	0.0
Total Delay	2.0	0.1	4.9	91.4	1.0
Queue Length 50th (m)	6.1	0.0	55.8	59.3	0.0
Queue Length 95th (m)	m8.0	m0.0	18.3	#105.7	0.0
Internal Link Dist (m)	291.5		59.3	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2392	1064	2387	288	1348
Starvation Cap Reductn	0	0	156	0	0
Spillback Cap Reductn	0	0	22	25	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.07	0.80	0.97	0.43

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2029)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	423	71	0	1614	233	525
Future Volume (vph)	423	71	0	1614	233	525
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3104	1359		3104	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3104	1359		3104	1506	1348
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	450	76	0	1793	256	577
RTOR Reduction (vph)	0	17	0	0	0	0
Lane Group Flow (vph)	450	59	0	1793	256	577
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	92.5	92.5		92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77		0.77	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2392	1047		2387	288	1348
v/s Ratio Prot	0.14			c0.58	c0.17	
v/s Ratio Perm		0.04				0.43
v/c Ratio	0.19	0.06		0.75	0.89	0.43
Uniform Delay, d1	3.7	3.3		7.6	47.3	0.0
Progression Factor	0.49	0.00		0.40	1.00	1.00
Incremental Delay, d2	0.2	0.1		1.5	26.4	1.0
Delay (s)	2.0	0.1		4.5	73.7	1.0
Level of Service	A	A		A	E	A
Approach Delay (s)	1.7			4.5	23.3	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

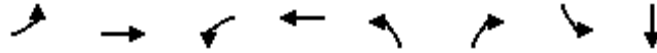
PM Peak Period
Future Background (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	941	1965	4	2	1
Future Volume (Veh/h)	7	941	1965	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	8	1057	2113	4	2	1
Pedestrians					3	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	118			
pX, platoon unblocked	0.61				0.62	0.61
vC, conflicting volume	2120				2662	1062
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1550				2263	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	100
cM capacity (veh/h)	262				21	660
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	8	528	528	1409	708	3
Volume Left	8	0	0	0	0	2
Volume Right	0	0	0	0	4	1
cSH	262	1700	1700	1700	1700	31
Volume to Capacity	0.03	0.31	0.31	0.83	0.42	0.10
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	2.2
Control Delay (s)	19.2	0.0	0.0	0.0	0.0	131.6
Lane LOS	C					F
Approach Delay (s)	0.1			0.0		131.6
Approach LOS						F
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			

Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	878	39	1803	154	59	10	0
Future Volume (vph)	11	878	39	1803	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	81.5	81.5	92.6	90.6	24.3	24.3	21.1	21.1
Actuated g/C Ratio	0.68	0.68	0.77	0.76	0.20	0.20	0.18	0.18
v/c Ratio	0.16	0.43	0.10	0.78	0.60	0.18	0.04	0.04
Control Delay	13.0	7.5	3.8	8.3	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Total Delay	13.0	7.5	3.8	8.7	51.7	9.5	37.7	0.2
LOS	B	A	A	A	D	A	D	A
Approach Delay		7.5		8.6				17.4
Approach LOS		A		A				B

Intersection Summary

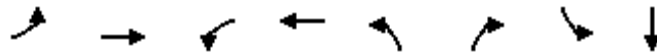
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 10.5
 Intersection Capacity Utilization 72.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 4: JBH Access & Northshore Blvd



Queues
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1002	44	2047	167	64	11	13
v/c Ratio	0.16	0.43	0.10	0.78	0.60	0.18	0.04	0.04
Control Delay	13.0	7.5	3.8	8.3	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Total Delay	13.0	7.5	3.8	8.7	51.7	9.5	37.7	0.2
Queue Length 50th (m)	0.7	35.7	1.9	55.2	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.6	51.0	m2.9	68.7	54.1	10.4	6.8	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	74	2348	443	2628	427	521	411	484
Starvation Cap Reductn	0	0	0	181	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	0.16	0.43	0.10	0.84	0.39	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	878	54	39	1803	19	154	0	59	10	0	12
Future Volume (vph)	11	878	54	39	1803	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1745	3454		1710	3483		1741		1533	1445	1539	
Flt Permitted	0.06	1.00		0.24	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	109	3454		429	3483		1373		1533	1445	1539	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	944	58	44	2026	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	999	0	44	2047	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	77.9	77.9		87.1	87.1		19.9		19.9	19.9	19.9	
Effective Green, g (s)	80.8	80.8		90.6	90.6		24.3		24.3	21.1	21.1	
Actuated g/C Ratio	0.67	0.67		0.75	0.75		0.20		0.20	0.18	0.18	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	73	2325		416	2629		278		310	254	270	
v/s Ratio Prot		0.29		0.01	c0.59						0.00	
v/s Ratio Perm	0.11			0.07			c0.12		0.01	0.01		
v/c Ratio	0.16	0.43		0.11	0.78		0.60		0.04	0.04	0.01	
Uniform Delay, d1	7.2	9.0		4.5	8.7		43.4		38.5	41.1	40.8	
Progression Factor	0.71	0.69		0.81	0.66		1.00		1.00	1.00	1.00	
Incremental Delay, d2	4.6	0.6		0.1	1.5		3.6		0.1	0.1	0.0	
Delay (s)	9.7	6.8		3.8	7.3		47.1		38.5	41.1	40.8	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		6.8			7.2			44.7			41.0	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2029)

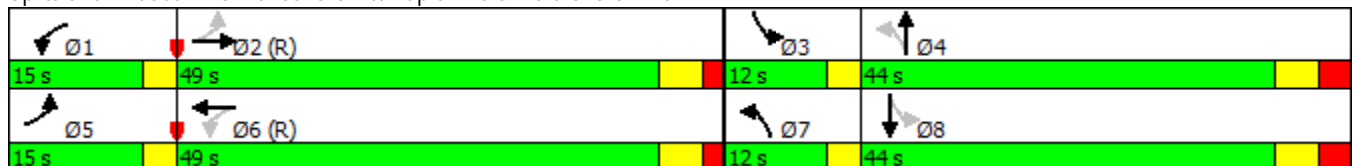


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	192	716	257	1318	84	100	76	166
Future Volume (vph)	192	716	257	1318	84	100	76	166
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	15.0	49.0	15.0	49.0	12.0	44.0	12.0	44.0
Total Split (%)	12.5%	40.8%	12.5%	40.8%	10.0%	36.7%	10.0%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.4	-4.4	-3.8	-3.8	-3.9	-3.9
Total Lost Time (s)	-2.0	1.0	-1.4	1.6	-0.8	3.2	-0.9	3.1
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	78.1	58.8	77.5	58.7	44.7	31.2	44.8	29.4
Actuated g/C Ratio	0.65	0.49	0.65	0.49	0.37	0.26	0.37	0.24
v/c Ratio	0.67	0.50	0.60	0.89	0.37	0.71	0.29	0.87dr
Control Delay	52.7	19.4	16.0	37.2	27.1	36.3	25.1	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	19.4	16.0	37.2	27.1	36.3	25.1	28.5
LOS	D	B	B	D	C	D	C	C
Approach Delay		26.2		33.9		34.4		28.2
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 30.8
 Intersection LOS: C
 Intersection Capacity Utilization 90.3%
 ICU Level of Service E
 Analysis Period (min) 15
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	216	848	276	1498	91	347	83	679
v/c Ratio	0.67	0.50	0.60	0.89	0.37	0.71	0.29	0.87dr
Control Delay	52.7	19.4	16.0	37.2	27.1	36.3	25.1	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	19.4	16.0	37.2	27.1	36.3	25.1	28.5
Queue Length 50th (m)	41.4	43.0	25.5	167.6	14.0	55.2	12.7	48.1
Queue Length 95th (m)	68.0	56.2	49.1	#253.4	21.6	79.0	20.1	60.7
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	338	1682	471	1689	253	610	295	1217
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	0.64	0.50	0.59	0.89	0.36	0.57	0.28	0.56

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	192	716	39	257	1318	75	84	100	219	76	166	459
Future Volume (vph)	192	716	39	257	1318	75	84	100	219	76	166	459
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3426		1744	3446		1727	1604		1675	3063	
Flt Permitted	0.07	1.00		0.23	1.00		0.14	1.00		0.25	1.00	
Satd. Flow (perm)	130	3426		417	3446		261	1604		433	3063	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	804	44	276	1417	81	91	109	238	83	180	499
RTOR Reduction (vph)	0	3	0	0	3	0	0	73	0	0	197	0
Lane Group Flow (vph)	216	845	0	276	1495	0	91	274	0	83	482	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	66.1	53.3		66.9	53.7		35.9	27.4		33.1	26.0	
Effective Green, g (s)	74.5	58.3		73.9	58.1		41.3	31.2		40.9	29.9	
Actuated g/C Ratio	0.62	0.49		0.62	0.48		0.34	0.26		0.34	0.25	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	1664		451	1668		240	417		261	763	
v/s Ratio Prot	c0.10	0.25		0.09	c0.43		c0.04	c0.17		0.03	0.16	
v/s Ratio Perm	0.32			0.29			0.09			0.08		
v/c Ratio	0.68	0.51		0.61	0.90		0.38	0.66		0.32	0.87dr	
Uniform Delay, d1	31.7	21.1		13.0	28.2		28.9	39.6		28.7	40.1	
Progression Factor	1.69	0.81		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	1.0		2.5	8.0		1.0	3.7		0.7	1.7	
Delay (s)	58.7	18.2		15.4	36.2		29.9	43.3		29.4	41.8	
Level of Service	E	B		B	D		C	D		C	D	
Approach Delay (s)		26.4			32.9			40.5			40.5	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

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

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	41.9	100.8	80.1	142.1	79.0	31.7
Average Queue (m)	27.2	32.0	48.9	65.7	41.5	12.0
95th Queue (m)	45.2	80.9	71.2	119.5	70.1	24.0
Link Distance (m)		151.8	307.2	307.2	165.7	165.7
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	10	3				
Queuing Penalty (veh)	28	4				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (m)	22.7	20.9	41.3	46.4	117.9	16.6
Average Queue (m)	7.4	3.8	19.4	23.5	64.9	2.7
95th Queue (m)	18.6	13.6	35.4	41.8	114.5	37.0
Link Distance (m)	307.2	307.2	75.4	75.4	160.9	160.9
Upstream Blk Time (%)					1	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B15	B15	SB
Directions Served	L	T	T	T	LR
Maximum Queue (m)	9.1	13.8	3.8	1.5	7.2
Average Queue (m)	1.4	1.0	0.1	0.0	0.5
95th Queue (m)	6.6	7.5	2.8	1.5	3.9
Link Distance (m)		20.0	75.4	75.4	92.5
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		1			
Storage Bay Dist (m)	5.0				
Storage Blk Time (%)	3	0			
Queuing Penalty (veh)	15	0			

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	11.4	45.8	49.1	15.6	60.0	64.2	32.3	77.6	18.1	12.4
Average Queue (m)	2.1	19.1	23.5	5.0	30.1	34.6	25.7	20.9	2.9	2.8
95th Queue (m)	7.9	38.3	43.0	13.0	54.2	59.1	37.6	59.4	11.6	9.6
Link Distance (m)		100.9	100.9		244.6	244.6		138.3	66.9	66.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0			0		16	1		
Queuing Penalty (veh)		0			0		10	1		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	67.7	70.6	76.2	32.3	170.0	175.3	42.8	98.4	41.8	86.2	138.2
Average Queue (m)	33.1	42.4	46.4	28.0	168.8	169.0	15.3	44.2	13.5	27.3	69.1
95th Queue (m)	59.5	65.4	70.8	39.7	169.6	171.9	34.7	79.1	29.3	57.7	115.7
Link Distance (m)		244.6	244.6		164.2	164.2		225.6		178.2	178.2
Upstream Blk Time (%)					67	57					0
Queuing Penalty (veh)					0	0					0
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				13	52		0	0	0	0	
Queuing Penalty (veh)				88	134		0	0	0	0	

Network Summary

Network wide Queuing Penalty: 281

Appendix H – 2029 Future Background Conditions – Synchro & SimTraffic Reports

3. Saturday Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Future Background (2029)

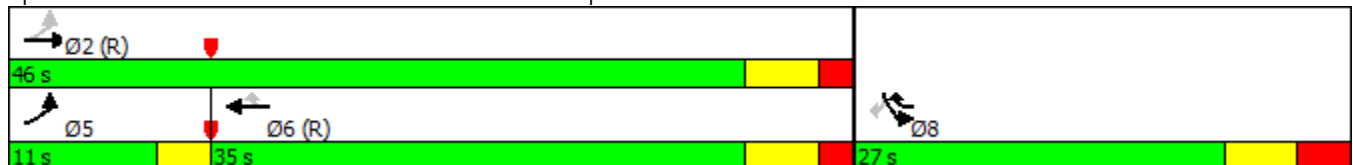


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	54	283	406	386	272	82
Future Volume (vph)	54	283	406	386	272	82
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.5	-4.5	-5.0	-5.0
Total Lost Time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	48.0	45.0	38.5	65.5	25.0	25.0
Actuated g/C Ratio	0.66	0.62	0.53	0.90	0.34	0.34
v/c Ratio	0.10	0.31	0.50	0.31	0.64	0.19
Control Delay	4.9	7.6	14.9	0.8	26.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	7.6	14.9	0.8	26.9	5.1
LOS	A	A	B	A	C	A
Approach Delay		7.2	8.0		21.9	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 11.5
 Intersection LOS: B
 Intersection Capacity Utilization 56.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

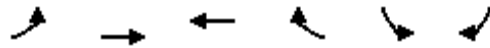


Queues

Saturday Peak Period

1: Northshore Blvd & QEW West Ramp

Future Background (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	58	304	423	402	328	99
v/c Ratio	0.10	0.31	0.50	0.31	0.64	0.19
Control Delay	4.9	7.6	14.9	0.8	26.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	7.6	14.9	0.8	26.9	5.1
Queue Length 50th (m)	2.4	17.4	38.6	0.0	37.2	0.0
Queue Length 95th (m)	5.8	29.4	66.0	3.0	56.2	7.5
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	596	996	852	1287	515	516
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	0.10	0.31	0.50	0.31	0.64	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Future Background (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	54	283	406	386	272	82
Future Volume (vph)	54	283	406	386	272	82
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
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	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1617	1617	1389	1506	1318
Flt Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	666	1617	1617	1389	1506	1318
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.83	0.83
Adj. Flow (vph)	58	304	423	402	328	99
RTOR Reduction (vph)	0	0	0	62	0	65
Lane Group Flow (vph)	58	304	423	340	328	34
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	32.8	52.8	20.0	20.0
Effective Green, g (s)	45.0	45.0	37.3	61.8	25.0	25.0
Actuated g/C Ratio	0.62	0.62	0.51	0.85	0.34	0.34
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	522	996	826	1175	515	451
v/s Ratio Prot	0.01	c0.19	c0.26	0.10	c0.22	
v/s Ratio Perm	0.05			0.15		0.03
v/c Ratio	0.11	0.31	0.51	0.29	0.64	0.08
Uniform Delay, d1	6.0	6.6	11.8	1.1	20.2	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	2.3	0.6	5.9	0.3
Delay (s)	6.1	7.4	14.1	1.8	26.1	16.5
Level of Service	A	A	B	A	C	B
Approach Delay (s)		7.2	8.1		23.9	
Approach LOS		A	A		C	

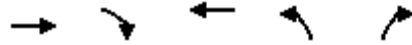
Intersection Summary

HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	3.5
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	451	104	668	124	365
Future Volume (vph)	451	104	668	124	365
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-2.9	-2.9	-3.3	-4.8	
Total Lost Time (s)	3.1	3.1	2.7	2.2	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	70.8	70.8	71.2	18.9	95.0
Actuated g/C Ratio	0.75	0.75	0.75	0.20	1.00
v/c Ratio	0.21	0.11	0.30	0.47	0.31
Control Delay	4.4	1.2	4.7	37.9	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	1.2	4.7	37.9	0.6
LOS	A	A	A	D	A
Approach Delay	3.8		4.7	10.1	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 6.0
 Intersection Capacity Utilization 45.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	490	113	696	141	415
v/c Ratio	0.21	0.11	0.30	0.47	0.31
Control Delay	4.4	1.2	4.7	37.9	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	1.2	4.7	37.9	0.6
Queue Length 50th (m)	11.8	0.0	17.8	23.0	0.0
Queue Length 95th (m)	21.6	4.7	31.7	36.8	0.0
Internal Link Dist (m)	288.3		59.3	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2288	1037	2301	440	1348
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.11	0.30	0.32	0.31

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2029)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	451	104	0	668	124	365
Future Volume (vph)	451	104	0	668	124	365
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	3.1	3.1		2.7	2.2	-0.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1354		3073	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1354		3073	1506	1348
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.88	0.88
Adj. Flow (vph)	490	113	0	696	141	415
RTOR Reduction (vph)	0	29	0	0	0	0
Lane Group Flow (vph)	490	84	0	696	141	415
Confl. Peds. (#/hr)		4	4			
Heavy Vehicles (%)	1%	0%	1%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	67.9	67.9		67.9	14.1	95.0
Effective Green, g (s)	70.8	70.8		71.2	18.9	95.0
Actuated g/C Ratio	0.75	0.75		0.75	0.20	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2290	1009		2303	299	1348
v/s Ratio Prot	0.16			0.23	c0.09	
v/s Ratio Perm		0.06				c0.31
v/c Ratio	0.21	0.08		0.30	0.47	0.31
Uniform Delay, d1	3.7	3.3		3.9	33.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		0.3	1.2	0.6
Delay (s)	3.9	3.4		4.2	34.8	0.6
Level of Service	A	A		A	C	A
Approach Delay (s)	3.8			4.2	9.3	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	5.3
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

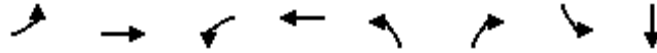
Saturday Peak Period
Future Background (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	813	895	4	4	3
Future Volume (Veh/h)	3	813	895	4	4	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	3	893	942	4	4	3
Pedestrians					8	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.94				0.96	0.94
vC, conflicting volume	954				1404	481
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	834				1191	334
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	758				174	627
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	3	446	446	628	318	7
Volume Left	3	0	0	0	0	4
Volume Right	0	0	0	0	4	3
cSH	758	1700	1700	1700	1700	252
Volume to Capacity	0.00	0.26	0.26	0.37	0.19	0.03
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	0.6
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	19.7
Lane LOS	A					C
Approach Delay (s)	0.0			0.0		19.7
Approach LOS						C
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			34.9%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	9	771	27	842	49	39	11	0
Future Volume (vph)	9	771	27	842	49	39	11	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-3.5	-3.5	-2.2	-2.2	0.0	0.0
Total Lost Time (s)	2.2	2.2	0.5	2.5	4.8	4.8	7.0	7.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	87.8	87.8	95.2	93.7	12.5	12.5	10.3	10.3
Actuated g/C Ratio	0.80	0.80	0.87	0.85	0.11	0.11	0.09	0.09
v/c Ratio	0.02	0.33	0.05	0.31	0.36	0.21	0.07	0.03
Control Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
LOS	A	A	A	A	D	A	D	A
Approach Delay		4.9		1.4				25.7
Approach LOS		A		A				C

Intersection Summary

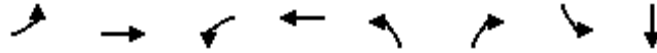
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 53.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	10	908	29	913	56	45	12	9
v/c Ratio	0.02	0.33	0.05	0.31	0.36	0.21	0.07	0.03
Control Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
Queue Length 50th (m)	0.5	31.2	0.4	9.0	11.4	0.0	2.4	0.0
Queue Length 95th (m)	2.3	46.7	m1.0	10.4	22.1	4.7	8.0	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	456	2768	570	2961	441	486	518	578
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	0.02	0.33	0.05	0.31	0.13	0.09	0.02	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	9	771	37	27	842	16	49	0	39	11	0	8
Future Volume (vph)	9	771	37	27	842	16	49	0	39	11	0	8
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		0.5	2.5		4.8		4.8	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1742	3465		1745	3478		1745		1375	1728	1561	
Flt Permitted	0.31	1.00		0.29	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	573	3465		525	3478		1381		1375	1728	1561	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	866	42	29	896	17	56	0	45	12	0	9
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	41	0	8	0
Lane Group Flow (vph)	10	906	0	29	913	0	56	0	4	12	1	0
Confl. Peds. (#/hr)	3						3		9	9		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	80.6	80.6		88.3	88.3		8.7		8.7	8.7	8.7	
Effective Green, g (s)	84.4	84.4		91.8	91.8		10.9		10.9	8.7	8.7	
Actuated g/C Ratio	0.77	0.77		0.83	0.83		0.10		0.10	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	439	2658		517	2902		136		136	136	123	
v/s Ratio Prot		c0.26		0.00	c0.26						0.00	
v/s Ratio Perm	0.02			0.04			c0.04		0.00	0.01		
v/c Ratio	0.02	0.34		0.06	0.31		0.41		0.03	0.09	0.01	
Uniform Delay, d1	3.0	4.0		1.8	2.0		46.5		44.8	47.0	46.7	
Progression Factor	1.00	1.00		0.52	0.48		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.0	0.3		2.0		0.1	0.3	0.0	
Delay (s)	3.1	4.4		1.0	1.3		48.6		44.9	47.3	46.7	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		4.4			1.2			46.9			47.0	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.7
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Background (2029)

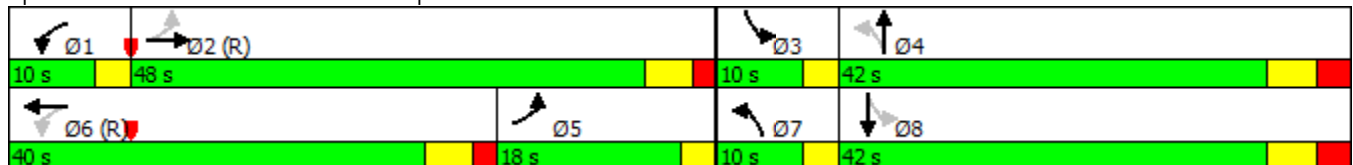


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	165	602	113	622	33	57	90	54
Future Volume (vph)	165	602	113	622	33	57	90	54
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-4.1	-4.1	-3.2	-3.2	-5.0	-5.0	-4.1	-4.1
Total Lost Time (s)	-1.1	1.9	-0.2	2.8	-2.0	2.0	-1.1	2.9
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	69.7	66.7	63.1	60.1	31.1	17.2	30.2	20.2
Actuated g/C Ratio	0.63	0.61	0.57	0.55	0.28	0.16	0.27	0.18
v/c Ratio	0.29	0.34	0.27	0.42	0.11	0.53	0.34	0.40
Control Delay	10.0	8.2	13.4	15.8	27.9	26.5	32.8	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	8.2	13.4	15.8	27.9	26.5	32.8	10.7
LOS	A	A	B	B	C	C	C	B
Approach Delay		8.6		15.5		26.8		16.0
Approach LOS		A		B		C		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 14.0
 Intersection LOS: B
 Intersection Capacity Utilization 70.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

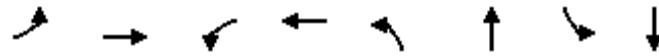


Queues

Saturday Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Background (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	705	122	783	37	172	96	302
v/c Ratio	0.29	0.34	0.27	0.42	0.11	0.53	0.34	0.40
Control Delay	10.0	8.2	13.4	15.8	27.9	26.5	32.8	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	8.2	13.4	15.8	27.9	26.5	32.8	10.7
Queue Length 50th (m)	6.8	36.1	11.2	47.6	5.9	16.6	16.0	5.7
Queue Length 95th (m)	28.3	60.5	22.9	71.1	12.4	34.5	26.8	16.7
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	600	2091	447	1855	331	641	286	1217
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	0.29	0.34	0.27	0.42	0.11	0.27	0.34	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Background (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↗↘	
Traffic Volume (vph)	165	602	54	113	622	106	33	57	96	90	54	230
Future Volume (vph)	165	602	54	113	622	106	33	57	96	90	54	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-1.1	1.9		-0.2	2.8		-2.0	2.0		-1.1	2.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		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)	1741	3440		1709	3382		1691	1613		1670	2982	
Flt Permitted	0.35	1.00		0.31	1.00		0.47	1.00		0.39	1.00	
Satd. Flow (perm)	649	3440		550	3382		845	1613		679	2982	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.94	0.94	0.94
Adj. Flow (vph)	177	647	58	122	669	114	37	64	108	96	57	245
RTOR Reduction (vph)	0	4	0	0	9	0	0	73	0	0	200	0
Lane Group Flow (vph)	177	701	0	122	774	0	37	99	0	96	102	0
Confl. Peds. (#/hr)	13		10	10		13	7		17	17		7
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	3%	0%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	64.5	61.5		55.7	55.7		17.5	13.3		23.1	16.1	
Effective Green, g (s)	68.6	65.6		58.9	58.9		27.5	18.3		27.4	20.2	
Actuated g/C Ratio	0.62	0.60		0.54	0.54		0.25	0.17		0.25	0.18	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	594	2051		425	1810		282	268		269	547	
v/s Ratio Prot	0.05	c0.20		0.03	c0.23		0.01	c0.06		c0.04	0.03	
v/s Ratio Perm	0.13			0.12			0.02			0.05		
v/c Ratio	0.30	0.34		0.29	0.43		0.13	0.37		0.36	0.19	
Uniform Delay, d1	10.8	11.3		13.3	15.4		31.7	40.7		33.1	38.0	
Progression Factor	0.68	0.67		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4		0.4	0.7		0.2	0.9		0.8	0.2	
Delay (s)	7.6	8.0		13.6	16.1		31.9	41.6		33.9	38.1	
Level of Service	A	A		B	B		C	D		C	D	
Approach Delay (s)		8.0			15.8			39.9			37.1	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.6
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	26.6	50.3	74.1	28.2	65.8	16.6
Average Queue (m)	9.4	21.2	34.1	11.3	33.6	7.4
95th Queue (m)	19.7	38.6	60.4	22.8	55.5	14.7
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	1				
Queuing Penalty (veh)	0	0				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	L
Maximum Queue (m)	29.3	28.4	43.7	41.9	47.2
Average Queue (m)	10.0	8.8	14.6	13.8	24.6
95th Queue (m)	22.9	22.1	34.0	32.9	41.9
Link Distance (m)	304.4	304.4	75.9	75.9	155.3
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (m)	6.3	4.6	1.0	8.9
Average Queue (m)	0.5	0.2	0.0	1.5
95th Queue (m)	3.7	2.7	1.0	6.9
Link Distance (m)		20.0	95.2	80.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	5.0			
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	1	0		

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	9.2	48.0	56.5	13.1	44.0	46.7	24.7	15.8	12.9	10.4
Average Queue (m)	1.5	16.4	20.2	3.9	15.4	16.3	11.4	5.2	2.7	1.9
95th Queue (m)	6.7	39.4	45.2	11.5	35.6	37.0	24.0	12.5	9.6	7.9
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0			0		0			
Queuing Penalty (veh)		0			0		0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	50.9	51.9	62.2	32.4	85.2	77.5	21.7	53.7	40.4	24.8	55.1
Average Queue (m)	21.4	21.6	27.0	19.3	43.3	35.3	7.7	23.1	15.6	8.5	21.9
95th Queue (m)	41.6	46.1	53.1	36.8	76.3	67.0	17.9	42.8	31.9	19.0	40.9
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				1	14				0		
Queuing Penalty (veh)				3	16				0		

Network Summary

Network wide Queuing Penalty: 20

Appendix I – 2034 Future Background Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Saturday Peak Hour

Appendix I – 2034 Future Background Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2034)

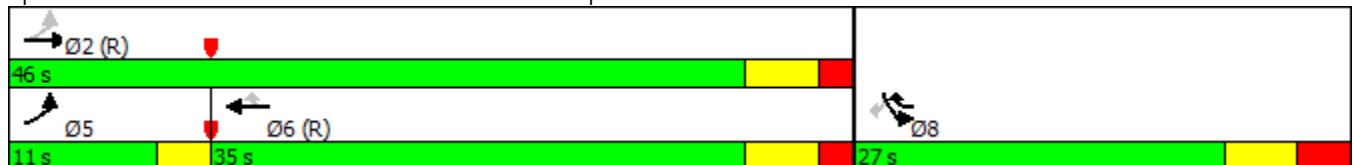


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Traffic Volume (vph)	124	411	470	558	354	59
Future Volume (vph)	124	411	470	558	354	59
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	45.6	42.6	34.8	61.5	24.0	24.0
Actuated g/C Ratio	0.62	0.58	0.48	0.84	0.33	0.33
v/c Ratio	0.32	0.48	0.69	0.51	0.80	0.14
Control Delay	7.8	10.9	22.2	1.7	37.2	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	10.9	22.2	1.7	37.2	5.9
LOS	A	B	C	A	D	A
Approach Delay		10.2	11.1		32.7	
Approach LOS		B	B		C	

Intersection Summary

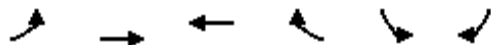
Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 15.4
 Intersection LOS: B
 Intersection Capacity Utilization 68.3%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	133	442	534	634	393	66
v/c Ratio	0.32	0.48	0.69	0.51	0.80	0.14
Control Delay	7.8	10.9	22.2	1.7	37.2	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	10.9	22.2	1.7	37.2	5.9
Queue Length 50th (m)	6.6	31.6	58.4	0.7	48.5	0.0
Queue Length 95th (m)	12.8	52.0	91.3	4.7	#91.8	7.6
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	428	925	769	1252	490	470
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	0.31	0.48	0.69	0.51	0.80	0.14

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

AM Peak Period
 Future Background (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	124	411	470	558	354	59
Future Volume (vph)	124	411	470	558	354	59
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1522	1586	1617	1375	1491	1296
Flt Permitted	0.27	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	433	1586	1617	1375	1491	1296
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	133	442	534	634	393	66
RTOR Reduction (vph)	0	0	0	126	0	44
Lane Group Flow (vph)	133	442	534	508	393	22
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	30.8	50.8	20.0	20.0
Effective Green, g (s)	42.6	42.6	34.2	57.6	24.0	24.0
Actuated g/C Ratio	0.58	0.58	0.47	0.79	0.33	0.33
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	383	925	757	1084	490	426
v/s Ratio Prot	0.04	c0.28	c0.33	0.15	c0.26	
v/s Ratio Perm	0.16			0.22		0.02
v/c Ratio	0.35	0.48	0.71	0.47	0.80	0.05
Uniform Delay, d1	8.6	8.8	15.4	2.6	22.3	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.8	5.5	1.5	13.0	0.2
Delay (s)	9.2	10.5	20.9	4.0	35.3	17.0
Level of Service	A	B	C	A	D	B
Approach Delay (s)		10.2	11.7		32.7	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	648	117	740	288	1195
Future Volume (vph)	648	117	740	288	1195
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	65.2	65.2	64.7	26.4	95.0
Actuated g/C Ratio	0.69	0.69	0.68	0.28	1.00
v/c Ratio	0.36	0.15	0.40	0.76	0.98
Control Delay	7.0	1.4	7.6	43.8	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	1.4	7.6	43.8	24.5
LOS	A	A	A	D	C
Approach Delay	6.2		7.6	28.2	
Approach LOS	A		A	C	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 17.2
 Intersection Capacity Utilization 56.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	753	136	841	316	1313
v/c Ratio	0.36	0.15	0.40	0.76	0.98
Control Delay	7.0	1.4	7.6	43.8	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	1.4	7.6	43.8	24.5
Queue Length 50th (m)	28.1	0.0	33.4	51.5	0.0
Queue Length 95th (m)	35.2	4.7	42.5	#82.2	#68.4
Internal Link Dist (m)	288.3		57.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2109	898	2093	443	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.15	0.40	0.71	0.98

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2034)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	648	117	0	740	288	1195
Future Volume (vph)	648	117	0	740	288	1195
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1247		3073	1506	1334
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1247		3073	1506	1334
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	753	136	0	841	316	1313
RTOR Reduction (vph)	0	43	0	0	0	0
Lane Group Flow (vph)	753	93	0	841	316	1313
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	60.6	60.6		60.6	21.4	95.0
Effective Green, g (s)	65.2	65.2		64.7	26.4	95.0
Actuated g/C Ratio	0.69	0.69		0.68	0.28	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2109	855		2092	418	1334
v/s Ratio Prot	0.25			0.27	0.21	
v/s Ratio Perm		0.07				c0.98
v/c Ratio	0.36	0.11		0.40	0.76	0.98
Uniform Delay, d1	6.2	5.1		6.7	31.4	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.3		0.6	7.6	21.2
Delay (s)	6.7	5.3		7.2	39.0	21.2
Level of Service	A	A		A	D	C
Approach Delay (s)	6.5			7.2	24.6	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

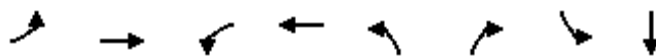
AM Peak Period
Future Background (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1843	1107	1	1	4
Future Volume (Veh/h)	0	1843	1107	1	1	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	0	1940	1258	1	1	4
Pedestrians			2		3	
Lane Width (m)			3.3		3.3	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.90				0.94	0.90
vC, conflicting volume	1262				2234	632
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1071				1777	372
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	592				71	567
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	0	970	970	839	420	5
Volume Left	0	0	0	0	0	1
Volume Right	0	0	0	0	1	4
cSH	1700	1700	1700	1700	1700	236
Volume to Capacity	0.00	0.57	0.57	0.49	0.25	0.02
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	0.5
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	20.6
Lane LOS						C
Approach Delay (s)	0.0			0.0		20.6
Approach LOS						C
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			60.9%		ICU Level of Service	B
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2034)

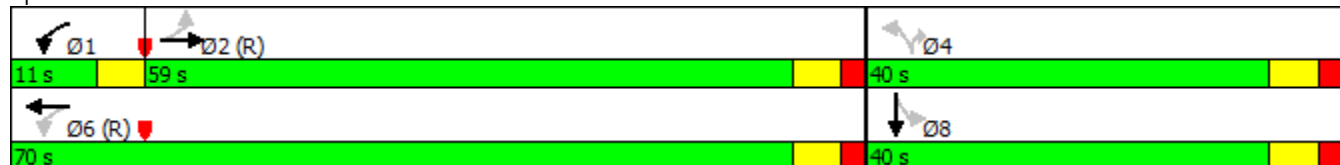


Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1599	45	994	102	22	13	0
Future Volume (vph)	11	1599	45	994	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	78.0	78.0	87.5	85.5	16.7	16.7	16.3	16.3
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.15	0.15
v/c Ratio	0.03	0.81	0.22	0.40	0.54	0.09	0.05	0.04
Control Delay	7.3	16.3	17.1	3.4	52.0	0.7	37.8	0.2
Queue Delay	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	17.4	17.1	3.4	52.0	0.7	37.8	0.2
LOS	A	B	B	A	D	A	D	A
Approach Delay		17.3		4.0				19.7
Approach LOS		B		A				B

Intersection Summary

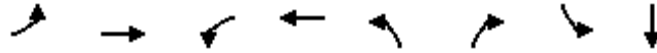
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 13.8
 Intersection LOS: B
 Intersection Capacity Utilization 82.1%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1950	47	1058	111	24	14	13
v/c Ratio	0.03	0.81	0.22	0.40	0.54	0.09	0.05	0.04
Control Delay	7.3	16.3	17.1	3.4	52.0	0.7	37.8	0.2
Queue Delay	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	17.4	17.1	3.4	52.0	0.7	37.8	0.2
Queue Length 50th (m)	0.7	139.8	2.7	12.8	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.3	#221.8	m7.0	33.0	37.6	0.0	7.7	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	352	2406	220	2676	432	470	546	571
Starvation Cap Reductn	0	227	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.89	0.21	0.40	0.26	0.05	0.03	0.02

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1599	234	45	994	11	102	0	22	13	0	12
Future Volume (vph)	11	1599	234	45	994	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1743	3384		1711	3445		1711		1319	1724	1561	
Flt Permitted	0.27	1.00		0.05	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	496	3384		93	3445		1349		1319	1724	1561	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1701	249	47	1046	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1943	0	47	1058	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.4	73.4		82.6	82.6		14.4		14.4	14.4	14.4	
Effective Green, g (s)	77.2	77.2		85.5	85.5		16.7		16.7	16.3	16.3	
Actuated g/C Ratio	0.70	0.70		0.78	0.78		0.15		0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	348	2374		191	2677		204		200	255	231	
v/s Ratio Prot		c0.57		0.02	c0.31						0.00	
v/s Ratio Perm	0.02			0.17			c0.08		0.00	0.01		
v/c Ratio	0.03	0.82		0.25	0.40		0.54		0.02	0.05	0.01	
Uniform Delay, d1	5.0	11.5		13.4	3.9		43.1		39.7	40.2	40.0	
Progression Factor	1.00	1.00		4.13	0.69		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2	3.3		0.5	0.3		2.9		0.0	0.1	0.0	
Delay (s)	5.2	14.8		55.8	3.0		46.1		39.7	40.3	40.0	
Level of Service	A	B		E	A		D		D	D	D	
Approach Delay (s)		14.7			5.3			44.9			40.2	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2034)

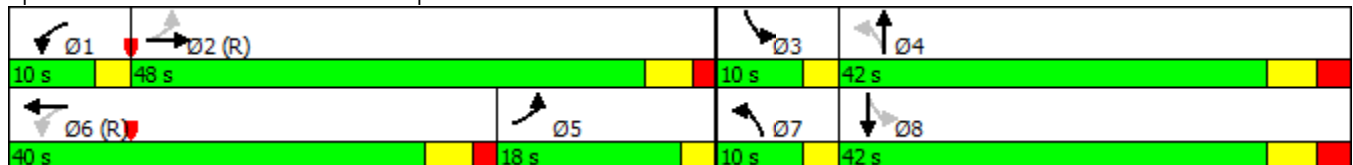


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	238	1275	153	785	29	158	37	85
Future Volume (vph)	238	1275	153	785	29	158	37	85
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	-1.8	2.2	-0.6	3.4
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	48.9	45.9	41.3	38.3	53.8	41.9	52.6	42.7
Actuated g/C Ratio	0.44	0.42	0.38	0.35	0.49	0.38	0.48	0.39
v/c Ratio	0.71	1.06	0.69	0.78	0.08	1.04	0.21	0.29
Control Delay	31.6	57.3	39.2	37.4	15.2	72.7	17.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	57.3	39.2	37.4	15.2	72.7	17.9	7.5
LOS	C	E	D	D	B	E	B	A
Approach Delay		53.6		37.7		70.1		8.6
Approach LOS		D		D		E		A

Intersection Summary

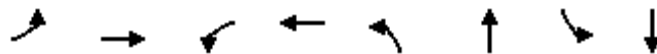
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 47.5
 Intersection LOS: D
 Intersection Capacity Utilization 95.2%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	256	1501	172	929	34	728	45	392
v/c Ratio	0.71	1.06	0.69	0.78	0.08	1.04	0.21	0.29
Control Delay	31.6	57.3	39.2	37.4	15.2	72.7	17.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	57.3	39.2	37.4	15.2	72.7	17.9	7.5
Queue Length 50th (m)	35.3	~185.8	25.3	92.6	3.7	~153.6	5.0	7.7
Queue Length 95th (m)	m44.5	#224.7	#43.7	115.1	8.5	#202.4	10.2	14.4
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	363	1422	251	1190	448	701	217	1345
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	1.06	0.69	0.78	0.08	1.04	0.21	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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	238	1275	121	153	785	42	29	158	461	37	85	236
Future Volume (vph)	238	1275	121	153	785	42	29	158	461	37	85	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		-1.8	2.2		-0.6	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3393		1711	3412		1502	1598		1601	3014	
Flt Permitted	0.14	1.00		0.16	1.00		0.48	1.00		0.10	1.00	
Satd. Flow (perm)	256	3393		279	3412		754	1598		166	3014	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	256	1371	130	172	882	47	34	186	542	45	104	288
RTOR Reduction (vph)	0	7	0	0	3	0	0	91	0	0	176	0
Lane Group Flow (vph)	256	1494	0	172	926	0	34	637	0	45	216	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	43.8	40.8		32.8	32.8		41.8	37.7		44.6	39.1	
Effective Green, g (s)	47.7	44.7		37.1	37.1		51.0	42.5		49.8	42.7	
Actuated g/C Ratio	0.43	0.41		0.34	0.34		0.46	0.39		0.45	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	360	1378		241	1150		410	617		193	1169	
v/s Ratio Prot	c0.12	c0.44		0.07	c0.27		0.01	c0.40		c0.02	0.07	
v/s Ratio Perm	0.19			0.17			0.03			0.09		
v/c Ratio	0.71	1.08		0.71	0.80		0.08	1.03		0.23	0.18	
Uniform Delay, d1	35.4	32.6		29.2	33.2		16.2	33.8		23.2	22.2	
Progression Factor	0.66	0.64		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	46.2		9.6	6.0		0.1	44.6		0.6	0.1	
Delay (s)	27.2	67.2		38.8	39.2		16.3	78.4		23.9	22.3	
Level of Service	C	E		D	D		B	E		C	C	
Approach Delay (s)		61.4			39.1			75.6			22.4	
Approach LOS		E			D			E			C	

Intersection Summary

HCM 2000 Control Delay	53.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.4
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	40.9	67.3	82.2	52.4	88.4	19.4
Average Queue (m)	17.6	31.6	41.8	20.3	49.2	6.4
95th Queue (m)	33.7	55.2	71.0	38.3	80.2	14.6
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	2				
Queuing Penalty (veh)	1	3				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (m)	42.6	44.0	3.9	51.6	51.6	164.4	167.7
Average Queue (m)	21.3	22.1	0.1	20.8	21.7	122.4	109.7
95th Queue (m)	37.5	39.6	2.8	41.2	43.4	206.5	231.9
Link Distance (m)	304.4	304.4		74.3	74.3	155.3	155.3
Upstream Blk Time (%)						16	36
Queuing Penalty (veh)						0	0
Storage Bay Dist (m)			70.0				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B15	B15	B15	WB	WB	SB
Directions Served	T	T	T	T		T	TR	LR
Maximum Queue (m)	40.8	42.2	81.4	85.7	93.5	8.3	7.4	11.5
Average Queue (m)	24.0	27.4	38.9	46.0	45.7	0.3	0.2	2.0
95th Queue (m)	51.6	52.2	93.3	102.4	118.5	3.9	3.4	8.8
Link Distance (m)	21.6	21.6	74.3	74.3	74.3	95.2	95.2	80.4
Upstream Blk Time (%)	21	25	2	5	14			
Queuing Penalty (veh)	190	234	11	31	85			
Storage Bay Dist (m)								
Storage Blk Time (%)	21							
Queuing Penalty (veh)	0							

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	39.5	103.0	103.2	27.1	59.2	60.6	31.8	47.5	14.8	12.3
Average Queue (m)	3.5	88.5	91.2	8.3	29.1	31.9	18.7	6.3	3.4	2.6
95th Queue (m)	20.2	120.3	117.6	20.1	51.4	52.5	32.5	24.7	11.1	9.6
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)		19	21							
Queuing Penalty (veh)		173	195							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)	0	38		0	0		3	0		
Queuing Penalty (veh)	0	4		0	0		1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	167.5	258.7	264.0	32.3	178.7	176.9	107.4	277.9	18.0	27.2	52.6
Average Queue (m)	133.9	225.4	227.7	31.8	158.8	152.0	31.7	217.0	5.7	10.7	24.7
95th Queue (m)	225.6	309.7	308.1	34.2	201.9	205.1	105.4	322.8	14.3	23.0	43.6
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)		8	10		64	36		31			
Queuing Penalty (veh)		69	79		0	0		0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	1	29		77	15		0	59		0	
Queuing Penalty (veh)	4	70		302	23		1	17		0	

Network Summary

Network wide Queuing Penalty: 1493

Appendix I – 2034 Future Background Conditions – Synchro & SimTraffic Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	143	302	756	1248	230	121
Future Volume (vph)	143	302	756	1248	230	121
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.37	0.25	0.74	1.06	0.88	0.37
Control Delay	9.1	5.4	11.3	48.0	73.8	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	5.4	11.3	48.0	73.8	8.9
LOS	A	A	B	D	E	A
Approach Delay		6.6	34.1		51.5	
Approach LOS		A	C		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 32.5
 Intersection LOS: C
 Intersection Capacity Utilization 102.6%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	146	308	804	1328	288	151
v/c Ratio	0.37	0.25	0.74	1.06	0.88	0.37
Control Delay	9.1	5.4	11.3	48.0	73.8	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	5.4	11.3	48.0	73.8	8.9
Queue Length 50th (m)	7.4	19.7	78.3	~345.6	66.2	0.0
Queue Length 95th (m)	12.4	29.3	m117.8	m#400.7	#93.0	11.5
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	393	1217	1083	1252	326	407
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	0.37	0.25	0.74	1.06	0.88	0.37

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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

PM Peak Period
 Future Background (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	143	302	756	1248	230	121
Future Volume (vph)	143	302	756	1248	230	121
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1634	1634	1364	1506	1334
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	364	1634	1634	1364	1506	1334
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	146	308	804	1328	288	151
RTOR Reduction (vph)	0	0	0	64	0	118
Lane Group Flow (vph)	146	308	804	1264	288	33
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	393	1217	1083	1223	326	289
v/s Ratio Prot	c0.04	0.19	0.49	c0.22	0.19	
v/s Ratio Perm	0.25			0.71		0.02
v/c Ratio	0.37	0.25	0.74	1.03	0.88	0.11
Uniform Delay, d1	19.1	4.8	13.4	7.4	45.5	37.7
Progression Factor	1.00	1.00	0.62	2.11	1.00	1.00
Incremental Delay, d2	0.6	0.5	2.5	27.9	27.5	0.8
Delay (s)	19.7	5.3	10.8	43.5	73.0	38.5
Level of Service	B	A	B	D	E	D
Approach Delay (s)		9.9	31.2		61.1	
Approach LOS		A	C		E	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	454	78	1747	257	579
Future Volume (vph)	454	78	1747	257	579
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	95.0	95.0	95.0	25.0	
Total Split (%)	79.2%	79.2%	79.2%	20.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	92.5	92.5	92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77	0.77	0.19	1.00
v/c Ratio	0.20	0.08	0.81	0.98	0.47
Control Delay	1.9	0.1	4.7	96.8	1.2
Queue Delay	0.0	0.0	0.6	0.0	0.0
Total Delay	1.9	0.1	5.4	96.8	1.2
LOS	A	A	A	F	A
Approach Delay	1.7		5.4	30.6	
Approach LOS	A		A	C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 11.5
 Intersection Capacity Utilization 77.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	483	83	1941	282	636
v/c Ratio	0.20	0.08	0.81	0.98	0.47
Control Delay	1.9	0.1	4.7	96.8	1.2
Queue Delay	0.0	0.0	0.6	0.0	0.0
Total Delay	1.9	0.1	5.4	96.8	1.2
Queue Length 50th (m)	6.5	0.0	54.1	66.7	0.0
Queue Length 95th (m)	m7.9	m0.0	18.0	#120.4	0.0
Internal Link Dist (m)	291.5		59.3	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2392	1066	2387	288	1348
Starvation Cap Reductn	0	0	158	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.08	0.87	0.98	0.47

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2034)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	454	78	0	1747	257	579
Future Volume (vph)	454	78	0	1747	257	579
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3104	1359		3104	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3104	1359		3104	1506	1348
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	483	83	0	1941	282	636
RTOR Reduction (vph)	0	19	0	0	0	0
Lane Group Flow (vph)	483	64	0	1941	282	636
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	92.5	92.5		92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77		0.77	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2392	1047		2387	288	1348
v/s Ratio Prot	0.16			c0.63	c0.19	
v/s Ratio Perm		0.05				0.47
v/c Ratio	0.20	0.06		0.81	0.98	0.47
Uniform Delay, d1	3.7	3.3		8.5	48.3	0.0
Progression Factor	0.47	0.00		0.33	1.00	1.00
Incremental Delay, d2	0.2	0.1		1.8	46.7	1.2
Delay (s)	1.9	0.1		4.6	95.0	1.2
Level of Service	A	A		A	F	A
Approach Delay (s)	1.7			4.6	30.0	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

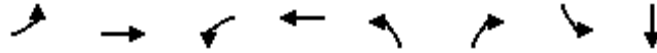
PM Peak Period
Future Background (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	
Traffic Volume (veh/h)	7	1026	2135	4	2	1
Future Volume (Veh/h)	7	1026	2135	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	8	1153	2296	4	2	1
Pedestrians					3	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		111	118			
pX, platoon unblocked	0.26				0.28	0.26
vC, conflicting volume	2303				2894	1153
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336				2118	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				83	100
cM capacity (veh/h)	322				12	285
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	8	576	576	1531	769	3
Volume Left	8	0	0	0	0	2
Volume Right	0	0	0	0	4	1
cSH	322	1700	1700	1700	1700	18
Volume to Capacity	0.02	0.34	0.34	0.90	0.45	0.17
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	3.7
Control Delay (s)	16.5	0.0	0.0	0.0	0.0	248.0
Lane LOS	C					F
Approach Delay (s)	0.1			0.0		248.0
Approach LOS						F
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			69.1%		ICU Level of Service	C
Analysis Period (min)			15			

Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2034)

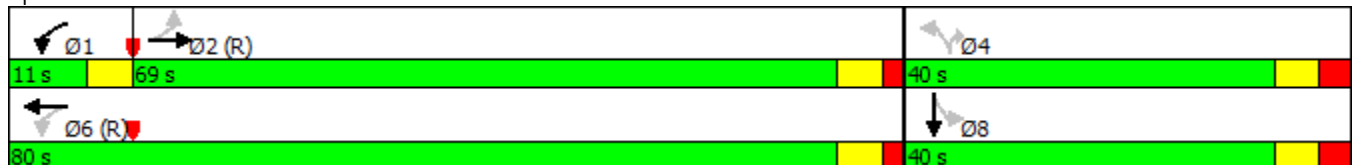


Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	963	39	1973	154	59	10	0
Future Volume (vph)	11	963	39	1973	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	81.5	81.5	92.6	90.6	24.3	24.3	21.1	21.1
Actuated g/C Ratio	0.68	0.68	0.77	0.76	0.20	0.20	0.18	0.18
v/c Ratio	0.19	0.46	0.11	0.85	0.60	0.18	0.04	0.04
Control Delay	15.7	7.8	3.6	11.3	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Total Delay	15.7	7.8	3.6	12.3	51.7	9.5	37.7	0.2
LOS	B	A	A	B	D	A	D	A
Approach Delay		7.8		12.2				17.4
Approach LOS		A		B				B

Intersection Summary

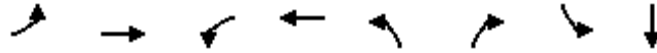
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 12.6
 Intersection Capacity Utilization 77.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 4: JBH Access & Northshore Blvd



Queues
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1093	44	2238	167	64	11	13
v/c Ratio	0.19	0.46	0.11	0.85	0.60	0.18	0.04	0.04
Control Delay	15.7	7.8	3.6	11.3	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Total Delay	15.7	7.8	3.6	12.3	51.7	9.5	37.7	0.2
Queue Length 50th (m)	0.8	39.7	1.8	60.3	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.7	56.5	m2.5	m79.0	54.1	10.4	6.8	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	62	2351	410	2630	427	521	411	484
Starvation Cap Reductn	0	0	0	175	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.46	0.11	0.91	0.39	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖		↗	↖	↕	↗
Traffic Volume (vph)	11	963	54	39	1973	19	154	0	59	10	0	12
Future Volume (vph)	11	963	54	39	1973	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1745	3457		1710	3484		1741		1533	1445	1539	
Flt Permitted	0.05	1.00		0.21	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	91	3457		380	3484		1373		1533	1445	1539	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1035	58	44	2217	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	1091	0	44	2238	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	77.9	77.9		87.1	87.1		19.9		19.9	19.9	19.9	
Effective Green, g (s)	80.8	80.8		90.6	90.6		24.3		24.3	21.1	21.1	
Actuated g/C Ratio	0.67	0.67		0.75	0.75		0.20		0.20	0.18	0.18	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	61	2327		383	2630		278		310	254	270	
v/s Ratio Prot		0.32		0.01	c0.64						0.00	
v/s Ratio Perm	0.13			0.08			c0.12		0.01	0.01		
v/c Ratio	0.20	0.47		0.11	0.85		0.60		0.04	0.04	0.01	
Uniform Delay, d1	7.4	9.4		4.8	10.1		43.4		38.5	41.1	40.8	
Progression Factor	0.71	0.69		0.78	0.77		1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.8	0.7		0.1	1.9		3.6		0.1	0.1	0.0	
Delay (s)	12.0	7.1		3.8	9.7		47.1		38.5	41.1	40.8	
Level of Service	B	A		A	A		D		D	D	D	
Approach Delay (s)		7.1			9.6			44.7			41.0	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2034)

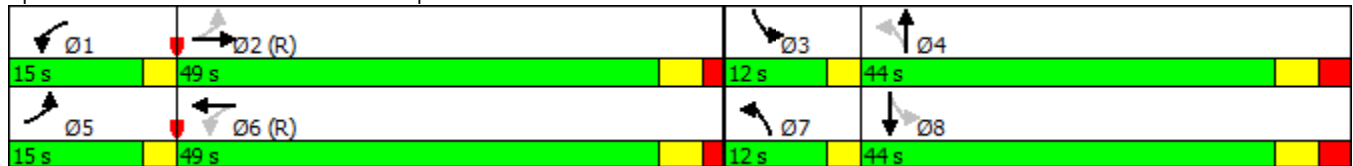


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	203	788	271	1459	88	106	80	176
Future Volume (vph)	203	788	271	1459	88	106	80	176
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	15.0	49.0	15.0	49.0	12.0	44.0	12.0	44.0
Total Split (%)	12.5%	40.8%	12.5%	40.8%	10.0%	36.7%	10.0%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.4	-4.4	-3.8	-3.8	-3.9	-3.9
Total Lost Time (s)	-2.0	1.0	-1.4	1.6	-0.8	3.2	-0.9	3.1
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	76.1	55.6	75.9	56.6	46.3	30.9	46.4	30.9
Actuated g/C Ratio	0.63	0.46	0.63	0.47	0.39	0.26	0.39	0.26
v/c Ratio	0.69	0.59	0.66	1.02	0.39	0.75	0.32	0.90dr
Control Delay	54.9	21.7	21.1	59.2	26.7	39.0	24.8	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	21.7	21.1	59.2	26.7	39.0	24.8	29.6
LOS	D	C	C	E	C	D	C	C
Approach Delay		28.2		53.5		36.4		29.1
Approach LOS		C		D		D		C

Intersection Summary

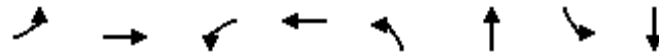
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 40.5
 Intersection LOS: D
 Intersection Capacity Utilization 95.6%
 ICU Level of Service F
 Analysis Period (min) 15
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	228	931	291	1654	96	366	87	717
v/c Ratio	0.69	0.59	0.66	1.02	0.39	0.75	0.32	0.90dr
Control Delay	54.9	21.7	21.1	59.2	26.7	39.0	24.8	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	21.7	21.1	59.2	26.7	39.0	24.8	29.6
Queue Length 50th (m)	44.5	48.5	28.2	~227.0	14.5	59.5	13.1	53.5
Queue Length 95th (m)	#74.4	60.1	#69.9	#294.4	22.2	83.4	20.5	66.1
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	340	1590	442	1627	251	610	281	1212
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	0.67	0.59	0.66	1.02	0.38	0.60	0.31	0.59

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

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Volume (vph)	203	788	41	271	1459	79	88	106	231	80	176	484
Future Volume (vph)	203	788	41	271	1459	79	88	106	231	80	176	484
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3428		1744	3448		1727	1604		1676	3063	
Flt Permitted	0.07	1.00		0.18	1.00		0.13	1.00		0.21	1.00	
Satd. Flow (perm)	133	3428		336	3448		242	1604		365	3063	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	885	46	291	1569	85	96	115	251	87	191	526
RTOR Reduction (vph)	0	3	0	0	3	0	0	74	0	0	190	0
Lane Group Flow (vph)	228	928	0	291	1651	0	96	292	0	87	527	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	63.9	50.6		67.1	52.2		35.6	27.1		35.4	27.0	
Effective Green, g (s)	73.5	55.6		72.9	56.6		42.3	30.9		42.4	30.9	
Actuated g/C Ratio	0.61	0.46		0.61	0.47		0.35	0.26		0.35	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	327	1588		430	1626		237	413		263	788	
v/s Ratio Prot	c0.11	0.27		0.11	c0.48		c0.04	c0.18		0.03	0.17	
v/s Ratio Perm	0.32			0.30			0.10			0.08		
v/c Ratio	0.70	0.58		0.68	1.02		0.41	0.71		0.33	0.90dr	
Uniform Delay, d1	33.1	23.7		15.1	31.7		28.5	40.5		28.1	40.0	
Progression Factor	1.71	0.79		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	1.5		4.2	26.3		1.1	5.5		0.7	2.2	
Delay (s)	62.4	20.3		19.3	58.0		29.6	45.9		28.8	42.1	
Level of Service	E	C		B	E		C	D		C	D	
Approach Delay (s)		28.5			52.2			42.6			40.7	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	42.4	131.3	87.4	117.2	96.6	28.6
Average Queue (m)	33.2	52.8	47.4	68.8	50.6	13.1
95th Queue (m)	50.3	123.1	72.7	116.6	88.6	24.3
Link Distance (m)		151.8	307.2	307.2	165.7	165.7
Upstream Blk Time (%)		6				
Queuing Penalty (veh)		0				
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	23	8				
Queuing Penalty (veh)	69	11				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (m)	24.3	18.5	45.1	45.9	156.0	114.5
Average Queue (m)	6.5	3.3	19.6	22.6	109.3	34.2
95th Queue (m)	18.2	12.3	36.5	40.0	181.7	144.0
Link Distance (m)	307.2	307.2	75.4	75.4	160.9	160.9
Upstream Blk Time (%)					14	6
Queuing Penalty (veh)					0	0
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (m)	9.1	12.2	9.1
Average Queue (m)	1.5	0.7	1.1
95th Queue (m)	6.9	5.3	5.9
Link Distance (m)		20.0	92.5
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (m)	5.0		
Storage Blk Time (%)	3	0	
Queuing Penalty (veh)	14	0	

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	10.0	47.9	53.8	14.9	60.9	64.1	32.1	66.0	17.8	11.2
Average Queue (m)	1.5	21.3	25.3	4.9	29.6	34.9	25.4	16.6	3.0	2.6
95th Queue (m)	6.5	41.3	46.4	12.3	54.1	59.6	36.3	49.2	11.7	9.2
Link Distance (m)		100.9	100.9		244.6	244.6		138.3	66.9	66.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0			0		13	0		
Queuing Penalty (veh)		0			0		8	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR	
Maximum Queue (m)	75.5	86.4	85.7	32.4	169.4	173.9	53.2	110.8	34.8	102.2	142.2	
Average Queue (m)	39.7	50.6	54.0	27.7	168.8	168.9	16.3	47.8	12.3	31.6	79.0	
95th Queue (m)	70.7	78.2	81.0	39.8	169.4	171.1	37.3	87.3	26.4	72.1	132.2	
Link Distance (m)		244.6	244.6		164.2	164.2		225.6		178.2	178.2	
Upstream Blk Time (%)					70	61					0	0
Queuing Penalty (veh)					0	0					0	0
Storage Bay Dist (m)	165.0			30.0			105.0		50.0			
Storage Blk Time (%)				14	53		0	1	0	0		
Queuing Penalty (veh)				104	144		0	1	0	0		

Network Summary

Network wide Queuing Penalty: 352

Appendix I – 2034 Future Background Conditions – Synchro & SimTraffic Reports

3. Saturday Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Future Background (2034)

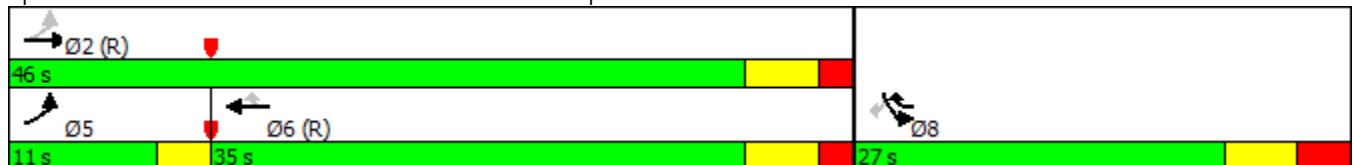


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Traffic Volume (vph)	59	299	428	426	300	90
Future Volume (vph)	59	299	428	426	300	90
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.5	-4.5	-5.0	-5.0
Total Lost Time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	48.0	45.0	38.4	65.4	25.0	25.0
Actuated g/C Ratio	0.66	0.62	0.53	0.90	0.34	0.34
v/c Ratio	0.11	0.32	0.52	0.34	0.70	0.21
Control Delay	5.0	7.8	15.5	0.9	29.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	7.8	15.5	0.9	29.6	5.0
LOS	A	A	B	A	C	A
Approach Delay		7.3	8.2		24.0	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 12.2
 Intersection LOS: B
 Intersection Capacity Utilization 59.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

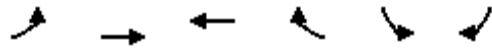


Queues

Saturday Peak Period

1: Northshore Blvd & QEW West Ramp

Future Background (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	63	322	446	444	361	108
v/c Ratio	0.11	0.32	0.52	0.34	0.70	0.21
Control Delay	5.0	7.8	15.5	0.9	29.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	7.8	15.5	0.9	29.6	5.0
Queue Length 50th (m)	2.7	18.7	41.7	0.0	42.1	0.0
Queue Length 95th (m)	6.2	31.3	71.0	3.1	62.7	7.7
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	579	996	851	1291	515	522
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	0.11	0.32	0.52	0.34	0.70	0.21

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
 Future Background (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	59	299	428	426	300	90
Future Volume (vph)	59	299	428	426	300	90
Ideal Flow (vphpl)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
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	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1617	1617	1389	1506	1318
Flt Permitted	0.39	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	633	1617	1617	1389	1506	1318
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.83	0.83
Adj. Flow (vph)	63	322	446	444	361	108
RTOR Reduction (vph)	0	0	0	69	0	71
Lane Group Flow (vph)	63	322	446	375	361	37
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	32.7	52.7	20.0	20.0
Effective Green, g (s)	45.0	45.0	37.2	61.7	25.0	25.0
Actuated g/C Ratio	0.62	0.62	0.51	0.85	0.34	0.34
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	507	996	824	1173	515	451
v/s Ratio Prot	0.02	c0.20	c0.28	0.11	c0.24	
v/s Ratio Perm	0.06			0.16		0.03
v/c Ratio	0.12	0.32	0.54	0.32	0.70	0.08
Uniform Delay, d1	6.1	6.7	12.1	1.2	20.8	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.9	2.5	0.7	7.7	0.4
Delay (s)	6.2	7.6	14.7	1.9	28.5	16.6
Level of Service	A	A	B	A	C	B
Approach Delay (s)		7.3	8.3		25.8	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	3.5
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	485	114	717	137	403
Future Volume (vph)	485	114	717	137	403
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-2.9	-2.9	-3.3	-4.8	
Total Lost Time (s)	3.1	3.1	2.7	2.2	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	69.8	69.8	70.2	19.9	95.0
Actuated g/C Ratio	0.73	0.73	0.74	0.21	1.00
v/c Ratio	0.23	0.12	0.33	0.50	0.34
Control Delay	4.8	1.3	5.2	37.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	1.3	5.2	37.7	0.7
LOS	A	A	A	D	A
Approach Delay	4.1		5.2	10.1	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 6.4
 Intersection Capacity Utilization 46.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	527	124	747	156	458
v/c Ratio	0.23	0.12	0.33	0.50	0.34
Control Delay	4.8	1.3	5.2	37.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	1.3	5.2	37.7	0.7
Queue Length 50th (m)	13.6	0.0	20.6	25.4	0.0
Queue Length 95th (m)	24.6	5.1	36.4	39.6	0.0
Internal Link Dist (m)	288.3		59.3	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2258	1028	2271	440	1348
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.12	0.33	0.35	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Background (2034)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	485	114	0	717	137	403
Future Volume (vph)	485	114	0	717	137	403
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	3.1	3.1		2.7	2.2	-0.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1354		3073	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1354		3073	1506	1348
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.88	0.88
Adj. Flow (vph)	527	124	0	747	156	458
RTOR Reduction (vph)	0	33	0	0	0	0
Lane Group Flow (vph)	527	91	0	747	156	458
Confl. Peds. (#/hr)		4	4			
Heavy Vehicles (%)	1%	0%	1%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	66.9	66.9		66.9	15.1	95.0
Effective Green, g (s)	69.8	69.8		70.2	19.9	95.0
Actuated g/C Ratio	0.73	0.73		0.74	0.21	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2257	994		2270	315	1348
v/s Ratio Prot	0.17			0.24	c0.10	
v/s Ratio Perm		0.07				c0.34
v/c Ratio	0.23	0.09		0.33	0.50	0.34
Uniform Delay, d1	4.0	3.6		4.3	33.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		0.4	1.2	0.7
Delay (s)	4.3	3.8		4.7	34.3	0.7
Level of Service	A	A		A	C	A
Approach Delay (s)	4.2			4.7	9.2	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	5.3
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

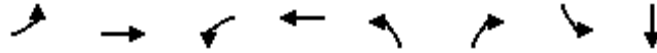
Saturday Peak Period
Future Background (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	885	968	4	4	3
Future Volume (Veh/h)	3	885	968	4	4	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	3	973	1019	4	4	3
Pedestrians					8	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.94				0.96	0.94
vC, conflicting volume	1031				1522	520
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	897				1268	351
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	712				154	605
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	3	486	486	679	344	7
Volume Left	3	0	0	0	0	4
Volume Right	0	0	0	0	4	3
cSH	712	1700	1700	1700	1700	227
Volume to Capacity	0.00	0.29	0.29	0.40	0.20	0.03
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	0.7
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	21.4
Lane LOS	B					C
Approach Delay (s)	0.0			0.0		21.4
Approach LOS						C
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.9%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	9	843	27	915	49	39	11	0
Future Volume (vph)	9	843	27	915	49	39	11	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-3.5	-3.5	-2.2	-2.2	0.0	0.0
Total Lost Time (s)	2.2	2.2	0.5	2.5	4.8	4.8	7.0	7.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	87.8	87.8	95.2	93.7	12.5	12.5	10.3	10.3
Actuated g/C Ratio	0.80	0.80	0.87	0.85	0.11	0.11	0.09	0.09
v/c Ratio	0.02	0.36	0.06	0.33	0.36	0.21	0.07	0.03
Control Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
LOS	A	A	A	A	D	A	D	A
Approach Delay		5.1		1.4				25.7
Approach LOS		A		A				C

Intersection Summary

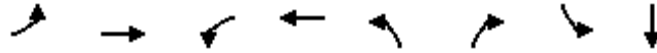
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 55.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	10	989	29	990	56	45	12	9
v/c Ratio	0.02	0.36	0.06	0.33	0.36	0.21	0.07	0.03
Control Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
Queue Length 50th (m)	0.5	35.1	0.4	9.8	11.4	0.0	2.4	0.0
Queue Length 95th (m)	2.3	52.2	m0.9	11.2	22.1	4.7	8.0	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	423	2771	534	2962	441	486	518	561
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	0.02	0.36	0.05	0.33	0.13	0.09	0.02	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Background (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	9	843	37	27	915	16	49	0	39	11	0	8
Future Volume (vph)	9	843	37	27	915	16	49	0	39	11	0	8
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		0.5	2.5		4.8		4.8	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1742	3467		1745	3479		1745		1375	1728	1561	
Flt Permitted	0.29	1.00		0.26	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	531	3467		477	3479		1381		1375	1728	1561	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	947	42	29	973	17	56	0	45	12	0	9
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	8	0
Lane Group Flow (vph)	10	988	0	29	990	0	56	0	4	12	1	0
Confl. Peds. (#/hr)	3						3		9	9		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	80.6	80.6		88.3	88.3		8.7		8.7	8.7	8.7	
Effective Green, g (s)	84.4	84.4		91.8	91.8		10.9		10.9	8.7	8.7	
Actuated g/C Ratio	0.77	0.77		0.83	0.83		0.10		0.10	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	407	2660		481	2903		136		136	136	123	
v/s Ratio Prot		c0.28		0.00	c0.28						0.00	
v/s Ratio Perm	0.02			0.05			c0.04		0.00	0.01		
v/c Ratio	0.02	0.37		0.06	0.34		0.41		0.03	0.09	0.01	
Uniform Delay, d1	3.0	4.2		1.9	2.1		46.5		44.8	47.0	46.7	
Progression Factor	1.00	1.00		0.53	0.47		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.0	0.3		2.0		0.1	0.3	0.0	
Delay (s)	3.1	4.6		1.1	1.3		48.6		44.9	47.3	46.7	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		4.6			1.3			46.9			47.0	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.37	A
Actuated Cycle Length (s)	110.0	Sum of lost time (s)
Intersection Capacity Utilization	55.7%	9.7
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Background (2034)

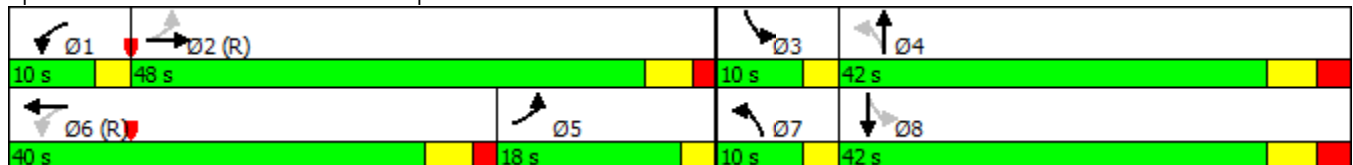


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	174	662	119	681	35	60	95	57
Future Volume (vph)	174	662	119	681	35	60	95	57
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-4.1	-4.1	-3.2	-3.2	-5.0	-5.0	-4.1	-4.1
Total Lost Time (s)	-1.1	1.9	-0.2	2.8	-2.0	2.0	-1.1	2.9
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	68.9	65.9	62.5	59.5	31.7	17.7	30.8	20.8
Actuated g/C Ratio	0.63	0.60	0.57	0.54	0.29	0.16	0.28	0.19
v/c Ratio	0.33	0.37	0.31	0.46	0.12	0.54	0.35	0.41
Control Delay	11.8	8.9	14.1	16.8	27.5	27.2	32.7	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	8.9	14.1	16.8	27.5	27.2	32.7	10.6
LOS	B	A	B	B	C	C	C	B
Approach Delay		9.5		16.4		27.2		15.9
Approach LOS		A		B		C		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 14.7
 Intersection Capacity Utilization 71.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

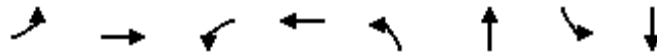


Queues

Saturday Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Background (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	187	773	128	852	39	180	101	318
v/c Ratio	0.33	0.37	0.31	0.46	0.12	0.54	0.35	0.41
Control Delay	11.8	8.9	14.1	16.8	27.5	27.2	32.7	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	8.9	14.1	16.8	27.5	27.2	32.7	10.6
Queue Length 50th (m)	13.3	41.4	11.9	54.2	6.2	18.1	16.7	6.0
Queue Length 95th (m)	30.4	68.9	24.4	80.4	12.7	36.2	27.7	17.2
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	567	2067	419	1840	329	641	286	1226
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	0.33	0.37	0.31	0.46	0.12	0.28	0.35	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Background (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	662	57	119	681	112	35	60	101	95	57	242
Future Volume (vph)	174	662	57	119	681	112	35	60	101	95	57	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-1.1	1.9		-0.2	2.8		-2.0	2.0		-1.1	2.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		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)	1741	3442		1709	3386		1691	1613		1671	2984	
Flt Permitted	0.32	1.00		0.27	1.00		0.46	1.00		0.38	1.00	
Satd. Flow (perm)	585	3442		488	3386		814	1613		662	2984	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.94	0.94	0.94
Adj. Flow (vph)	187	712	61	128	732	120	39	67	113	101	61	257
RTOR Reduction (vph)	0	4	0	0	8	0	0	72	0	0	208	0
Lane Group Flow (vph)	187	769	0	128	844	0	39	108	0	101	110	0
Confl. Peds. (#/hr)	13		10	10		13	7		17	17		7
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	3%	0%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	63.6	60.6		55.1	55.1		18.1	13.9		23.7	16.7	
Effective Green, g (s)	67.7	64.7		58.3	58.3		28.1	18.9		28.0	20.8	
Actuated g/C Ratio	0.62	0.59		0.53	0.53		0.26	0.17		0.25	0.19	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	560	2024		399	1794		281	277		270	564	
v/s Ratio Prot	0.06	c0.22		0.04	c0.25		0.01	c0.07		c0.04	0.04	
v/s Ratio Perm	0.15			0.13			0.02			0.06		
v/c Ratio	0.33	0.38		0.32	0.47		0.14	0.39		0.37	0.19	
Uniform Delay, d1	12.8	12.0		13.8	16.2		31.3	40.4		32.8	37.5	
Progression Factor	0.71	0.68		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.5	0.9		0.2	0.9		0.9	0.2	
Delay (s)	9.4	8.7		14.3	17.1		31.5	41.3		33.7	37.7	
Level of Service	A	A		B	B		C	D		C	D	
Approach Delay (s)		8.8			16.7			39.6			36.7	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.6
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	25.8	52.6	79.7	35.5	72.5	19.5
Average Queue (m)	9.7	22.9	37.2	13.3	38.6	8.0
95th Queue (m)	20.1	42.0	64.0	26.6	60.4	16.2
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	1				
Queuing Penalty (veh)	0	1				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	L
Maximum Queue (m)	26.9	27.7	49.8	49.7	56.0
Average Queue (m)	12.2	9.5	17.2	17.0	26.5
95th Queue (m)	24.5	23.1	39.0	38.3	45.7
Link Distance (m)	304.4	304.4	75.9	75.9	155.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (m)	9.0	3.8	9.1
Average Queue (m)	0.5	0.2	1.9
95th Queue (m)	3.9	2.1	7.7
Link Distance (m)		20.0	80.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	5.0		
Storage Blk Time (%)	0	0	
Queuing Penalty (veh)	2	0	

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	11.7	53.4	57.8	11.6	46.8	45.6	28.1	14.1	13.6	9.6
Average Queue (m)	1.7	19.2	21.9	3.7	17.0	17.9	11.0	5.4	2.7	2.3
95th Queue (m)	7.7	43.9	48.4	10.8	38.1	39.2	23.5	11.7	9.6	8.7
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		1					0			
Queuing Penalty (veh)		0					0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	52.1	57.0	64.2	32.3	91.4	83.5	23.6	59.3	38.7	26.4	55.9
Average Queue (m)	23.4	23.4	27.5	19.8	49.8	42.2	7.4	24.7	16.9	8.8	23.1
95th Queue (m)	43.5	50.2	56.1	36.8	85.0	76.9	17.6	46.7	32.7	20.4	44.0
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				1	20				0		
Queuing Penalty (veh)				3	23				0		

Network Summary

Network wide Queuing Penalty: 29

Appendix J – 2024 Future Total Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Saturday Peak Hour

Appendix J – 2024 Future Total Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2024)

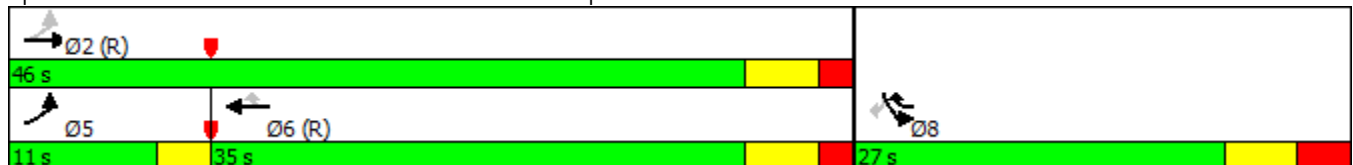


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	102	385	428	467	302	49
Future Volume (vph)	102	385	428	467	302	49
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	45.6	42.6	34.9	61.6	24.0	24.0
Actuated g/C Ratio	0.62	0.58	0.48	0.84	0.33	0.33
v/c Ratio	0.24	0.45	0.63	0.43	0.69	0.12
Control Delay	7.0	10.5	19.8	1.3	29.9	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	10.5	19.8	1.3	29.9	6.2
LOS	A	B	B	A	C	A
Approach Delay		9.8	10.1		26.6	
Approach LOS		A	B		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 13.4
 Intersection LOS: B
 Intersection Capacity Utilization 61.1%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

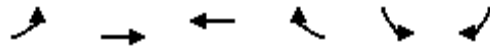


Queues

AM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2024)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	110	414	486	531	336	54
v/c Ratio	0.24	0.45	0.63	0.43	0.69	0.12
Control Delay	7.0	10.5	19.8	1.3	29.9	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	10.5	19.8	1.3	29.9	6.2
Queue Length 50th (m)	5.4	28.9	50.1	0.0	39.4	0.0
Queue Length 95th (m)	10.9	47.7	79.9	3.5	#67.6	6.8
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	461	925	773	1243	490	462
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	0.24	0.45	0.63	0.43	0.69	0.12

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	102	385	428	467	302	49
Future Volume (vph)	102	385	428	467	302	49
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1522	1586	1617	1375	1491	1296
Flt Permitted	0.31	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	501	1586	1617	1375	1491	1296
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	110	414	486	531	336	54
RTOR Reduction (vph)	0	0	0	111	0	36
Lane Group Flow (vph)	110	414	486	420	336	18
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	30.9	50.9	20.0	20.0
Effective Green, g (s)	42.6	42.6	34.3	57.7	24.0	24.0
Actuated g/C Ratio	0.58	0.58	0.47	0.79	0.33	0.33
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	414	925	759	1086	490	426
v/s Ratio Prot	0.03	c0.26	c0.30	0.12	c0.23	
v/s Ratio Perm	0.12			0.18		0.01
v/c Ratio	0.27	0.45	0.64	0.39	0.69	0.04
Uniform Delay, d1	8.0	8.6	14.7	2.3	21.2	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.6	4.1	1.0	7.6	0.2
Delay (s)	8.3	10.1	18.8	3.3	28.8	16.9
Level of Service	A	B	B	A	C	B
Approach Delay (s)		9.8	10.7		27.2	
Approach LOS		A	B		C	

Intersection Summary

HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2024)

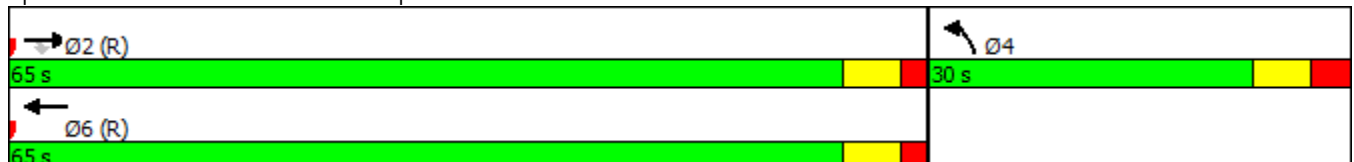
	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	591	96	659	236	1023
Future Volume (vph)	591	96	659	236	1023
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	66.8	66.8	66.3	24.8	95.0
Actuated g/C Ratio	0.70	0.70	0.70	0.26	1.00
v/c Ratio	0.32	0.12	0.35	0.66	0.84
Control Delay	6.3	1.4	6.7	39.4	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	1.4	6.7	39.4	7.2
LOS	A	A	A	D	A
Approach Delay	5.6		6.7	13.2	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 9.5
 Intersection Capacity Utilization 52.6%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2024)



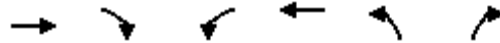
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	687	112	749	259	1124
v/c Ratio	0.32	0.12	0.35	0.66	0.84
Control Delay	6.3	1.4	6.7	39.4	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	1.4	6.7	39.4	7.2
Queue Length 50th (m)	23.4	0.0	26.7	41.4	0.0
Queue Length 95th (m)	31.6	4.3	36.7	65.5	0.0
Internal Link Dist (m)	288.3		40.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2159	909	2143	443	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.12	0.35	0.58	0.84

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2024)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	591	96	0	659	236	1023
Future Volume (vph)	591	96	0	659	236	1023
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1247		3073	1506	1334
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1247		3073	1506	1334
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	687	112	0	749	259	1124
RTOR Reduction (vph)	0	33	0	0	0	0
Lane Group Flow (vph)	687	79	0	749	259	1124
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	62.2	62.2		62.2	19.8	95.0
Effective Green, g (s)	66.8	66.8		66.3	24.8	95.0
Actuated g/C Ratio	0.70	0.70		0.70	0.26	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2160	876		2144	393	1334
v/s Ratio Prot	0.22			0.24	0.17	
v/s Ratio Perm		0.06				c0.84
v/c Ratio	0.32	0.09		0.35	0.66	0.84
Uniform Delay, d1	5.4	4.5		5.7	31.3	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2		0.5	4.0	6.6
Delay (s)	5.8	4.7		6.2	35.3	6.6
Level of Service	A	A		A	D	A
Approach Delay (s)	5.6			6.2	12.0	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

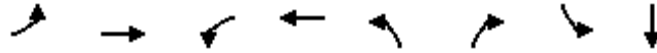
AM Peak Period
 Future Total (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	1544	946	31	24	25
Future Volume (Veh/h)	70	1544	946	31	24	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	74	1625	1075	35	26	27
Pedestrians			2		3	
Lane Width (m)			3.3		3.3	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.92				0.95	0.92
vC, conflicting volume	1113				2058	558
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	950				1705	347
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				63	96
cM capacity (veh/h)	671				71	601
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	74	812	812	717	393	53
Volume Left	74	0	0	0	0	26
Volume Right	0	0	0	0	35	27
cSH	671	1700	1700	1700	1700	129
Volume to Capacity	0.11	0.48	0.48	0.42	0.23	0.41
Queue Length 95th (m)	2.8	0.0	0.0	0.0	0.0	13.4
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	51.1
Lane LOS	B					F
Approach Delay (s)	0.5			0.0		51.1
Approach LOS						F
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			52.7%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1323	45	863	102	22	13	0
Future Volume (vph)	11	1323	45	863	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	78.0	78.0	87.5	85.5	16.7	16.7	16.3	16.3
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.15	0.15
v/c Ratio	0.03	0.69	0.18	0.34	0.54	0.09	0.05	0.04
Control Delay	7.2	12.4	8.1	2.4	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	12.8	8.1	2.4	52.0	0.7	37.8	0.2
LOS	A	B	A	A	D	A	D	A
Approach Delay		12.7		2.7				19.7
Approach LOS		B		A				B

Intersection Summary

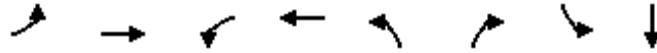
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 10.8
 Intersection LOS: B
 Intersection Capacity Utilization 74.5%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2024)
























Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1656	47	920	111	24	14	13
v/c Ratio	0.03	0.69	0.18	0.34	0.54	0.09	0.05	0.04
Control Delay	7.2	12.4	8.1	2.4	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	12.8	8.1	2.4	52.0	0.7	37.8	0.2
Queue Length 50th (m)	0.7	98.2	0.9	11.2	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.3	154.6	m4.1	15.1	37.6	0.0	7.7	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	403	2397	270	2676	432	470	546	599
Starvation Cap Reductn	0	272	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.78	0.17	0.34	0.26	0.05	0.03	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

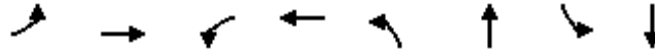
HCM Signalized Intersection Capacity Analysis
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2024)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1323	234	45	863	11	102	0	22	13	0	12
Future Volume (vph)	11	1323	234	45	863	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1743	3371		1711	3444		1711		1319	1724	1561	
Flt Permitted	0.31	1.00		0.09	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	569	3371		164	3444		1349		1319	1724	1561	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1407	249	47	908	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1648	0	47	920	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.4	73.4		82.6	82.6		14.4		14.4	14.4	14.4	
Effective Green, g (s)	77.2	77.2		85.5	85.5		16.7		16.7	16.3	16.3	
Actuated g/C Ratio	0.70	0.70		0.78	0.78		0.15		0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	399	2365		241	2676		204		200	255	231	
v/s Ratio Prot		c0.49		0.01	c0.27						0.00	
v/s Ratio Perm	0.02			0.14			c0.08		0.00	0.01		
v/c Ratio	0.03	0.70		0.20	0.34		0.54		0.02	0.05	0.01	
Uniform Delay, d1	5.0	9.6		7.7	3.7		43.1		39.7	40.2	40.0	
Progression Factor	1.00	1.00		2.16	0.51		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.7		0.3	0.3		2.9		0.0	0.1	0.0	
Delay (s)	5.1	11.3		16.9	2.2		46.1		39.7	40.3	40.0	
Level of Service	A	B		B	A		D		D	D	D	
Approach Delay (s)		11.3			2.9			44.9			40.2	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			10.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)		10.3			
Intersection Capacity Utilization			74.5%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2024)

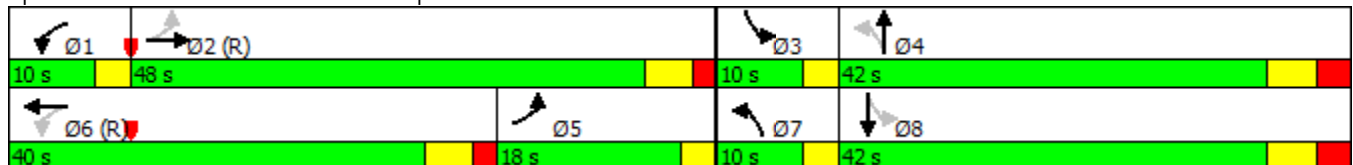


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	218	1029	137	672	28	142	33	76
Future Volume (vph)	218	1029	137	672	28	142	33	76
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	-1.8	2.2	-0.6	3.4
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	50.4	47.4	42.9	39.9	52.2	42.2	51.0	41.0
Actuated g/C Ratio	0.46	0.43	0.39	0.36	0.47	0.38	0.46	0.37
v/c Ratio	0.56	0.84	0.61	0.64	0.07	0.93	0.19	0.28
Control Delay	24.2	22.6	33.9	32.3	15.2	46.5	17.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	22.6	33.9	32.3	15.2	46.5	17.6	7.4
LOS	C	C	C	C	B	D	B	A
Approach Delay		22.9		32.5		45.0		8.4
Approach LOS		C		C		D		A

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 28.2
 Intersection LOS: C
 Intersection Capacity Utilization 83.4%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

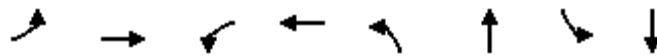


Queues

AM Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	1225	154	798	33	653	40	360
v/c Ratio	0.56	0.84	0.61	0.64	0.07	0.93	0.19	0.28
Control Delay	24.2	22.6	33.9	32.3	15.2	46.5	17.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	22.6	33.9	32.3	15.2	46.5	17.6	7.4
Queue Length 50th (m)	27.9	122.6	22.4	75.4	3.6	112.2	4.5	6.9
Queue Length 95th (m)	m40.8	136.5	37.1	95.0	8.3	#167.8	9.4	13.5
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	415	1464	254	1242	449	704	215	1290
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	0.56	0.84	0.61	0.64	0.07	0.93	0.19	0.28

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	218	1029	111	137	672	38	28	142	413	33	76	219
Future Volume (vph)	218	1029	111	137	672	38	28	142	413	33	76	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		-1.8	2.2		-0.6	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3386		1711	3409		1502	1598		1601	3010	
Flt Permitted	0.24	1.00		0.15	1.00		0.50	1.00		0.10	1.00	
Satd. Flow (perm)	424	3386		266	3409		788	1598		167	3010	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	234	1106	119	154	755	43	33	167	486	40	93	267
RTOR Reduction (vph)	0	8	0	0	4	0	0	92	0	0	167	0
Lane Group Flow (vph)	234	1217	0	154	794	0	33	561	0	40	193	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	45.2	42.2		34.3	34.3		41.5	37.4		41.7	37.5	
Effective Green, g (s)	49.1	46.1		38.6	38.6		49.4	42.2		48.2	41.1	
Actuated g/C Ratio	0.45	0.42		0.35	0.35		0.45	0.38		0.44	0.37	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	411	1419		244	1196		411	613		174	1124	
v/s Ratio Prot	c0.10	c0.36		0.07	c0.23		0.01	c0.35		c0.02	0.06	
v/s Ratio Perm	0.16			0.16			0.03			0.08		
v/c Ratio	0.57	0.86		0.63	0.66		0.08	0.92		0.23	0.17	
Uniform Delay, d1	30.3	29.0		28.1	30.2		17.1	32.2		23.8	23.1	
Progression Factor	0.64	0.63		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	5.2		5.2	2.9		0.1	18.4		0.7	0.1	
Delay (s)	20.8	23.6		33.4	33.1		17.2	50.6		24.5	23.1	
Level of Service	C	C		C	C		B	D		C	C	
Approach Delay (s)		23.1			33.2			49.0			23.3	
Approach LOS		C			C			D			C	

Intersection Summary

HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.4
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	41.5	62.9	79.6	38.9	77.1	18.3
Average Queue (m)	14.9	29.6	37.2	16.6	41.6	5.8
95th Queue (m)	29.6	51.6	64.9	30.7	67.8	13.9
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	2				
Queuing Penalty (veh)	0	2				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	EB	WB	WB	B15	B15	NB	NB
Directions Served	T	T	R	T	T	T	T	L	R
Maximum Queue (m)	39.1	37.3	2.7	55.2	56.1	1.6	4.0	142.0	129.4
Average Queue (m)	17.9	17.3	0.1	19.3	20.2	0.1	0.1	46.8	10.7
95th Queue (m)	33.2	33.5	2.0	42.9	44.1	2.0	2.5	95.6	76.6
Link Distance (m)	304.4	304.4		57.2	57.2	38.8	38.8	155.3	155.3
Upstream Blk Time (%)				0	0			0	1
Queuing Penalty (veh)				0	1			0	0
Storage Bay Dist (m)			70.0						
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B15	B15	B15	WB	WB	SB
Directions Served	L	T	T	T	T		T	TR	LR
Maximum Queue (m)	19.0	24.7	35.5	45.9	60.0	26.4	9.0	6.7	35.6
Average Queue (m)	8.2	1.9	3.7	4.5	7.4	1.5	0.3	0.3	12.3
95th Queue (m)	17.0	13.2	19.9	25.4	36.3	16.8	3.8	3.3	26.7
Link Distance (m)		38.8	38.8	57.2	57.2	57.2	95.2	95.2	80.4
Upstream Blk Time (%)		0	0	0	0	0			
Queuing Penalty (veh)		0	1	0	2	1			
Storage Bay Dist (m)	35.0								
Storage Blk Time (%)		0							
Queuing Penalty (veh)		0							

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	18.7	98.3	99.5	21.9	49.4	55.9	31.7	33.3	15.8	9.8
Average Queue (m)	2.4	48.3	57.7	8.7	23.5	27.4	19.8	5.3	2.9	2.7
95th Queue (m)	11.8	90.5	98.5	18.1	43.0	48.0	33.1	19.0	10.6	9.5
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)		0	1							
Queuing Penalty (veh)		3	7							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		7					4	0		
Queuing Penalty (veh)		1					1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	83.2	124.0	126.7	32.4	164.0	154.6	99.5	223.7	20.8	24.8	47.0
Average Queue (m)	38.8	68.5	73.4	30.7	125.7	113.8	15.5	124.1	6.1	9.6	21.8
95th Queue (m)	70.2	114.7	119.8	37.7	195.0	191.3	65.2	214.3	15.6	20.8	39.9
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)					27	16		0			
Queuing Penalty (veh)					0	0		0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	0	0		63	18		0	26			
Queuing Penalty (veh)	0	0		210	25		0	7			

Network Summary

Network wide Queuing Penalty: 262

Appendix J – 2024 Future Total Conditions – Synchro & SimTraffic Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2024)

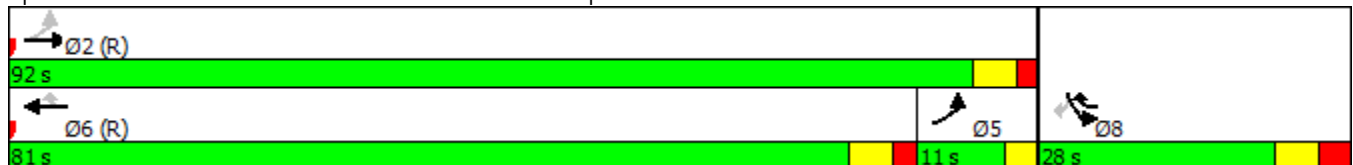


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	117	276	683	1037	191	99
Future Volume (vph)	117	276	683	1037	191	99
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.27	0.23	0.67	0.87	0.73	0.32
Control Delay	6.4	5.3	9.4	11.9	58.3	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	5.3	9.4	11.9	58.3	9.1
LOS	A	A	A	B	E	A
Approach Delay		5.6	10.9		41.5	
Approach LOS		A	B		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 14.4
 Intersection LOS: B
 Intersection Capacity Utilization 86.3%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

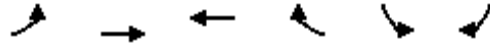


Queues

PM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2024)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	119	282	727	1103	239	124
v/c Ratio	0.27	0.23	0.67	0.87	0.73	0.32
Control Delay	6.4	5.3	9.4	11.9	58.3	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	5.3	9.4	11.9	58.3	9.1
Queue Length 50th (m)	5.9	17.7	34.8	166.6	52.8	0.0
Queue Length 95th (m)	10.2	26.6	114.7	73.7	70.2	10.7
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	438	1217	1083	1268	326	386
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	0.27	0.23	0.67	0.87	0.73	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	117	276	683	1037	191	99
Future Volume (vph)	117	276	683	1037	191	99
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1634	1634	1364	1506	1334
Flt Permitted	0.26	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	432	1634	1634	1364	1506	1334
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	119	282	727	1103	239	124
RTOR Reduction (vph)	0	0	0	78	0	97
Lane Group Flow (vph)	119	282	727	1025	239	27
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	439	1217	1083	1223	326	289
v/s Ratio Prot	0.03	c0.17	0.45	c0.18	0.16	
v/s Ratio Perm	0.18			0.57		0.02
v/c Ratio	0.27	0.23	0.67	0.84	0.73	0.09
Uniform Delay, d1	14.7	4.7	12.3	3.4	43.8	37.6
Progression Factor	1.00	1.00	0.56	3.54	1.00	1.00
Incremental Delay, d2	0.3	0.4	2.3	4.9	13.6	0.6
Delay (s)	15.0	5.2	9.1	17.0	57.4	38.2
Level of Service	B	A	A	B	E	D
Approach Delay (s)		8.1	13.9		50.8	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2024)

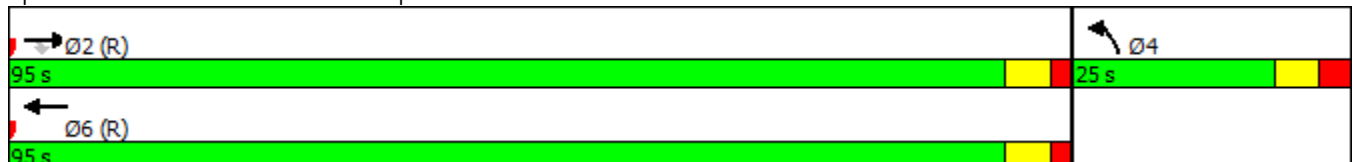
	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	403	64	1509	211	484
Future Volume (vph)	403	64	1509	211	484
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	95.0	95.0	95.0	25.0	
Total Split (%)	79.2%	79.2%	79.2%	20.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	92.9	92.9	92.7	22.6	120.0
Actuated g/C Ratio	0.77	0.77	0.77	0.19	1.00
v/c Ratio	0.18	0.06	0.70	0.82	0.39
Control Delay	2.0	0.1	4.6	69.8	0.9
Queue Delay	0.0	0.0	0.2	0.1	0.0
Total Delay	2.0	0.1	4.8	69.9	0.9
LOS	A	A	A	E	A
Approach Delay	1.7		4.8	21.8	
Approach LOS	A		A	C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 8.7
 Intersection Capacity Utilization 67.1%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2024)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	429	68	1677	232	532
v/c Ratio	0.18	0.06	0.70	0.82	0.39
Control Delay	2.0	0.1	4.6	69.8	0.9
Queue Delay	0.0	0.0	0.2	0.1	0.0
Total Delay	2.0	0.1	4.8	69.9	0.9
Queue Length 50th (m)	6.0	0.0	59.4	52.7	0.0
Queue Length 95th (m)	7.9	m0.0	18.8	#92.0	0.0
Internal Link Dist (m)	291.5		40.0	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2401	1067	2396	288	1348
Starvation Cap Reductn	0	0	157	0	0
Spillback Cap Reductn	0	0	0	1	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.06	0.75	0.81	0.39

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2024)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	403	64	0	1509	211	484
Future Volume (vph)	403	64	0	1509	211	484
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3104	1359		3104	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3104	1359		3104	1506	1348
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	429	68	0	1677	232	532
RTOR Reduction (vph)	0	15	0	0	0	0
Lane Group Flow (vph)	429	53	0	1677	232	532
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.4	89.4		89.4	17.6	120.0
Effective Green, g (s)	92.9	92.9		92.7	22.6	120.0
Actuated g/C Ratio	0.77	0.77		0.77	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2403	1052		2397	283	1348
v/s Ratio Prot	0.14			c0.54	c0.15	
v/s Ratio Perm		0.04				0.39
v/c Ratio	0.18	0.05		0.70	0.82	0.39
Uniform Delay, d1	3.6	3.2		6.8	46.7	0.0
Progression Factor	0.50	0.00		0.47	1.00	1.00
Incremental Delay, d2	0.1	0.1		1.3	16.7	0.9
Delay (s)	1.9	0.1		4.4	63.4	0.9
Level of Service	A	A		A	E	A
Approach Delay (s)	1.7			4.4	19.9	
Approach LOS	A			A	B	

Intersection Summary

HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

PM Peak Period
 Future Total (2024)



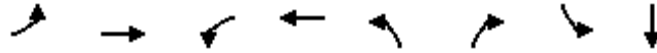
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	866	1811	21	16	21
Future Volume (Veh/h)	21	866	1811	21	16	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	24	973	1947	23	17	23
Pedestrians					3	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	118			
pX, platoon unblocked	0.69				0.70	0.69
vC, conflicting volume	1973				2496	988
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1506				2133	73
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				39	97
cM capacity (veh/h)	309				28	672

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	24	486	486	1298	672	40
Volume Left	24	0	0	0	0	17
Volume Right	0	0	0	0	23	23
cSH	309	1700	1700	1700	1700	62
Volume to Capacity	0.08	0.29	0.29	0.76	0.40	0.64
Queue Length 95th (m)	1.9	0.0	0.0	0.0	0.0	20.7
Control Delay (s)	17.6	0.0	0.0	0.0	0.0	134.9
Lane LOS	C					F
Approach Delay (s)	0.4			0.0		134.9
Approach LOS						F

Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			60.7%	ICU Level of Service		B
Analysis Period (min)			15			

Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	817	39	1666	154	59	10	0
Future Volume (vph)	11	817	39	1666	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	81.5	81.5	92.6	90.6	24.3	24.3	21.1	21.1
Actuated g/C Ratio	0.68	0.68	0.77	0.76	0.20	0.20	0.18	0.18
v/c Ratio	0.12	0.40	0.09	0.72	0.60	0.18	0.04	0.04
Control Delay	10.5	7.3	3.9	6.5	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	10.5	7.3	3.9	6.7	51.7	9.5	37.7	0.2
LOS	B	A	A	A	D	A	D	A
Approach Delay		7.4		6.7				17.4
Approach LOS		A		A				B

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 9.4
 Intersection Capacity Utilization 68.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 4: JBH Access & Northshore Blvd

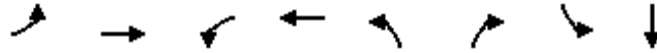


Queues

PM Peak Period

4: JBH Access & Northshore Blvd

Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	936	44	1893	167	64	11	13
v/c Ratio	0.12	0.40	0.09	0.72	0.60	0.18	0.04	0.04
Control Delay	10.5	7.3	3.9	6.5	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	10.5	7.3	3.9	6.7	51.7	9.5	37.7	0.2
Queue Length 50th (m)	0.8	33.0	1.9	50.7	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.8	47.4	m3.2	62.7	54.1	10.4	6.8	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	99	2349	470	2628	427	521	411	484
Starvation Cap Reductn	0	0	0	186	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	0.12	0.40	0.09	0.78	0.39	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 4: JBH Access & Northshore Blvd

PM Peak Period
 Future Total (2024)



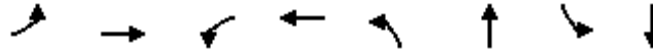
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	
Traffic Volume (vph)	11	817	54	39	1666	19	154	0	59	10	0	12
Future Volume (vph)	11	817	54	39	1666	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1745	3452		1710	3483		1741		1533	1445	1539	
Flt Permitted	0.08	1.00		0.26	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	148	3452		468	3483		1373		1533	1445	1539	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	878	58	44	1872	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	933	0	44	1893	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	77.9	77.9		87.1	87.1		19.9		19.9	19.9	19.9	
Effective Green, g (s)	80.8	80.8		90.6	90.6		24.3		24.3	21.1	21.1	
Actuated g/C Ratio	0.67	0.67		0.75	0.75		0.20		0.20	0.18	0.18	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	99	2324		443	2629		278		310	254	270	
v/s Ratio Prot		0.27		0.01	c0.54						0.00	
v/s Ratio Perm	0.08			0.07			c0.12		0.01	0.01		
v/c Ratio	0.12	0.40		0.10	0.72		0.60		0.04	0.04	0.01	
Uniform Delay, d1	7.0	8.8		4.4	7.9		43.4		38.5	41.1	40.8	
Progression Factor	0.74	0.70		0.85	0.57		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.4	0.5		0.1	1.3		3.6		0.1	0.1	0.0	
Delay (s)	7.6	6.7		3.8	5.8		47.1		38.5	41.1	40.8	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		6.7			5.7			44.7			41.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2024)

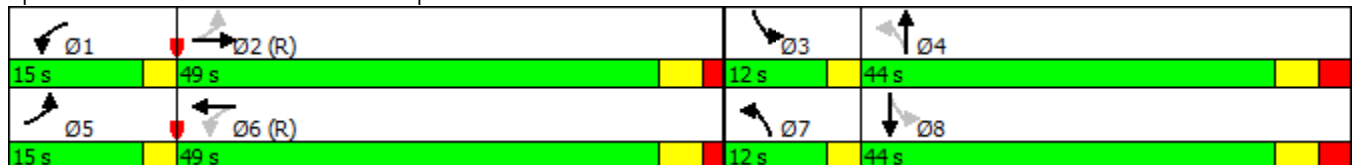


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↙	↕	↙	↕	↙	↕	↙	↕
Traffic Volume (vph)	185	663	243	1206	80	95	72	157
Future Volume (vph)	185	663	243	1206	80	95	72	157
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	15.0	49.0	15.0	49.0	12.0	44.0	12.0	44.0
Total Split (%)	12.5%	40.8%	12.5%	40.8%	10.0%	36.7%	10.0%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.4	-4.4	-3.8	-3.8	-3.9	-3.9
Total Lost Time (s)	-2.0	1.0	-1.4	1.6	-0.8	3.2	-0.9	3.1
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	80.0	61.6	79.3	60.8	42.8	29.4	42.9	27.5
Actuated g/C Ratio	0.67	0.51	0.66	0.51	0.36	0.24	0.36	0.23
v/c Ratio	0.64	0.45	0.53	0.79	0.36	0.70	0.28	0.71
Control Delay	48.4	17.8	13.6	30.6	28.0	36.5	26.1	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	17.8	13.6	30.6	28.0	36.5	26.1	28.1
LOS	D	B	B	C	C	D	C	C
Approach Delay		24.2		27.8		34.7		27.8
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 27.6
 Intersection LOS: C
 Intersection Capacity Utilization 86.1%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

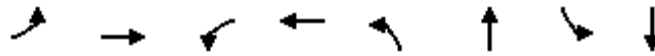


Queues

PM Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	208	788	261	1373	87	328	78	647
v/c Ratio	0.64	0.45	0.53	0.79	0.36	0.70	0.28	0.71
Control Delay	48.4	17.8	13.6	30.6	28.0	36.5	26.1	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	17.8	13.6	30.6	28.0	36.5	26.1	28.1
Queue Length 50th (m)	38.4	38.3	22.9	138.2	13.6	51.1	12.2	43.7
Queue Length 95th (m)	64.6	52.8	44.1	#220.4	21.7	75.0	19.9	57.0
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	345	1760	505	1748	251	610	290	1221
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	0.60	0.45	0.52	0.79	0.35	0.54	0.27	0.53

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	185	663	38	243	1206	71	80	95	207	72	157	438
Future Volume (vph)	185	663	38	243	1206	71	80	95	207	72	157	438
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3425		1744	3445		1727	1604		1675	3062	
Flt Permitted	0.07	1.00		0.26	1.00		0.15	1.00		0.25	1.00	
Satd. Flow (perm)	137	3425		481	3445		267	1604		442	3062	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	745	43	261	1297	76	87	103	225	78	171	476
RTOR Reduction (vph)	0	3	0	0	3	0	0	75	0	0	206	0
Lane Group Flow (vph)	208	785	0	261	1370	0	87	253	0	78	441	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	68.6	56.0		68.2	55.8		34.0	25.6		31.2	24.2	
Effective Green, g (s)	76.4	61.0		75.8	60.2		39.4	29.4		39.0	28.1	
Actuated g/C Ratio	0.64	0.51		0.63	0.50		0.33	0.24		0.32	0.23	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	1741		480	1728		236	392		255	717	
v/s Ratio Prot	c0.09	0.23		0.08	c0.40		c0.04	c0.16		0.03	0.14	
v/s Ratio Perm	0.31			0.27			0.08			0.07		
v/c Ratio	0.64	0.45		0.54	0.79		0.37	0.65		0.31	0.62	
Uniform Delay, d1	28.3	18.8		11.2	24.7		30.0	40.6		29.8	41.1	
Progression Factor	1.75	0.83		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	0.8		1.3	3.8		1.0	3.6		0.7	1.6	
Delay (s)	53.6	16.5		12.5	28.6		30.9	44.3		30.5	42.7	
Level of Service	D	B		B	C		C	D		C	D	
Approach Delay (s)		24.2			26.0			41.5			41.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	41.9	87.0	81.6	107.5	70.1	25.3
Average Queue (m)	25.6	28.4	49.2	55.9	36.1	10.5
95th Queue (m)	43.1	65.0	73.6	98.8	62.1	20.2
Link Distance (m)		151.8	307.2	307.2	165.7	165.7
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	7	2				
Queuing Penalty (veh)	20	2				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B15	NB
Directions Served	T	T	T	T	T	L
Maximum Queue (m)	20.6	17.3	43.4	46.6	1.5	88.5
Average Queue (m)	7.6	3.6	18.3	22.5	0.1	48.1
95th Queue (m)	17.7	12.3	35.0	39.9	1.9	80.2
Link Distance (m)	307.2	307.2	56.1	56.1	39.2	160.9
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				0		
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	B15	B15	WB	SB
Directions Served	L	T		TR	LR
Maximum Queue (m)	15.0	5.7	1.4	3.1	23.5
Average Queue (m)	4.0	0.2	0.0	0.1	8.7
95th Queue (m)	12.5	2.9	1.4	2.5	18.7
Link Distance (m)		56.1	56.1	100.9	92.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	35.0				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	11.7	45.7	48.6	15.4	62.6	68.9	32.1	71.4	18.2	12.0
Average Queue (m)	2.2	18.5	22.6	5.1	30.2	34.1	25.6	18.4	3.2	2.8
95th Queue (m)	8.2	37.9	41.7	12.8	53.5	58.5	37.0	53.7	12.4	9.3
Link Distance (m)		100.9	100.9		244.6	244.6		138.3	66.9	66.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0			0		15	1		
Queuing Penalty (veh)		0			0		9	1		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	71.6	69.3	75.3	32.4	171.1	170.9	63.7	104.1	33.7	81.7	129.9
Average Queue (m)	32.7	36.6	40.2	28.2	167.6	166.7	14.6	45.0	12.1	25.6	64.7
95th Queue (m)	61.0	60.0	64.0	40.2	179.8	183.6	37.0	82.1	26.4	54.8	107.4
Link Distance (m)		244.6	244.6		164.2	164.2		225.6		178.2	178.2
Upstream Blk Time (%)					62	52					
Queuing Penalty (veh)					0	0					
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				12	50		0	1		0	
Queuing Penalty (veh)				74	123		0	0		0	

Network Summary

Network wide Queuing Penalty: 230

Appendix J – 2024 Future Total Conditions – Synchro & SimTraffic Reports

3. Saturday Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Future Total (2024)

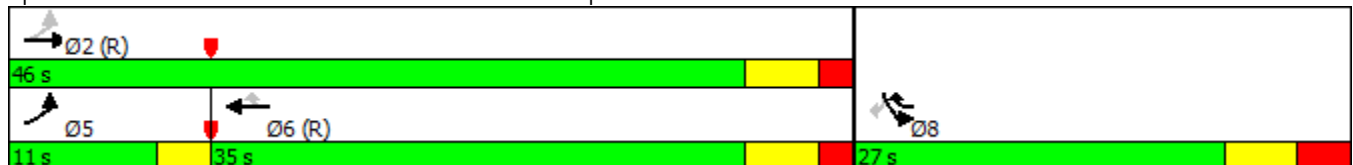


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	49	275	394	357	251	74
Future Volume (vph)	49	275	394	357	251	74
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.5	-4.5	-5.0	-5.0
Total Lost Time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	48.0	45.0	38.6	65.6	25.0	25.0
Actuated g/C Ratio	0.66	0.62	0.53	0.90	0.34	0.34
v/c Ratio	0.09	0.30	0.48	0.29	0.59	0.17
Control Delay	4.8	7.6	14.6	0.7	25.3	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	7.6	14.6	0.7	25.3	5.3
LOS	A	A	B	A	C	A
Approach Delay		7.1	8.0		20.8	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 11.1
 Intersection LOS: B
 Intersection Capacity Utilization 54.4%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

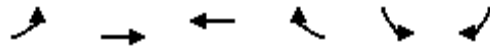


Queues

Saturday Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2024)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	53	296	410	372	302	89
v/c Ratio	0.09	0.30	0.48	0.29	0.59	0.17
Control Delay	4.8	7.6	14.6	0.7	25.3	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	7.6	14.6	0.7	25.3	5.3
Queue Length 50th (m)	2.2	16.9	36.9	0.0	33.5	0.0
Queue Length 95th (m)	5.4	28.7	63.1	2.8	51.1	7.1
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	605	996	854	1285	515	509
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	0.09	0.30	0.48	0.29	0.59	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
 Future Total (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	275	394	357	251	74
Future Volume (vph)	49	275	394	357	251	74
Ideal Flow (vphpl)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
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	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1617	1617	1389	1506	1318
Flt Permitted	0.42	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	686	1617	1617	1389	1506	1318
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.83	0.83
Adj. Flow (vph)	53	296	410	372	302	89
RTOR Reduction (vph)	0	0	0	57	0	59
Lane Group Flow (vph)	53	296	410	315	302	30
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	32.9	52.9	20.0	20.0
Effective Green, g (s)	45.0	45.0	37.4	61.9	25.0	25.0
Actuated g/C Ratio	0.62	0.62	0.51	0.85	0.34	0.34
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	530	996	828	1177	515	451
v/s Ratio Prot	0.01	c0.18	c0.25	0.09	c0.20	
v/s Ratio Perm	0.05			0.14		0.02
v/c Ratio	0.10	0.30	0.50	0.27	0.59	0.07
Uniform Delay, d1	5.9	6.6	11.6	1.1	19.7	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	2.1	0.6	4.8	0.3
Delay (s)	6.0	7.3	13.7	1.7	24.6	16.4
Level of Service	A	A	B	A	C	B
Approach Delay (s)		7.1	8.0		22.7	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	3.5
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2024)

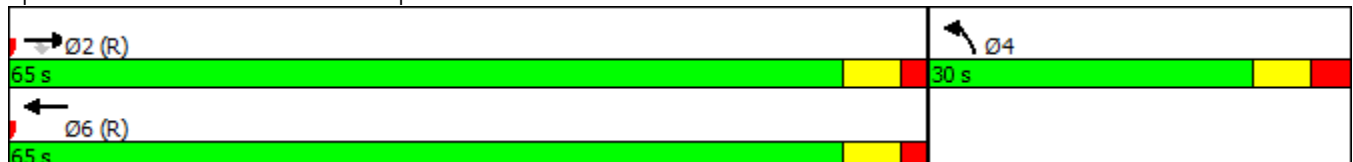
	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	432	94	638	113	342
Future Volume (vph)	432	94	638	113	342
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-2.9	-2.9	-3.3	-4.8	
Total Lost Time (s)	3.1	3.1	2.7	2.2	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	71.5	71.5	71.9	18.2	95.0
Actuated g/C Ratio	0.75	0.75	0.76	0.19	1.00
v/c Ratio	0.20	0.10	0.29	0.44	0.29
Control Delay	4.1	1.1	4.3	38.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	1.1	4.3	38.0	0.5
LOS	A	A	A	D	A
Approach Delay	3.6		4.3	9.8	
Approach LOS	A		A	A	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 5.7
 Intersection Capacity Utilization 44.8%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2024)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	470	102	665	128	389
v/c Ratio	0.20	0.10	0.29	0.44	0.29
Control Delay	4.1	1.1	4.3	38.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	1.1	4.3	38.0	0.5
Queue Length 50th (m)	10.7	0.0	16.1	20.9	0.0
Queue Length 95th (m)	19.8	4.2	28.5	34.5	0.0
Internal Link Dist (m)	288.3		39.2	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2312	1044	2325	440	1348
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.10	0.29	0.29	0.29

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2024)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	432	94	0	638	113	342
Future Volume (vph)	432	94	0	638	113	342
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	3.1	3.1		2.7	2.2	-0.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1354		3073	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1354		3073	1506	1348
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.88	0.88
Adj. Flow (vph)	470	102	0	665	128	389
RTOR Reduction (vph)	0	25	0	0	0	0
Lane Group Flow (vph)	470	77	0	665	128	389
Confl. Peds. (#/hr)		4	4			
Heavy Vehicles (%)	1%	0%	1%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	68.6	68.6		68.6	13.4	95.0
Effective Green, g (s)	71.5	71.5		71.9	18.2	95.0
Actuated g/C Ratio	0.75	0.75		0.76	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2312	1019		2325	288	1348
v/s Ratio Prot	0.15			0.22	c0.08	
v/s Ratio Perm		0.06				c0.29
v/c Ratio	0.20	0.08		0.29	0.44	0.29
Uniform Delay, d1	3.4	3.1		3.6	33.9	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		0.3	1.1	0.5
Delay (s)	3.6	3.2		3.9	35.0	0.5
Level of Service	A	A		A	D	A
Approach Delay (s)	3.6			3.9	9.1	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	5.3
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

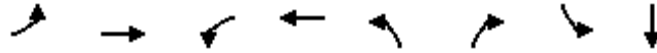
Saturday Peak Period
Future Total (2024)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	748	827	21	19	25
Future Volume (Veh/h)	26	748	827	21	19	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	29	822	871	22	21	27
Pedestrians					8	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.95				0.96	0.95
vC, conflicting volume	901				1359	454
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	791				1179	321
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				88	96
cM capacity (veh/h)	791				172	642
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	29	411	411	581	312	48
Volume Left	29	0	0	0	0	21
Volume Right	0	0	0	0	22	27
cSH	791	1700	1700	1700	1700	292
Volume to Capacity	0.04	0.24	0.24	0.34	0.18	0.16
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	4.4
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	19.7
Lane LOS	A					C
Approach Delay (s)	0.3			0.0		19.7
Approach LOS						C
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			33.5%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	9	721	27	791	49	39	11	0
Future Volume (vph)	9	721	27	791	49	39	11	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-3.5	-3.5	-2.2	-2.2	0.0	0.0
Total Lost Time (s)	2.2	2.2	0.5	2.5	4.8	4.8	7.0	7.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	87.8	87.8	95.2	93.7	12.5	12.5	10.3	10.3
Actuated g/C Ratio	0.80	0.80	0.87	0.85	0.11	0.11	0.09	0.09
v/c Ratio	0.02	0.31	0.05	0.29	0.36	0.21	0.07	0.03
Control Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
LOS	A	A	A	A	D	A	D	A
Approach Delay		4.7		1.4				25.6
Approach LOS		A		A				C

Intersection Summary

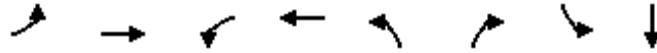
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 52.4%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	10	852	29	858	56	45	12	9
v/c Ratio	0.02	0.31	0.05	0.29	0.36	0.21	0.07	0.03
Control Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.7	1.1	1.4	50.7	6.6	44.7	0.1
Queue Length 50th (m)	0.5	28.6	0.4	8.4	11.4	0.0	2.4	0.0
Queue Length 95th (m)	2.3	43.1	1.0	9.8	22.1	4.7	8.0	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	483	2768	597	2961	441	486	518	592
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	0.02	0.31	0.05	0.29	0.13	0.09	0.02	0.02

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2024)



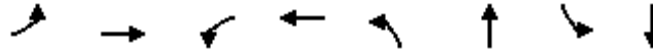
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	9	721	37	27	791	16	49	0	39	11	0	8
Future Volume (vph)	9	721	37	27	791	16	49	0	39	11	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		0.5	2.5		4.8		4.8	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1741	3464		1745	3477		1745		1375	1728	1561	
Flt Permitted	0.33	1.00		0.31	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	605	3464		561	3477		1381		1375	1728	1561	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	810	42	29	841	17	56	0	45	12	0	9
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	41	0	8	0
Lane Group Flow (vph)	10	850	0	29	858	0	56	0	4	12	1	0
Confl. Peds. (#/hr)	3						3		9	9		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	80.6	80.6		88.3	88.3		8.7		8.7	8.7	8.7	
Effective Green, g (s)	84.4	84.4		91.8	91.8		10.9		10.9	8.7	8.7	
Actuated g/C Ratio	0.77	0.77		0.83	0.83		0.10		0.10	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	464	2657		545	2901		136		136	136	123	
v/s Ratio Prot		c0.25		0.00	c0.25						0.00	
v/s Ratio Perm	0.02			0.04			c0.04		0.00	0.01		
v/c Ratio	0.02	0.32		0.05	0.30		0.41		0.03	0.09	0.01	
Uniform Delay, d1	3.0	3.9		1.8	2.0		46.5		44.8	47.0	46.7	
Progression Factor	1.00	1.00		0.52	0.49		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.0	0.2		2.0		0.1	0.3	0.0	
Delay (s)	3.1	4.3		1.0	1.2		48.6		44.9	47.3	46.7	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		4.3			1.2			46.9			47.0	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.7
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Total (2024)

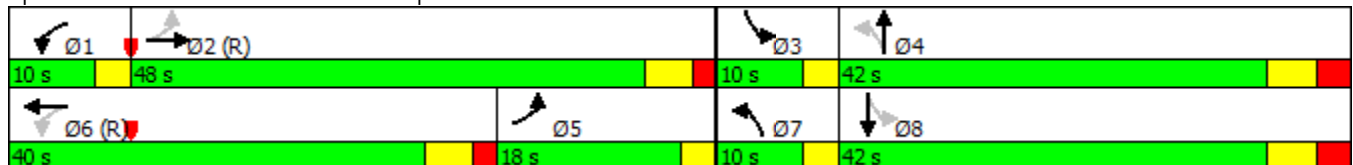


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	158	560	107	577	35	54	86	51
Future Volume (vph)	158	560	107	577	35	54	86	51
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-4.1	-4.1	-3.2	-3.2	-5.0	-5.0	-4.1	-4.1
Total Lost Time (s)	-1.1	1.9	-0.2	2.8	-2.0	2.0	-1.1	2.9
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	72.5	69.5	65.5	62.5	28.7	16.7	27.8	17.8
Actuated g/C Ratio	0.66	0.63	0.60	0.57	0.26	0.15	0.25	0.16
v/c Ratio	0.27	0.30	0.24	0.38	0.13	0.51	0.33	0.43
Control Delay	8.6	7.2	12.5	14.4	28.6	25.9	33.7	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	7.2	12.5	14.4	28.6	25.9	33.7	11.2
LOS	A	A	B	B	C	C	C	B
Approach Delay		7.5		14.2		26.4		16.5
Approach LOS		A		B		C		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51
 Intersection Signal Delay: 13.2
 Intersection LOS: B
 Intersection Capacity Utilization 69.8%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

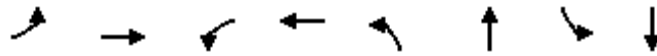


Queues

Saturday Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2024)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	170	659	115	728	39	163	91	290
v/c Ratio	0.27	0.30	0.24	0.38	0.13	0.51	0.33	0.43
Control Delay	8.6	7.2	12.5	14.4	28.6	25.9	33.7	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	7.2	12.5	14.4	28.6	25.9	33.7	11.2
Queue Length 50th (m)	4.9	30.4	10.3	42.7	6.3	15.0	15.3	5.4
Queue Length 95th (m)	26.6	54.7	21.5	64.3	13.0	32.5	26.0	16.3
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	634	2175	484	1929	305	641	272	1211
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.30	0.24	0.38	0.13	0.25	0.33	0.24

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Total (2024)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	158	560	53	107	577	100	35	54	91	86	51	222
Future Volume (vph)	158	560	53	107	577	100	35	54	91	86	51	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-1.1	1.9		-0.2	2.8		-2.0	2.0		-1.1	2.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		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)	1740	3438		1709	3380		1691	1614		1670	2981	
Flt Permitted	0.38	1.00		0.34	1.00		0.45	1.00		0.39	1.00	
Satd. Flow (perm)	687	3438		607	3380		799	1614		689	2981	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.94	0.94	0.94
Adj. Flow (vph)	170	602	57	115	620	108	39	61	102	91	54	236
RTOR Reduction (vph)	0	4	0	0	8	0	0	72	0	0	198	0
Lane Group Flow (vph)	170	655	0	115	720	0	39	91	0	91	92	0
Confl. Peds. (#/hr)	13		10	10		13	7		17	17		7
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	3%	0%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	67.2	64.2		58.1	58.1		16.5	12.3		19.3	13.7	
Effective Green, g (s)	71.3	68.3		61.3	61.3		25.9	17.3		25.0	17.8	
Actuated g/C Ratio	0.65	0.62		0.56	0.56		0.24	0.16		0.23	0.16	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	628	2134		459	1883		262	253		243	482	
v/s Ratio Prot	0.05	c0.19		0.03	c0.21		0.01	c0.06		c0.03	0.03	
v/s Ratio Perm	0.13			0.11			0.02			0.05		
v/c Ratio	0.27	0.31		0.25	0.38		0.15	0.36		0.37	0.19	
Uniform Delay, d1	9.0	9.8		11.9	13.7		33.0	41.4		34.9	39.9	
Progression Factor	0.66	0.65		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.3	0.6		0.3	0.9		1.0	0.2	
Delay (s)	6.2	6.7		12.2	14.3		33.2	42.3		35.9	40.1	
Level of Service	A	A		B	B		C	D		D	D	
Approach Delay (s)		6.6			14.0			40.5			39.1	
Approach LOS		A			B			D			D	

Intersection Summary		
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.35	B
Actuated Cycle Length (s)	110.0	Sum of lost time (s)
Intersection Capacity Utilization	69.8%	2.6
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	23.3	42.4	68.8	25.7	64.2	18.1
Average Queue (m)	8.6	20.7	32.9	10.6	31.4	7.0
95th Queue (m)	18.4	36.3	57.0	21.3	53.0	14.5
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	0	0				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B15	NB
Directions Served	T	T	T	T	T	L
Maximum Queue (m)	25.4	25.4	41.5	44.5	1.6	46.6
Average Queue (m)	10.0	8.0	13.3	12.8	0.1	21.5
95th Queue (m)	22.0	20.9	32.4	32.0	1.5	38.3
Link Distance (m)	304.4	304.4	55.6	55.6	40.3	155.3
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	B15	B15	B15	WB	SB
Directions Served	L	T	T		TR	LR
Maximum Queue (m)	12.3	3.1	4.3	1.6	1.2	18.4
Average Queue (m)	3.5	0.1	0.1	0.1	0.0	7.8
95th Queue (m)	11.3	1.9	2.5	1.6	1.2	15.4
Link Distance (m)		55.6	55.6	55.6	95.2	80.4
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	35.0					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	9.6	47.3	52.8	13.2	40.3	41.7	27.4	14.9	17.8	9.7
Average Queue (m)	1.7	16.6	19.4	4.5	14.6	16.0	11.3	5.2	3.5	1.7
95th Queue (m)	7.2	38.4	42.5	12.1	32.9	34.6	23.5	12.2	12.2	7.6
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0					1			
Queuing Penalty (veh)		0					0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	47.9	50.8	56.4	32.3	79.2	74.7	22.6	55.8	33.5	22.6	52.6
Average Queue (m)	19.9	18.6	22.7	17.1	37.3	30.2	8.1	22.6	13.4	8.0	19.7
95th Queue (m)	39.0	42.0	47.8	33.9	67.5	59.7	18.9	43.5	26.9	18.0	37.7
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				0	11						
Queuing Penalty (veh)				1	12						

Network Summary

Network wide Queuing Penalty: 14

Appendix K – 2029 Future Total Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Saturday Peak Hour

Appendix K – 2029 Future Total Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2029)

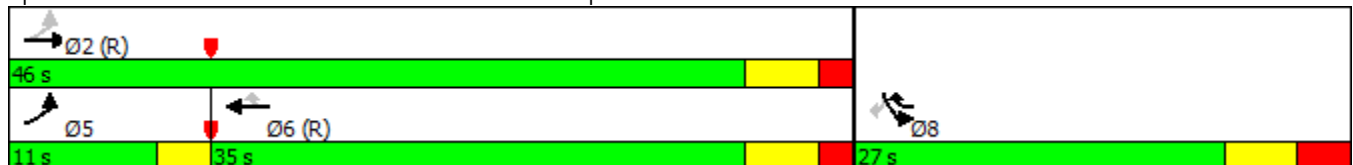


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	112	405	452	514	332	54
Future Volume (vph)	112	405	452	514	332	54
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	45.6	42.6	34.8	61.6	24.0	24.0
Actuated g/C Ratio	0.62	0.58	0.48	0.84	0.33	0.33
v/c Ratio	0.28	0.47	0.67	0.47	0.75	0.13
Control Delay	7.3	10.8	21.0	1.5	33.7	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	10.8	21.0	1.5	33.7	6.1
LOS	A	B	C	A	C	A
Approach Delay		10.1	10.6		29.8	
Approach LOS		B	B		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 14.4
 Intersection LOS: B
 Intersection Capacity Utilization 65.0%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

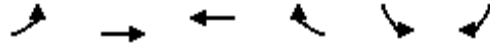


Queues

AM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	120	435	514	584	369	60
v/c Ratio	0.28	0.47	0.67	0.47	0.75	0.13
Control Delay	7.3	10.8	21.0	1.5	33.7	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	10.8	21.0	1.5	33.7	6.1
Queue Length 50th (m)	5.9	30.9	54.9	0.0	44.6	0.0
Queue Length 95th (m)	11.7	50.8	86.3	3.7	#83.7	7.1
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	441	925	771	1250	490	466
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	0.27	0.47	0.67	0.47	0.75	0.13

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	112	405	452	514	332	54
Future Volume (vph)	112	405	452	514	332	54
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1522	1586	1617	1375	1491	1296
Flt Permitted	0.29	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	460	1586	1617	1375	1491	1296
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	120	435	514	584	369	60
RTOR Reduction (vph)	0	0	0	123	0	40
Lane Group Flow (vph)	120	435	514	461	369	20
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	30.8	50.8	20.0	20.0
Effective Green, g (s)	42.6	42.6	34.2	57.6	24.0	24.0
Actuated g/C Ratio	0.58	0.58	0.47	0.79	0.33	0.33
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	396	925	757	1084	490	426
v/s Ratio Prot	0.04	c0.27	c0.32	0.14	c0.25	
v/s Ratio Perm	0.14			0.20		0.02
v/c Ratio	0.30	0.47	0.68	0.43	0.75	0.05
Uniform Delay, d1	8.3	8.7	15.1	2.4	21.9	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.7	4.9	1.2	10.3	0.2
Delay (s)	8.7	10.4	20.0	3.7	32.1	16.9
Level of Service	A	B	B	A	C	B
Approach Delay (s)		10.1	11.3		30.0	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2029)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	631	106	705	261	1125
Future Volume (vph)	631	106	705	261	1125
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	65.9	65.9	65.4	25.7	95.0
Actuated g/C Ratio	0.69	0.69	0.69	0.27	1.00
v/c Ratio	0.34	0.14	0.38	0.71	0.93
Control Delay	6.7	1.4	7.2	41.1	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	1.4	7.2	41.1	14.3
LOS	A	A	A	D	B
Approach Delay	6.0		7.2	19.3	
Approach LOS	A		A	B	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 12.7
 Intersection Capacity Utilization 54.3%
 Analysis Period (min) 15

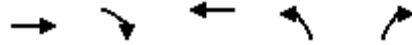
Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	734	123	801	287	1236
v/c Ratio	0.34	0.14	0.38	0.71	0.93
Control Delay	6.7	1.4	7.2	41.1	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	1.4	7.2	41.1	14.3
Queue Length 50th (m)	27.2	0.0	31.2	45.7	0.0
Queue Length 95th (m)	34.1	4.5	40.0	73.3	#38.1
Internal Link Dist (m)	288.3		40.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2131	902	2115	443	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.14	0.38	0.65	0.93

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2029)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	631	106	0	705	261	1125
Future Volume (vph)	631	106	0	705	261	1125
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1247		3073	1506	1334
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1247		3073	1506	1334
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	734	123	0	801	287	1236
RTOR Reduction (vph)	0	38	0	0	0	0
Lane Group Flow (vph)	734	85	0	801	287	1236
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	61.3	61.3		61.3	20.7	95.0
Effective Green, g (s)	65.9	65.9		65.4	25.7	95.0
Actuated g/C Ratio	0.69	0.69		0.69	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2131	865		2115	407	1334
v/s Ratio Prot	0.24			0.26	0.19	
v/s Ratio Perm		0.07				c0.93
v/c Ratio	0.34	0.10		0.38	0.71	0.93
Uniform Delay, d1	5.9	4.8		6.2	31.2	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2		0.5	5.5	12.4
Delay (s)	6.3	5.0		6.8	36.7	12.4
Level of Service	A	A		A	D	B
Approach Delay (s)	6.1			6.8	17.0	
Approach LOS	A			A	B	

Intersection Summary

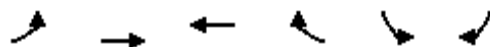
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

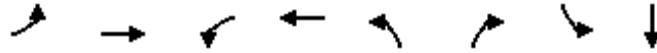
AM Peak Period
Future Total (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	1686	1023	31	24	25
Future Volume (Veh/h)	70	1686	1023	31	24	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	74	1775	1163	35	26	27
Pedestrians			2		3	
Lane Width (m)			3.3		3.3	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.91				0.95	0.91
vC, conflicting volume	1201				2221	602
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1022				1815	363
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				56	95
cM capacity (veh/h)	623				59	580
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	74	888	888	775	423	53
Volume Left	74	0	0	0	0	26
Volume Right	0	0	0	0	35	27
cSH	623	1700	1700	1700	1700	109
Volume to Capacity	0.12	0.52	0.52	0.46	0.25	0.49
Queue Length 95th (m)	3.1	0.0	0.0	0.0	0.0	16.5
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	65.9
Lane LOS	B					F
Approach Delay (s)	0.5			0.0		65.9
Approach LOS						F
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			56.6%		ICU Level of Service	B
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1465	45	940	102	22	13	0
Future Volume (vph)	11	1465	45	940	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	78.0	78.0	87.5	85.5	16.7	16.7	16.3	16.3
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.15	0.15
v/c Ratio	0.03	0.75	0.20	0.37	0.54	0.09	0.05	0.04
Control Delay	7.3	14.1	12.8	2.9	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	14.8	12.8	2.9	52.0	0.7	37.8	0.2
LOS	A	B	B	A	D	A	D	A
Approach Delay		14.7		3.3				19.7
Approach LOS		B		A				B

Intersection Summary

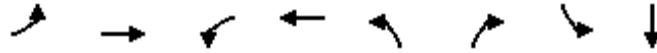
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 12.1
 Intersection LOS: B
 Intersection Capacity Utilization 78.4%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1808	47	1001	111	24	14	13
v/c Ratio	0.03	0.75	0.20	0.37	0.54	0.09	0.05	0.04
Control Delay	7.3	14.1	12.8	2.9	52.0	0.7	37.8	0.2
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	14.8	12.8	2.9	52.0	0.7	37.8	0.2
Queue Length 50th (m)	0.7	117.9	0.9	12.2	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.3	185.7	m5.7	25.6	37.6	0.0	7.7	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	372	2402	240	2676	432	470	546	581
Starvation Cap Reductn	0	250	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.84	0.20	0.37	0.26	0.05	0.03	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

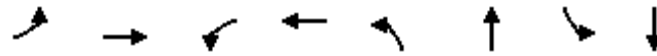
AM Peak Period
Future Total (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1465	234	45	940	11	102	0	22	13	0	12
Future Volume (vph)	11	1465	234	45	940	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1743	3378		1711	3445		1711		1319	1724	1561	
Flt Permitted	0.29	1.00		0.07	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	525	3378		123	3445		1349		1319	1724	1561	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1559	249	47	989	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1801	0	47	1001	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.4	73.4		82.6	82.6		14.4		14.4	14.4	14.4	
Effective Green, g (s)	77.2	77.2		85.5	85.5		16.7		16.7	16.3	16.3	
Actuated g/C Ratio	0.70	0.70		0.78	0.78		0.15		0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	368	2370		212	2677		204		200	255	231	
v/s Ratio Prot		c0.53		0.02	c0.29						0.00	
v/s Ratio Perm	0.02			0.16			c0.08		0.00	0.01		
v/c Ratio	0.03	0.76		0.22	0.37		0.54		0.02	0.05	0.01	
Uniform Delay, d1	5.0	10.5		10.1	3.8		43.1		39.7	40.2	40.0	
Progression Factor	1.00	1.00		3.56	0.59		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2	2.4		0.4	0.3		2.9		0.0	0.1	0.0	
Delay (s)	5.2	12.8		36.4	2.6		46.1		39.7	40.3	40.0	
Level of Service	A	B		D	A		D		D	D	D	
Approach Delay (s)		12.8			4.1			44.9			40.2	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			11.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)		10.3			
Intersection Capacity Utilization			78.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2029)

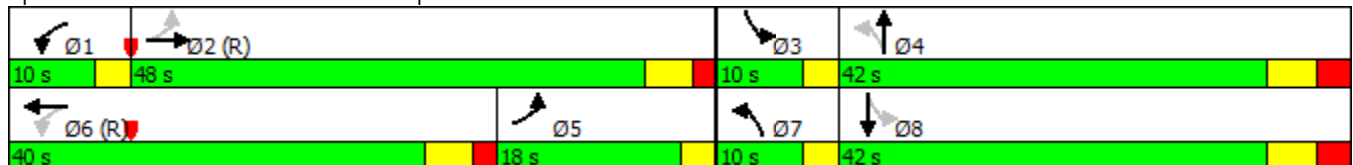


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↶↷	↶	↶↷	↶	↷	↶	↶↷
Traffic Volume (vph)	230	1153	145	736	30	149	35	80
Future Volume (vph)	230	1153	145	736	30	149	35	80
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	-1.8	2.2	-0.6	3.4
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	48.9	45.9	41.3	38.3	53.8	43.8	52.6	42.6
Actuated g/C Ratio	0.44	0.42	0.38	0.35	0.49	0.40	0.48	0.39
v/c Ratio	0.65	0.96	0.65	0.73	0.08	0.95	0.20	0.28
Control Delay	28.9	33.6	36.8	35.6	15.2	49.7	17.8	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	33.6	36.8	35.6	15.2	49.7	17.8	7.4
LOS	C	C	D	D	B	D	B	A
Approach Delay		32.9		35.8		48.1		8.5
Approach LOS		C		D		D		A

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 33.9
 Intersection LOS: C
 Intersection Capacity Utilization 89.3%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

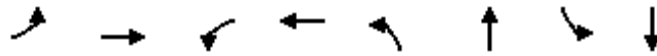


Queues

AM Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	247	1366	163	872	35	688	43	378
v/c Ratio	0.65	0.96	0.65	0.73	0.08	0.95	0.20	0.28
Control Delay	28.9	33.6	36.8	35.6	15.2	49.7	17.8	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	33.6	36.8	35.6	15.2	49.7	17.8	7.4
Queue Length 50th (m)	31.3	146.2	23.9	85.0	3.8	~135.1	4.8	7.3
Queue Length 95th (m)	m42.0	#192.2	#39.2	106.2	8.6	#183.9	9.9	13.8
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	380	1421	251	1190	455	726	215	1338
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	0.65	0.96	0.65	0.73	0.08	0.95	0.20	0.28

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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↗↘	
Traffic Volume (vph)	230	1153	117	145	736	40	30	149	436	35	80	230
Future Volume (vph)	230	1153	117	145	736	40	30	149	436	35	80	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		-1.8	2.2		-0.6	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3389		1711	3411		1502	1598		1601	3010	
Flt Permitted	0.18	1.00		0.16	1.00		0.49	1.00		0.10	1.00	
Satd. Flow (perm)	316	3389		279	3411		771	1598		160	3010	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	247	1240	126	163	827	45	35	175	513	43	98	280
RTOR Reduction (vph)	0	7	0	0	3	0	0	90	0	0	172	0
Lane Group Flow (vph)	247	1359	0	163	869	0	35	598	0	43	206	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	43.8	40.8		32.8	32.8		43.2	39.0		43.2	39.0	
Effective Green, g (s)	47.7	44.7		37.1	37.1		51.0	43.8		49.8	42.6	
Actuated g/C Ratio	0.43	0.41		0.34	0.34		0.46	0.40		0.45	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	376	1377		241	1150		417	636		174	1165	
v/s Ratio Prot	c0.11	c0.40		0.07	c0.25		0.01	c0.37		0.02	0.07	
v/s Ratio Perm	0.17			0.16			0.03			0.09		
v/c Ratio	0.66	0.99		0.68	0.76		0.08	0.94		0.25	0.18	
Uniform Delay, d1	33.6	32.4		29.1	32.4		16.2	31.8		23.7	22.2	
Progression Factor	0.66	0.65		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.8	17.0		7.3	4.6		0.1	21.8		0.7	0.1	
Delay (s)	24.8	38.0		36.4	37.1		16.3	53.6		24.4	22.2	
Level of Service	C	D		D	D		B	D		C	C	
Approach Delay (s)		36.0			36.9			51.8			22.5	
Approach LOS		D			D			D			C	

Intersection Summary

HCM 2000 Control Delay	37.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.4
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	41.9	64.7	86.3	44.1	86.9	18.1
Average Queue (m)	16.6	31.4	39.4	18.4	45.4	5.9
95th Queue (m)	31.8	54.3	69.8	34.6	74.1	13.5
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	2				
Queuing Penalty (veh)	0	3				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	EB	WB	WB	NB	NB
Directions Served	T	T	R	T	T	L	R
Maximum Queue (m)	41.7	40.1	1.0	53.7	52.6	159.8	164.5
Average Queue (m)	19.9	19.5	0.0	20.8	22.8	70.3	44.5
95th Queue (m)	35.8	36.3	1.0	44.9	46.2	150.4	161.3
Link Distance (m)	304.4	304.4		57.2	57.2	155.3	155.3
Upstream Blk Time (%)				0	0	2	6
Queuing Penalty (veh)				1	1	0	0
Storage Bay Dist (m)			70.0				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B15	B15	B15	WB	WB	SB
Directions Served	L	T	T	T	T		T	TR	LR
Maximum Queue (m)	22.2	42.5	49.3	51.6	62.3	64.9	4.9	7.5	43.5
Average Queue (m)	8.3	6.5	9.2	5.5	10.4	5.9	0.2	0.4	19.6
95th Queue (m)	18.4	31.0	36.6	28.3	43.2	37.4	3.0	3.8	55.2
Link Distance (m)		38.8	38.8	57.2	57.2	57.2	95.2	95.2	80.4
Upstream Blk Time (%)	0	1	2	0	0	1			7
Queuing Penalty (veh)	0	10	16	0	3	6			0
Storage Bay Dist (m)	35.0								
Storage Blk Time (%)	0	1							
Queuing Penalty (veh)	0	1							

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	23.9	99.4	100.5	23.1	47.6	70.0	31.3	41.9	17.2	12.2
Average Queue (m)	3.0	60.1	66.7	7.8	24.5	27.6	20.0	6.1	3.4	3.2
95th Queue (m)	16.1	106.9	111.6	18.0	43.5	56.7	33.5	22.6	11.4	10.5
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)		2	3			0				
Queuing Penalty (veh)		19	28			0				
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)	0	12					4	0		
Queuing Penalty (veh)	0	1					1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	160.3	226.9	228.9	32.3	178.1	172.9	107.4	250.0	20.0	26.8	48.2
Average Queue (m)	80.9	146.4	150.4	31.6	149.6	140.6	23.3	158.4	5.6	10.3	23.5
95th Queue (m)	181.3	257.9	259.3	35.1	204.3	205.3	87.6	293.6	15.2	22.2	41.3
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)		1	2		52	28		16			
Queuing Penalty (veh)		11	13		0	0		0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	0	10		73	15		0	36			
Queuing Penalty (veh)	1	24		269	22		1	11			

Network Summary

Network wide Queuing Penalty: 441

Appendix K – 2029 Future Total Conditions – Synchro & SimTraffic Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	129	291	721	1143	210	110
Future Volume (vph)	129	291	721	1143	210	110
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.32	0.24	0.71	0.97	0.81	0.35
Control Delay	7.5	5.3	10.4	22.1	64.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	5.3	10.4	22.1	64.4	9.0
LOS	A	A	B	C	E	A
Approach Delay		6.0	17.6		45.3	
Approach LOS		A	B		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 19.8
 Intersection LOS: B
 Intersection Capacity Utilization 94.4%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

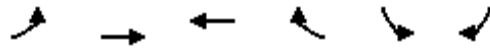


Queues

PM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	132	297	767	1216	263	138
v/c Ratio	0.32	0.24	0.71	0.97	0.81	0.35
Control Delay	7.5	5.3	10.4	22.1	64.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	5.3	10.4	22.1	64.4	9.0
Queue Length 50th (m)	6.6	18.8	36.8	212.7	59.2	0.0
Queue Length 95th (m)	11.2	28.1	m110.7	m#348.5	#77.9	11.1
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	414	1217	1083	1260	326	397
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	0.32	0.24	0.71	0.97	0.81	0.35

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	129	291	721	1143	210	110
Future Volume (vph)	129	291	721	1143	210	110
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1634	1634	1364	1506	1334
Flt Permitted	0.24	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	396	1634	1634	1364	1506	1334
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	132	297	767	1216	262	138
RTOR Reduction (vph)	0	0	0	71	0	108
Lane Group Flow (vph)	132	297	767	1145	263	30
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	414	1217	1083	1223	326	289
v/s Ratio Prot	c0.03	0.18	0.47	c0.20	0.17	
v/s Ratio Perm	0.21			0.64		0.02
v/c Ratio	0.32	0.24	0.71	0.94	0.81	0.10
Uniform Delay, d1	16.8	4.8	12.8	5.1	44.6	37.7
Progression Factor	1.00	1.00	0.59	2.82	1.00	1.00
Incremental Delay, d2	0.4	0.5	2.4	9.8	18.9	0.7
Delay (s)	17.2	5.2	10.0	24.1	63.5	38.4
Level of Service	B	A	A	C	E	D
Approach Delay (s)		8.9	18.6		54.9	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2029)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	430	71	1631	233	533
Future Volume (vph)	430	71	1631	233	533
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	95.0	95.0	95.0	25.0	
Total Split (%)	79.2%	79.2%	79.2%	20.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	92.5	92.5	92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77	0.77	0.19	1.00
v/c Ratio	0.19	0.07	0.76	0.89	0.43
Control Delay	2.0	0.1	4.7	78.9	1.0
Queue Delay	0.0	0.0	0.3	17.7	0.0
Total Delay	2.0	0.1	5.0	96.6	1.0
LOS	A	A	A	F	A
Approach Delay	1.7		5.0	30.1	
Approach LOS	A		A	C	

Intersection Summary

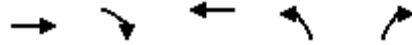
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 72.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2029)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	457	76	1812	256	586
v/c Ratio	0.19	0.07	0.76	0.89	0.43
Control Delay	2.0	0.1	4.7	78.9	1.0
Queue Delay	0.0	0.0	0.3	17.7	0.0
Total Delay	2.0	0.1	5.0	96.6	1.0
Queue Length 50th (m)	6.3	0.0	59.1	59.3	0.0
Queue Length 95th (m)	m8.1	m0.0	18.6	#105.7	0.0
Internal Link Dist (m)	291.5		40.0	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2392	1064	2387	288	1348
Starvation Cap Reductn	0	0	159	0	0
Spillback Cap Reductn	0	0	18	31	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.07	0.81	1.00	0.43

Intersection Summary

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

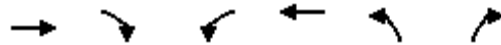
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2029)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	430	71	0	1631	233	533
Future Volume (vph)	430	71	0	1631	233	533
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3104	1359		3104	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3104	1359		3104	1506	1348
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	457	76	0	1812	256	586
RTOR Reduction (vph)	0	17	0	0	0	0
Lane Group Flow (vph)	457	59	0	1812	256	586
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	92.5	92.5		92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77		0.77	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2392	1047		2387	288	1348
v/s Ratio Prot	0.15			c0.58	c0.17	
v/s Ratio Perm		0.04				0.43
v/c Ratio	0.19	0.06		0.76	0.89	0.43
Uniform Delay, d1	3.7	3.3		7.7	47.3	0.0
Progression Factor	0.49	0.00		0.40	1.00	1.00
Incremental Delay, d2	0.2	0.1		1.5	26.4	1.0
Delay (s)	2.0	0.1		4.6	73.7	1.0
Level of Service	A	A		A	E	A
Approach Delay (s)	1.7			4.6	23.1	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

PM Peak Period
 Future Total (2029)

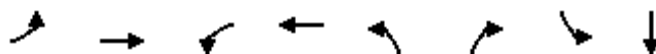


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	942	1966	21	16	21
Future Volume (Veh/h)	21	942	1966	21	16	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	24	1058	2114	23	17	23
Pedestrians					3	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	118			
pX, platoon unblocked	0.59				0.60	0.59
vC, conflicting volume	2140				2706	1072
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1543				2313	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				5	96
cM capacity (veh/h)	257				18	642
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	24	529	529	1409	728	40
Volume Left	24	0	0	0	0	17
Volume Right	0	0	0	0	23	23
cSH	257	1700	1700	1700	1700	41
Volume to Capacity	0.09	0.31	0.31	0.83	0.43	0.99
Queue Length 95th (m)	2.3	0.0	0.0	0.0	0.0	29.2
Control Delay (s)	20.5	0.0	0.0	0.0	0.0	289.1
Lane LOS	C					F
Approach Delay (s)	0.5			0.0		289.1
Approach LOS						F
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			65.0%		ICU Level of Service	C
Analysis Period (min)			15			

Timings

4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	893	39	1821	154	59	10	0
Future Volume (vph)	11	893	39	1821	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	81.5	81.5	92.6	90.6	24.3	24.3	21.1	21.1
Actuated g/C Ratio	0.68	0.68	0.77	0.76	0.20	0.20	0.18	0.18
v/c Ratio	0.17	0.43	0.10	0.79	0.60	0.18	0.04	0.04
Control Delay	13.7	7.6	3.8	8.6	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Total Delay	13.7	7.6	3.8	9.0	51.7	9.5	37.7	0.2
LOS	B	A	A	A	D	A	D	A
Approach Delay		7.6		8.9				17.4
Approach LOS		A		A				B

Intersection Summary

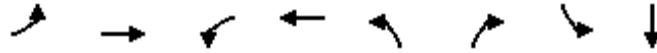
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 10.7
 Intersection LOS: B
 Intersection Capacity Utilization 72.8%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



Queues
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1018	44	2067	167	64	11	13
v/c Ratio	0.17	0.43	0.10	0.79	0.60	0.18	0.04	0.04
Control Delay	13.7	7.6	3.8	8.6	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Total Delay	13.7	7.6	3.8	9.0	51.7	9.5	37.7	0.2
Queue Length 50th (m)	0.8	36.7	1.9	55.7	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.9	52.2	m2.9	71.6	54.1	10.4	6.8	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	71	2348	437	2628	427	521	411	484
Starvation Cap Reductn	0	0	0	180	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	0.17	0.43	0.10	0.84	0.39	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	893	54	39	1821	19	154	0	59	10	0	12
Future Volume (vph)	11	893	54	39	1821	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1745	3455		1710	3484		1741		1533	1445	1539	
Flt Permitted	0.06	1.00		0.23	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	105	3455		420	3484		1373		1533	1445	1539	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	960	58	44	2046	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	1015	0	44	2067	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	77.9	77.9		87.1	87.1		19.9		19.9	19.9	19.9	
Effective Green, g (s)	80.8	80.8		90.6	90.6		24.3		24.3	21.1	21.1	
Actuated g/C Ratio	0.67	0.67		0.75	0.75		0.20		0.20	0.18	0.18	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	70	2326		410	2630		278		310	254	270	
v/s Ratio Prot		0.29		0.01	c0.59						0.00	
v/s Ratio Perm	0.11			0.07			c0.12		0.01	0.01		
v/c Ratio	0.17	0.44		0.11	0.79		0.60		0.04	0.04	0.01	
Uniform Delay, d1	7.2	9.1		4.6	8.9		43.4		38.5	41.1	40.8	
Progression Factor	0.72	0.70		0.81	0.68		1.00		1.00	1.00	1.00	
Incremental Delay, d2	5.1	0.6		0.1	1.6		3.6		0.1	0.1	0.0	
Delay (s)	10.3	6.9		3.8	7.5		47.1		38.5	41.1	40.8	
Level of Service	B	A		A	A		D		D	D	D	
Approach Delay (s)		6.9			7.5			44.7			41.0	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

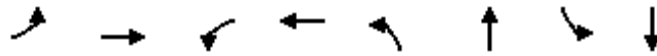
c Critical Lane Group

Queues

PM Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	219	862	276	1513	92	347	83	682
v/c Ratio	0.67	0.52	0.60	0.90	0.37	0.71	0.29	0.87dr
Control Delay	52.8	19.6	16.2	38.4	27.2	36.2	25.1	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.8	19.6	16.2	38.4	27.2	36.2	25.1	28.8
Queue Length 50th (m)	42.2	43.6	25.4	171.4	14.2	55.3	12.7	48.7
Queue Length 95th (m)	68.7	56.7	49.1	#257.3	21.8	79.0	20.1	61.2
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	340	1671	466	1680	253	610	295	1216
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	0.64	0.52	0.59	0.90	0.36	0.57	0.28	0.56

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↗↘	
Traffic Volume (vph)	195	727	40	257	1332	75	85	100	219	76	166	462
Future Volume (vph)	195	727	40	257	1332	75	85	100	219	76	166	462
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3426		1744	3447		1727	1604		1675	3062	
Flt Permitted	0.07	1.00		0.22	1.00		0.14	1.00		0.25	1.00	
Satd. Flow (perm)	130	3426		403	3447		259	1604		436	3062	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	219	817	45	276	1432	81	92	109	238	83	180	502
RTOR Reduction (vph)	0	3	0	0	3	0	0	73	0	0	197	0
Lane Group Flow (vph)	219	859	0	276	1510	0	92	274	0	83	486	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	65.8	52.8		67.0	53.4		36.0	27.5		33.2	26.1	
Effective Green, g (s)	74.4	57.8		73.8	57.8		41.4	31.3		41.0	30.0	
Actuated g/C Ratio	0.62	0.48		0.61	0.48		0.34	0.26		0.34	0.25	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	1650		448	1660		239	418		262	765	
v/s Ratio Prot	c0.10	0.25		0.09	c0.44		c0.04	c0.17		0.03	0.16	
v/s Ratio Perm	0.32			0.29			0.09			0.08		
v/c Ratio	0.68	0.52		0.62	0.91		0.38	0.66		0.32	0.87dr	
Uniform Delay, d1	31.9	21.5		13.2	28.7		28.8	39.5		28.6	40.1	
Progression Factor	1.69	0.81		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.4	1.1		2.5	8.9		1.0	3.7		0.7	1.7	
Delay (s)	59.3	18.5		15.7	37.6		29.9	43.2		29.3	41.8	
Level of Service	E	B		B	D		C	D		C	D	
Approach Delay (s)		26.7			34.3			40.4			40.5	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

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

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	42.2	117.3	81.9	137.2	76.6	28.2
Average Queue (m)	28.9	36.3	48.0	63.5	41.7	12.0
95th Queue (m)	46.8	89.3	74.2	114.2	69.4	23.2
Link Distance (m)		151.8	307.2	307.2	165.7	165.7
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	13	3				
Queuing Penalty (veh)	37	4				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (m)	21.4	17.6	46.9	52.3	119.2	12.3
Average Queue (m)	7.8	3.7	20.2	25.2	66.2	0.4
95th Queue (m)	19.2	12.7	37.8	44.1	112.4	12.1
Link Distance (m)	307.2	307.2	56.1	56.1	160.9	160.9
Upstream Blk Time (%)			0	0	0	
Queuing Penalty (veh)			0	1	0	
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	B15	B15	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (m)	16.2	11.3	2.6	14.6	23.2
Average Queue (m)	4.7	0.6	0.1	0.5	8.3
95th Queue (m)	13.2	5.3	1.9	11.9	18.8
Link Distance (m)		56.1	56.1	100.9	92.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	35.0				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	11.8	44.4	49.7	15.5	61.2	67.7	32.2	74.0	16.0	9.9
Average Queue (m)	2.2	18.6	23.1	4.8	30.0	35.3	25.5	21.1	2.7	2.6
95th Queue (m)	8.0	38.3	42.9	12.3	54.5	60.6	37.8	58.6	10.7	8.9
Link Distance (m)		100.9	100.9		244.6	244.6		138.3	66.9	66.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0			0		16	0		
Queuing Penalty (veh)		0			0		9	1		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	64.5	72.7	76.0	32.4	170.1	173.6	35.1	85.0	34.4	72.4	133.7
Average Queue (m)	32.8	41.5	44.4	27.3	168.8	168.9	14.9	42.8	11.8	26.5	69.2
95th Queue (m)	56.6	65.1	68.8	40.0	169.6	171.6	28.7	73.9	26.0	56.0	113.1
Link Distance (m)		244.6	244.6		164.2	164.2		225.6		178.2	178.2
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				10	54						0
Queuing Penalty (veh)				67	138						0

Network Summary

Network wide Queuing Penalty: 257

Appendix K – 2029 Future Total Conditions – Synchro & SimTraffic Reports

3. Saturday Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Future Total (2029)

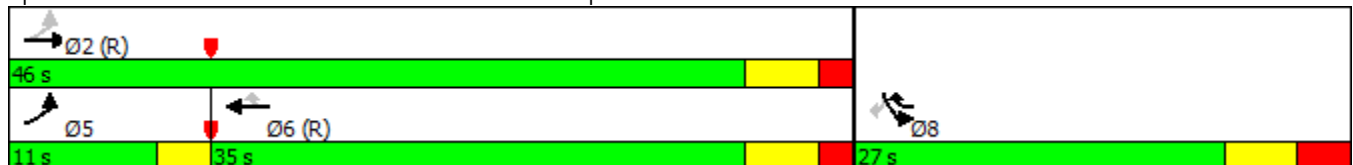


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	54	290	416	393	277	82
Future Volume (vph)	54	290	416	393	277	82
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.5	-4.5	-5.0	-5.0
Total Lost Time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	48.0	45.0	38.5	65.5	25.0	25.0
Actuated g/C Ratio	0.66	0.62	0.53	0.90	0.34	0.34
v/c Ratio	0.10	0.31	0.51	0.32	0.65	0.19
Control Delay	4.9	7.7	15.1	0.8	27.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	7.7	15.1	0.8	27.3	5.1
LOS	A	A	B	A	C	A
Approach Delay		7.3	8.2		22.3	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 11.7
 Intersection LOS: B
 Intersection Capacity Utilization 57.4%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

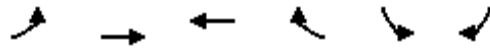


Queues

Saturday Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2029)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	58	312	433	409	334	99
v/c Ratio	0.10	0.31	0.51	0.32	0.65	0.19
Control Delay	4.9	7.7	15.1	0.8	27.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	7.7	15.1	0.8	27.3	5.1
Queue Length 50th (m)	2.4	18.0	39.8	0.0	38.1	0.0
Queue Length 95th (m)	5.8	30.2	68.0	3.0	57.3	7.5
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	588	996	852	1288	515	516
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	0.10	0.31	0.51	0.32	0.65	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
 Future Total (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	54	290	416	393	277	82
Future Volume (vph)	54	290	416	393	277	82
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
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	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1617	1617	1389	1506	1318
Flt Permitted	0.40	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	652	1617	1617	1389	1506	1318
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.83	0.83
Adj. Flow (vph)	58	312	433	409	334	99
RTOR Reduction (vph)	0	0	0	63	0	65
Lane Group Flow (vph)	58	312	433	346	334	34
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	32.8	52.8	20.0	20.0
Effective Green, g (s)	45.0	45.0	37.3	61.8	25.0	25.0
Actuated g/C Ratio	0.62	0.62	0.51	0.85	0.34	0.34
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	515	996	826	1175	515	451
v/s Ratio Prot	0.01	c0.19	c0.27	0.10	c0.22	
v/s Ratio Perm	0.06			0.15		0.03
v/c Ratio	0.11	0.31	0.52	0.29	0.65	0.08
Uniform Delay, d1	6.0	6.7	11.9	1.1	20.3	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8	2.4	0.6	6.2	0.3
Delay (s)	6.1	7.5	14.3	1.8	26.5	16.5
Level of Service	A	A	B	A	C	B
Approach Delay (s)		7.3	8.2		24.2	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	3.5
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2029)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	463	104	685	124	376
Future Volume (vph)	463	104	685	124	376
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-2.9	-2.9	-3.3	-4.8	
Total Lost Time (s)	3.1	3.1	2.7	2.2	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	70.8	70.8	71.2	18.9	95.0
Actuated g/C Ratio	0.75	0.75	0.75	0.20	1.00
v/c Ratio	0.22	0.11	0.31	0.47	0.32
Control Delay	4.4	1.2	4.8	37.9	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	1.2	4.8	37.9	0.6
LOS	A	A	A	D	A
Approach Delay	3.8		4.8	9.9	
Approach LOS	A		A	A	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 6.0
 Intersection Capacity Utilization 45.5%
 Analysis Period (min) 15

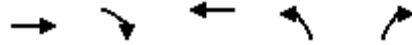
Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2029)



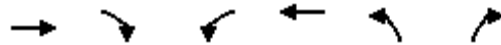
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	503	113	714	141	427
v/c Ratio	0.22	0.11	0.31	0.47	0.32
Control Delay	4.4	1.2	4.8	37.9	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.4	1.2	4.8	37.9	0.6
Queue Length 50th (m)	12.2	0.0	18.5	23.0	0.0
Queue Length 95th (m)	22.3	4.7	32.7	36.8	0.0
Internal Link Dist (m)	288.3		39.2	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2288	1037	2301	440	1348
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.11	0.31	0.32	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2029)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	463	104	0	685	124	376
Future Volume (vph)	463	104	0	685	124	376
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	3.1	3.1		2.7	2.2	-0.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1354		3073	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1354		3073	1506	1348
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.88	0.88
Adj. Flow (vph)	503	113	0	714	141	427
RTOR Reduction (vph)	0	29	0	0	0	0
Lane Group Flow (vph)	503	84	0	714	141	427
Confl. Peds. (#/hr)		4	4			
Heavy Vehicles (%)	1%	0%	1%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	67.9	67.9		67.9	14.1	95.0
Effective Green, g (s)	70.8	70.8		71.2	18.9	95.0
Actuated g/C Ratio	0.75	0.75		0.75	0.20	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2290	1009		2303	299	1348
v/s Ratio Prot	0.16			0.23	c0.09	
v/s Ratio Perm		0.06				c0.32
v/c Ratio	0.22	0.08		0.31	0.47	0.32
Uniform Delay, d1	3.7	3.3		3.9	33.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2		0.4	1.2	0.6
Delay (s)	3.9	3.4		4.2	34.8	0.6
Level of Service	A	A		A	C	A
Approach Delay (s)	3.8			4.2	9.1	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	5.3
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

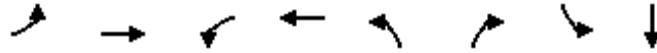
Saturday Peak Period
 Future Total (2029)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	813	895	21	19	25
Future Volume (Veh/h)	26	813	895	21	19	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	29	893	942	22	21	27
Pedestrians					8	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.94				0.96	0.94
vC, conflicting volume	972				1466	490
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	849				1252	338
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				86	96
cM capacity (veh/h)	747				153	622
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	29	446	446	628	336	48
Volume Left	29	0	0	0	0	21
Volume Right	0	0	0	0	22	27
cSH	747	1700	1700	1700	1700	266
Volume to Capacity	0.04	0.26	0.26	0.37	0.20	0.18
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	4.9
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	21.5
Lane LOS	B					C
Approach Delay (s)	0.3			0.0		21.5
Approach LOS						C
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			35.4%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	9	786	27	859	49	39	11	0
Future Volume (vph)	9	786	27	859	49	39	11	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-3.5	-3.5	-2.2	-2.2	0.0	0.0
Total Lost Time (s)	2.2	2.2	0.5	2.5	4.8	4.8	7.0	7.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	87.8	87.8	95.2	93.7	12.5	12.5	10.3	10.3
Actuated g/C Ratio	0.80	0.80	0.87	0.85	0.11	0.11	0.09	0.09
v/c Ratio	0.02	0.33	0.05	0.31	0.36	0.21	0.07	0.03
Control Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
LOS	A	A	A	A	D	A	D	A
Approach Delay		4.9		1.4				25.7
Approach LOS		A		A				C

Intersection Summary

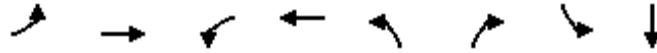
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 4.8
 Intersection Capacity Utilization 54.2%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2029)



























Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	10	925	29	931	56	45	12	9
v/c Ratio	0.02	0.33	0.05	0.31	0.36	0.21	0.07	0.03
Control Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.9	4.9	1.1	1.4	50.7	6.6	44.7	0.2
Queue Length 50th (m)	0.5	32.0	0.4	9.2	11.4	0.0	2.4	0.0
Queue Length 95th (m)	2.3	47.8	m1.0	10.5	22.1	4.7	8.0	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	449	2768	562	2962	441	486	518	574
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	0.02	0.33	0.05	0.31	0.13	0.09	0.02	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2029)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 				 		 	
Traffic Volume (vph)	9	786	37	27	859	16	49	0	39	11	0	8
Future Volume (vph)	9	786	37	27	859	16	49	0	39	11	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		0.5	2.5		4.8		4.8	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1742	3466		1745	3478		1745		1375	1728	1561	
Flt Permitted	0.31	1.00		0.28	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	563	3466		515	3478		1381		1375	1728	1561	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	883	42	29	914	17	56	0	45	12	0	9
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	8	0
Lane Group Flow (vph)	10	924	0	29	931	0	56	0	4	12	1	0
Confl. Peds. (#/hr)	3						3		9	9		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	80.6	80.6		88.3	88.3		8.7		8.7	8.7	8.7	
Effective Green, g (s)	84.4	84.4		91.8	91.8		10.9		10.9	8.7	8.7	
Actuated g/C Ratio	0.77	0.77		0.83	0.83		0.10		0.10	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	431	2659		510	2902		136		136	136	123	
v/s Ratio Prot		c0.27		0.00	c0.27						0.00	
v/s Ratio Perm	0.02			0.04			c0.04		0.00	0.01		
v/c Ratio	0.02	0.35		0.06	0.32		0.41		0.03	0.09	0.01	
Uniform Delay, d1	3.0	4.1		1.8	2.1		46.5		44.8	47.0	46.7	
Progression Factor	1.00	1.00		0.52	0.48		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.0	0.3		2.0		0.1	0.3	0.0	
Delay (s)	3.1	4.4		1.0	1.3		48.6		44.9	47.3	46.7	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		4.4			1.3			46.9			47.0	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			5.5				HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)		9.7			
Intersection Capacity Utilization			54.2%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Total (2029)

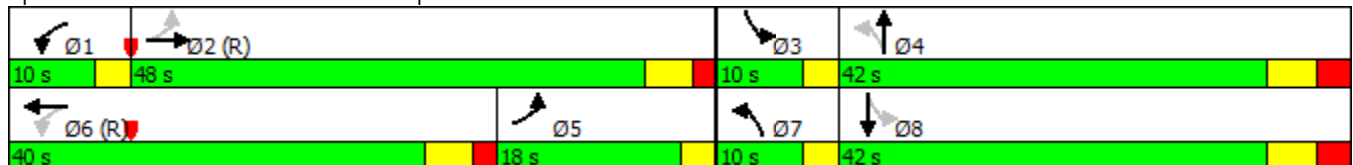


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	167	613	113	632	36	57	90	54
Future Volume (vph)	167	613	113	632	36	57	90	54
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-4.1	-4.1	-3.2	-3.2	-5.0	-5.0	-4.1	-4.1
Total Lost Time (s)	-1.1	1.9	-0.2	2.8	-2.0	2.0	-1.1	2.9
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	69.7	66.7	63.1	60.1	31.1	17.2	30.2	20.2
Actuated g/C Ratio	0.63	0.61	0.57	0.55	0.28	0.16	0.27	0.18
v/c Ratio	0.30	0.34	0.28	0.43	0.12	0.53	0.34	0.41
Control Delay	10.2	8.2	13.5	15.9	28.1	26.5	32.8	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	8.2	13.5	15.9	28.1	26.5	32.8	10.6
LOS	B	A	B	B	C	C	C	B
Approach Delay		8.6		15.6		26.8		15.9
Approach LOS		A		B		C		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 14.0
 Intersection LOS: B
 Intersection Capacity Utilization 70.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

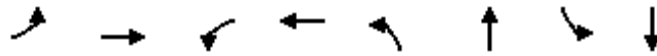


Queues

Saturday Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2029)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	180	719	122	794	40	172	96	306
v/c Ratio	0.30	0.34	0.28	0.43	0.12	0.53	0.34	0.41
Control Delay	10.2	8.2	13.5	15.9	28.1	26.5	32.8	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	8.2	13.5	15.9	28.1	26.5	32.8	10.6
Queue Length 50th (m)	12.5	36.8	11.2	48.5	6.4	16.6	16.0	5.7
Queue Length 95th (m)	28.3	61.8	22.9	72.4	13.2	34.5	26.8	16.8
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	595	2089	441	1855	329	641	286	1220
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	0.30	0.34	0.28	0.43	0.12	0.27	0.34	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Total (2029)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	167	613	56	113	632	106	36	57	96	90	54	234
Future Volume (vph)	167	613	56	113	632	106	36	57	96	90	54	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-1.1	1.9		-0.2	2.8		-2.0	2.0		-1.1	2.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		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)	1741	3440		1709	3384		1691	1613		1670	2981	
Flt Permitted	0.35	1.00		0.30	1.00		0.47	1.00		0.39	1.00	
Satd. Flow (perm)	638	3440		538	3384		835	1613		679	2981	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.94	0.94	0.94
Adj. Flow (vph)	180	659	60	122	680	114	40	64	108	96	57	249
RTOR Reduction (vph)	0	4	0	0	9	0	0	73	0	0	203	0
Lane Group Flow (vph)	180	715	0	122	785	0	40	99	0	96	103	0
Confl. Peds. (#/hr)	13		10	10		13	7		17	17		7
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	3%	0%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	64.5	61.5		55.7	55.7		17.5	13.3		23.1	16.1	
Effective Green, g (s)	68.6	65.6		58.9	58.9		27.5	18.3		27.4	20.2	
Actuated g/C Ratio	0.62	0.60		0.54	0.54		0.25	0.17		0.25	0.18	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	589	2051		420	1811		280	268		269	547	
v/s Ratio Prot	0.05	c0.21		0.03	c0.23		0.01	c0.06		c0.04	0.03	
v/s Ratio Perm	0.14			0.12			0.02			0.05		
v/c Ratio	0.31	0.35		0.29	0.43		0.14	0.37		0.36	0.19	
Uniform Delay, d1	11.1	11.3		13.3	15.5		31.7	40.7		33.1	38.0	
Progression Factor	0.69	0.67		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.4	0.8		0.2	0.9		0.8	0.2	
Delay (s)	7.9	8.1		13.7	16.2		32.0	41.6		33.9	38.1	
Level of Service	A	A		B	B		C	D		C	D	
Approach Delay (s)		8.0			15.9			39.8			37.1	
Approach LOS		A			B			D			D	

Intersection Summary		
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.38	B
Actuated Cycle Length (s)	110.0	Sum of lost time (s)
Intersection Capacity Utilization	70.6%	2.6
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	23.1	43.8	72.4	31.0	67.0	17.6
Average Queue (m)	9.3	22.8	34.7	11.7	36.4	7.8
95th Queue (m)	19.2	38.8	60.8	23.3	59.7	14.8
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	0	0				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B15	NB
Directions Served	T	T	T	T	T	L
Maximum Queue (m)	27.2	28.4	46.8	43.3	0.6	52.1
Average Queue (m)	11.3	8.7	15.8	14.3	0.0	25.4
95th Queue (m)	23.0	21.9	35.6	33.1	0.6	43.5
Link Distance (m)	304.4	304.4	55.6	55.6	40.3	155.3
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	B15	B15	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (m)	12.0	0.7	2.2	0.7	17.8
Average Queue (m)	3.4	0.0	0.1	0.0	7.7
95th Queue (m)	10.9	0.7	1.7	0.7	15.7
Link Distance (m)		55.6	55.6	95.2	80.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	35.0				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	8.5	49.8	52.1	13.8	40.2	45.2	26.8	17.1	15.3	9.7
Average Queue (m)	1.5	17.0	20.7	4.1	14.3	14.5	10.1	5.6	3.2	2.1
95th Queue (m)	6.6	40.0	43.7	11.8	31.9	34.6	22.3	13.0	10.9	8.4
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0					1	0		
Queuing Penalty (veh)		0					0	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	49.6	55.7	58.2	32.3	94.1	81.3	24.3	57.7	41.6	25.4	52.2
Average Queue (m)	22.0	21.6	26.9	19.2	42.7	35.2	7.9	24.0	16.5	8.5	21.1
95th Queue (m)	41.4	47.5	53.6	37.0	77.0	67.1	19.1	46.1	34.6	20.0	38.7
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				1	14				0		
Queuing Penalty (veh)				3	16				0		

Network Summary

Network wide Queuing Penalty: 20

Appendix L – 2034 Future Total Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour
3. Saturday Peak Hour

Appendix L – 2034 Future Total Conditions – Synchro & SimTraffic Reports

1. Weekday AM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2034)

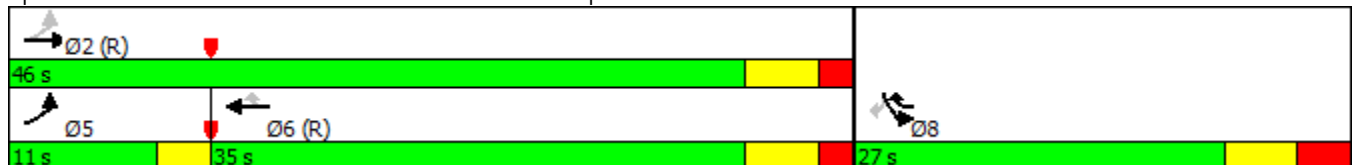


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	124	427	476	566	366	59
Future Volume (vph)	124	427	476	566	366	59
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	45.6	42.6	34.8	61.5	24.0	24.0
Actuated g/C Ratio	0.62	0.58	0.48	0.84	0.33	0.33
v/c Ratio	0.32	0.50	0.70	0.51	0.83	0.14
Control Delay	7.8	11.2	22.6	1.8	39.7	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	11.2	22.6	1.8	39.7	5.9
LOS	A	B	C	A	D	A
Approach Delay		10.5	11.3		35.0	
Approach LOS		B	B		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 16.1
 Intersection Capacity Utilization 69.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

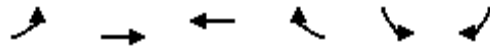


Queues

AM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	133	459	541	643	407	66
v/c Ratio	0.32	0.50	0.70	0.51	0.83	0.14
Control Delay	7.8	11.2	22.6	1.8	39.7	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	11.2	22.6	1.8	39.7	5.9
Queue Length 50th (m)	6.6	33.3	59.4	1.0	50.8	0.0
Queue Length 95th (m)	12.8	54.5	93.3	5.1	#96.5	7.6
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	423	925	769	1251	490	470
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	0.31	0.50	0.70	0.51	0.83	0.14

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	124	427	476	566	366	59
Future Volume (vph)	124	427	476	566	366	59
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1522	1586	1617	1375	1491	1296
Flt Permitted	0.26	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	423	1586	1617	1375	1491	1296
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	133	459	541	643	407	66
RTOR Reduction (vph)	0	0	0	125	0	44
Lane Group Flow (vph)	133	459	541	518	407	22
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	30.8	50.8	20.0	20.0
Effective Green, g (s)	42.6	42.6	34.2	57.6	24.0	24.0
Actuated g/C Ratio	0.58	0.58	0.47	0.79	0.33	0.33
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	379	925	757	1084	490	426
v/s Ratio Prot	0.04	c0.29	c0.33	0.15	c0.27	
v/s Ratio Perm	0.16			0.22		0.02
v/c Ratio	0.35	0.50	0.71	0.48	0.83	0.05
Uniform Delay, d1	8.7	8.9	15.5	2.6	22.6	16.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	1.9	5.7	1.5	15.0	0.2
Delay (s)	9.2	10.8	21.2	4.1	37.7	17.0
Level of Service	A	B	C	A	D	B
Approach Delay (s)		10.5	11.9		34.8	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2034)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	676	117	754	288	1237
Future Volume (vph)	676	117	754	288	1237
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	65.2	65.2	64.7	26.4	95.0
Actuated g/C Ratio	0.69	0.69	0.68	0.28	1.00
v/c Ratio	0.37	0.15	0.41	0.76	1.02
Control Delay	7.1	1.4	7.7	43.8	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	1.4	7.7	43.8	33.6
LOS	A	A	A	D	C
Approach Delay	6.3		7.7	35.6	
Approach LOS	A		A	D	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 20.8
 Intersection Capacity Utilization 56.0%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	786	136	857	316	1359
v/c Ratio	0.37	0.15	0.41	0.76	1.02
Control Delay	7.1	1.4	7.7	43.8	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	1.4	7.7	43.8	33.6
Queue Length 50th (m)	29.8	0.0	34.2	51.5	~9.6
Queue Length 95th (m)	37.1	4.7	43.6	#82.2	#86.5
Internal Link Dist (m)	288.3		40.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2109	898	2093	443	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.15	0.41	0.71	1.02

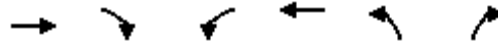
Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2034)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	676	117	0	754	288	1237
Future Volume (vph)	676	117	0	754	288	1237
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1247		3073	1506	1334
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1247		3073	1506	1334
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	786	136	0	857	316	1359
RTOR Reduction (vph)	0	43	0	0	0	0
Lane Group Flow (vph)	786	93	0	857	316	1359
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	60.6	60.6		60.6	21.4	95.0
Effective Green, g (s)	65.2	65.2		64.7	26.4	95.0
Actuated g/C Ratio	0.69	0.69		0.68	0.28	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2109	855		2092	418	1334
v/s Ratio Prot	0.26			0.28	0.21	
v/s Ratio Perm		0.07				c1.02
v/c Ratio	0.37	0.11		0.41	0.76	1.02
Uniform Delay, d1	6.3	5.1		6.7	31.4	47.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.3		0.6	7.6	29.4
Delay (s)	6.8	5.3		7.3	39.0	76.9
Level of Service	A	A		A	D	E
Approach Delay (s)	6.6			7.3	69.8	
Approach LOS	A			A	E	

Intersection Summary

HCM 2000 Control Delay	37.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

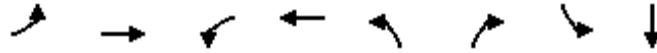
AM Peak Period
Future Total (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	1843	1107	31	24	25
Future Volume (Veh/h)	70	1843	1107	31	24	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	74	1940	1258	35	26	27
Pedestrians			2		3	
Lane Width (m)			3.3		3.3	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.90				0.94	0.90
vC, conflicting volume	1296				2398	650
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099				1935	377
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				46	95
cM capacity (veh/h)	575				48	560
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	74	970	970	839	454	53
Volume Left	74	0	0	0	0	26
Volume Right	0	0	0	0	35	27
cSH	575	1700	1700	1700	1700	90
Volume to Capacity	0.13	0.57	0.57	0.49	0.27	0.59
Queue Length 95th (m)	3.3	0.0	0.0	0.0	0.0	20.5
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	90.6
Lane LOS	B					F
Approach Delay (s)	0.4			0.0		90.6
Approach LOS						F
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			60.9%		ICU Level of Service	B
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1622	45	1024	102	22	13	0
Future Volume (vph)	11	1622	45	1024	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	78.0	78.0	87.5	85.5	16.7	16.7	16.3	16.3
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.15	0.15
v/c Ratio	0.04	0.82	0.22	0.41	0.54	0.09	0.05	0.04
Control Delay	7.4	16.8	16.7	3.6	52.0	0.7	37.8	0.2
Queue Delay	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	18.0	16.7	3.6	52.0	0.7	37.8	0.2
LOS	A	B	B	A	D	A	D	A
Approach Delay		17.9		4.1				19.7
Approach LOS		B		A				B

Intersection Summary

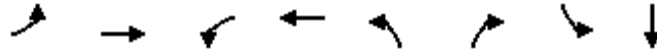
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 14.2
 Intersection LOS: B
 Intersection Capacity Utilization 82.8%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1975	47	1090	111	24	14	13
v/c Ratio	0.04	0.82	0.22	0.41	0.54	0.09	0.05	0.04
Control Delay	7.4	16.8	16.7	3.6	52.0	0.7	37.8	0.2
Queue Delay	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	18.0	16.7	3.6	52.0	0.7	37.8	0.2
Queue Length 50th (m)	0.7	144.3	2.7	13.2	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.3	#237.6	m6.9	35.9	37.6	0.0	7.7	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	341	2406	220	2676	432	470	546	565
Starvation Cap Reductn	0	224	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.91	0.21	0.41	0.26	0.05	0.03	0.02

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2034)



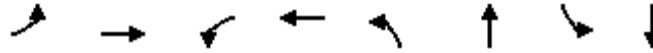
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1622	234	45	1024	11	102	0	22	13	0	12
Future Volume (vph)	11	1622	234	45	1024	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1743	3385		1711	3445		1711		1319	1724	1561	
Flt Permitted	0.26	1.00		0.05	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	481	3385		93	3445		1349		1319	1724	1561	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1726	249	47	1078	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1969	0	47	1090	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.4	73.4		82.6	82.6		14.4		14.4	14.4	14.4	
Effective Green, g (s)	77.2	77.2		85.5	85.5		16.7		16.7	16.3	16.3	
Actuated g/C Ratio	0.70	0.70		0.78	0.78		0.15		0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	337	2375		191	2677		204		200	255	231	
v/s Ratio Prot		c0.58		0.02	c0.32						0.00	
v/s Ratio Perm	0.02			0.17			c0.08		0.00	0.01		
v/c Ratio	0.04	0.83		0.25	0.41		0.54		0.02	0.05	0.01	
Uniform Delay, d1	5.0	11.7		13.9	4.0		43.1		39.7	40.2	40.0	
Progression Factor	1.00	1.00		4.05	0.73		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2	3.5		0.5	0.3		2.9		0.0	0.1	0.0	
Delay (s)	5.2	15.2		56.9	3.2		46.1		39.7	40.3	40.0	
Level of Service	A	B		E	A		D		D	D	D	
Approach Delay (s)		15.1			5.5			44.9			40.2	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.3
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2034)

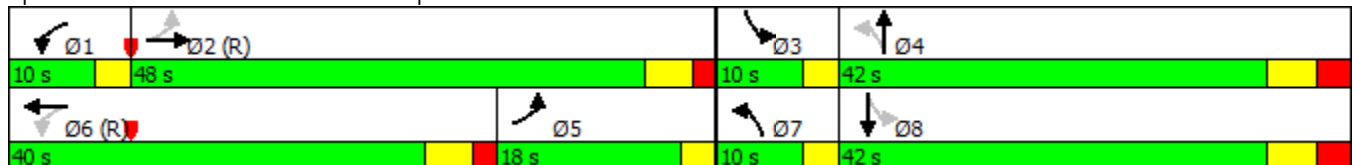


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↶	↶↷	↶	↶↷	↶	↷	↶	↶↷
Traffic Volume (vph)	242	1292	153	806	31	158	37	85
Future Volume (vph)	242	1292	153	806	31	158	37	85
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	-1.8	2.2	-0.6	3.4
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	48.9	45.9	41.3	38.3	53.8	41.9	52.6	42.6
Actuated g/C Ratio	0.44	0.42	0.38	0.35	0.49	0.38	0.48	0.39
v/c Ratio	0.72	1.07	0.69	0.80	0.08	1.04	0.21	0.30
Control Delay	32.0	62.2	39.2	38.3	15.3	72.7	17.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	62.2	39.2	38.3	15.3	72.7	17.9	7.4
LOS	C	E	D	D	B	E	B	A
Approach Delay		57.8		38.4		70.0		8.5
Approach LOS		E		D		E		A

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 49.4
 Intersection LOS: D
 Intersection Capacity Utilization 95.8%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

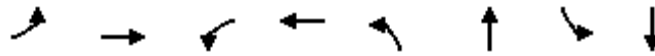


Queues

AM Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	260	1521	172	953	36	728	45	400
v/c Ratio	0.72	1.07	0.69	0.80	0.08	1.04	0.21	0.30
Control Delay	32.0	62.2	39.2	38.3	15.3	72.7	17.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	62.2	39.2	38.3	15.3	72.7	17.9	7.4
Queue Length 50th (m)	36.7	~190.6	25.3	96.0	3.9	~153.6	5.0	7.7
Queue Length 95th (m)	m45.0	#229.4	#43.7	119.1	8.7	#202.4	10.2	14.4
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	362	1422	251	1192	445	701	217	1348
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	0.72	1.07	0.69	0.80	0.08	1.04	0.21	0.30

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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	242	1292	123	153	806	42	31	158	461	37	85	243
Future Volume (vph)	242	1292	123	153	806	42	31	158	461	37	85	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		-1.8	2.2		-0.6	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3393		1711	3413		1502	1598		1601	3011	
Flt Permitted	0.14	1.00		0.16	1.00		0.47	1.00		0.10	1.00	
Satd. Flow (perm)	250	3393		279	3413		744	1598		166	3011	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	260	1389	132	172	906	47	36	186	542	45	104	296
RTOR Reduction (vph)	0	7	0	0	3	0	0	91	0	0	181	0
Lane Group Flow (vph)	260	1514	0	172	950	0	36	637	0	45	219	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	43.8	40.8		32.8	32.8		41.9	37.7		44.5	39.0	
Effective Green, g (s)	47.7	44.7		37.1	37.1		51.0	42.5		49.8	42.6	
Actuated g/C Ratio	0.43	0.41		0.34	0.34		0.46	0.39		0.45	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	359	1378		241	1151		406	617		193	1166	
v/s Ratio Prot	c0.12	c0.45		0.07	c0.28		0.01	c0.40		c0.02	0.07	
v/s Ratio Perm	0.19			0.17			0.03			0.09		
v/c Ratio	0.72	1.10		0.71	0.83		0.09	1.03		0.23	0.19	
Uniform Delay, d1	35.9	32.6		29.2	33.5		16.3	33.8		23.2	22.3	
Progression Factor	0.66	0.64		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	51.8		9.6	6.8		0.1	44.6		0.6	0.1	
Delay (s)	27.8	72.7		38.8	40.3		16.4	78.4		23.9	22.3	
Level of Service	C	E		D	D		B	E		C	C	
Approach Delay (s)		66.1			40.0			75.5			22.5	
Approach LOS		E			D			E			C	

Intersection Summary

HCM 2000 Control Delay	56.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.4
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	41.6	72.9	84.2	42.4	101.0	19.2
Average Queue (m)	17.8	34.2	39.7	18.4	54.8	7.0
95th Queue (m)	34.0	58.5	70.9	33.7	91.7	15.2
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	0	3				
Queuing Penalty (veh)	0	4				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B15	NB	NB
Directions Served	T	T	T	T	T	L	R
Maximum Queue (m)	44.8	43.8	55.3	55.0	0.6	164.5	169.1
Average Queue (m)	23.0	22.4	21.1	22.3	0.0	151.8	152.6
95th Queue (m)	39.2	40.0	45.7	47.1	0.6	197.7	210.4
Link Distance (m)	304.4	304.4	57.2	57.2	38.8	155.3	155.3
Upstream Blk Time (%)			0	0		25	59
Queuing Penalty (veh)			1	1		0	0
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B15	B15	B15	WB	WB	SB
Directions Served	L	T	T	T	T		T	TR	LR
Maximum Queue (m)	37.4	56.2	59.0	67.7	68.7	79.5	6.1	10.6	84.0
Average Queue (m)	12.5	41.6	44.2	37.1	44.4	47.4	0.3	0.6	58.4
95th Queue (m)	32.9	75.5	76.7	74.9	83.8	103.7	3.5	4.8	104.6
Link Distance (m)		38.8	38.8	57.2	57.2	57.2	95.2	95.2	80.4
Upstream Blk Time (%)	0	21	26	2	7	20			51
Queuing Penalty (veh)	0	202	252	12	47	127			0
Storage Bay Dist (m)	35.0								
Storage Blk Time (%)	0	22							
Queuing Penalty (veh)	1	16							

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	36.3	103.1	104.8	23.9	57.8	59.5	31.8	47.0	14.8	11.5
Average Queue (m)	3.0	92.8	94.5	7.0	29.3	33.2	19.4	7.0	3.5	3.0
95th Queue (m)	18.1	116.6	114.6	18.1	49.8	53.8	32.7	25.1	11.3	10.0
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)		24	26							
Queuing Penalty (veh)		220	243							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)	0	44			0		4	0		
Queuing Penalty (veh)	0	5			0		1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	167.5	261.4	263.2	32.3	179.2	178.4	107.4	273.8	21.4	32.2	54.6
Average Queue (m)	145.9	241.9	243.9	31.9	167.6	165.0	39.1	227.3	5.6	11.6	25.1
95th Queue (m)	224.5	298.5	297.9	33.8	186.5	191.6	117.8	337.7	15.0	25.6	44.5
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)		11	13		82	51		46			
Queuing Penalty (veh)		93	106		0	0		0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	1	35		79	12		0	59		0	
Queuing Penalty (veh)	5	84		319	19		1	18		0	

Network Summary

Network wide Queuing Penalty: 1776

Appendix L – 2034 Future Total Conditions – Synchro & SimTraffic Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	143	307	761	1260	232	121
Future Volume (vph)	143	307	761	1260	232	121
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.38	0.26	0.75	1.07	0.89	0.37
Control Delay	9.3	5.4	11.4	51.6	74.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	5.4	11.4	51.6	74.7	8.9
LOS	A	A	B	D	E	A
Approach Delay		6.7	36.5		52.2	
Approach LOS		A	D		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 34.3
 Intersection LOS: C
 Intersection Capacity Utilization 103.4%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

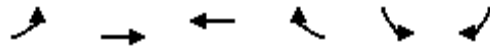


Queues

PM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	146	313	810	1340	290	151
v/c Ratio	0.38	0.26	0.75	1.07	0.89	0.37
Control Delay	9.3	5.4	11.4	51.6	74.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	5.4	11.4	51.6	74.7	8.9
Queue Length 50th (m)	7.4	20.1	83.8	~184.2	66.8	0.0
Queue Length 95th (m)	12.4	29.8	m118.7	m#407.2	#93.5	11.5
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	389	1217	1083	1252	326	407
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	0.38	0.26	0.75	1.07	0.89	0.37

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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

PM Peak Period
 Future Total (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	143	307	761	1260	232	121
Future Volume (vph)	143	307	761	1260	232	121
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1634	1634	1364	1506	1334
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	358	1634	1634	1364	1506	1334
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	146	313	810	1340	290	151
RTOR Reduction (vph)	0	0	0	64	0	118
Lane Group Flow (vph)	146	313	810	1276	290	33
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	389	1217	1083	1223	326	289
v/s Ratio Prot	c0.04	0.19	0.50	c0.22	0.19	
v/s Ratio Perm	0.25			0.71		0.02
v/c Ratio	0.38	0.26	0.75	1.04	0.89	0.11
Uniform Delay, d1	19.5	4.8	13.5	7.4	45.6	37.7
Progression Factor	1.00	1.00	0.63	2.09	1.00	1.00
Incremental Delay, d2	0.6	0.5	2.5	31.0	28.3	0.8
Delay (s)	20.1	5.3	10.9	46.5	73.9	38.5
Level of Service	C	A	B	D	E	D
Approach Delay (s)		10.0	33.1		61.8	
Approach LOS		B	C		E	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2034)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	461	78	1764	257	587
Future Volume (vph)	461	78	1764	257	587
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	95.0	95.0	95.0	25.0	
Total Split (%)	79.2%	79.2%	79.2%	20.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	92.5	92.5	92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77	0.77	0.19	1.00
v/c Ratio	0.20	0.08	0.82	0.98	0.48
Control Delay	2.0	0.1	4.9	96.8	1.2
Queue Delay	0.0	0.0	0.7	0.0	0.0
Total Delay	2.0	0.1	5.6	96.8	1.2
LOS	A	A	A	F	A
Approach Delay	1.7		5.6	30.3	
Approach LOS	A		A	C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 11.5
 Intersection Capacity Utilization 78.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	490	83	1960	282	645
v/c Ratio	0.20	0.08	0.82	0.98	0.48
Control Delay	2.0	0.1	4.9	96.8	1.2
Queue Delay	0.0	0.0	0.7	0.0	0.0
Total Delay	2.0	0.1	5.6	96.8	1.2
Queue Length 50th (m)	6.6	0.0	60.6	66.7	0.0
Queue Length 95th (m)	m8.1	m0.0	18.5	#120.4	0.0
Internal Link Dist (m)	291.5		40.0	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2392	1066	2387	288	1348
Starvation Cap Reductn	0	0	159	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.08	0.88	0.98	0.48

Intersection Summary

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

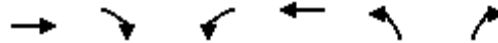
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2034)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	461	78	0	1764	257	587
Future Volume (vph)	461	78	0	1764	257	587
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3104	1359		3104	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3104	1359		3104	1506	1348
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	490	83	0	1960	282	645
RTOR Reduction (vph)	0	19	0	0	0	0
Lane Group Flow (vph)	490	64	0	1960	282	645
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	92.5	92.5		92.3	23.0	120.0
Actuated g/C Ratio	0.77	0.77		0.77	0.19	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2392	1047		2387	288	1348
v/s Ratio Prot	0.16			c0.63	c0.19	
v/s Ratio Perm		0.05				0.48
v/c Ratio	0.20	0.06		0.82	0.98	0.48
Uniform Delay, d1	3.7	3.3		8.7	48.3	0.0
Progression Factor	0.48	0.00		0.33	1.00	1.00
Incremental Delay, d2	0.2	0.1		1.9	46.7	1.2
Delay (s)	1.9	0.1		4.7	95.0	1.2
Level of Service	A	A		A	F	A
Approach Delay (s)	1.7			4.7	29.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

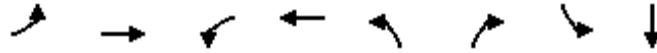
PM Peak Period
 Future Total (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	1027	2136	21	16	21
Future Volume (Veh/h)	21	1027	2136	21	16	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	24	1154	2297	23	17	23
Pedestrians					3	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	118			
pX, platoon unblocked	0.26				0.28	0.26
vC, conflicting volume	2323				2936	1163
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410				2269	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				0	92
cM capacity (veh/h)	302				9	284
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	24	577	577	1531	789	40
Volume Left	24	0	0	0	0	17
Volume Right	0	0	0	0	23	23
cSH	302	1700	1700	1700	1700	20
Volume to Capacity	0.08	0.34	0.34	0.90	0.46	1.99
Queue Length 95th (m)	2.0	0.0	0.0	0.0	0.0	40.3
Control Delay (s)	17.9	0.0	0.0	0.0	0.0	862.8
Lane LOS	C					F
Approach Delay (s)	0.4			0.0		862.8
Approach LOS						F
Intersection Summary						
Average Delay			9.9			
Intersection Capacity Utilization			69.7%		ICU Level of Service	C
Analysis Period (min)			15			

Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	978	39	1991	154	59	10	0
Future Volume (vph)	11	978	39	1991	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	81.5	81.5	92.6	90.6	24.3	24.3	21.1	21.1
Actuated g/C Ratio	0.68	0.68	0.77	0.76	0.20	0.20	0.18	0.18
v/c Ratio	0.19	0.47	0.11	0.86	0.60	0.18	0.04	0.04
Control Delay	15.8	7.9	3.6	11.7	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Total Delay	15.8	7.9	3.6	12.8	51.7	9.5	37.7	0.2
LOS	B	A	A	B	D	A	D	A
Approach Delay		7.9		12.6				17.4
Approach LOS		A		B				B

Intersection Summary

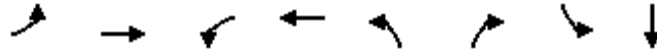
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 77.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 4: JBH Access & Northshore Blvd



Queues
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1110	44	2258	167	64	11	13
v/c Ratio	0.19	0.47	0.11	0.86	0.60	0.18	0.04	0.04
Control Delay	15.8	7.9	3.6	11.7	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Total Delay	15.8	7.9	3.6	12.8	51.7	9.5	37.7	0.2
Queue Length 50th (m)	0.8	40.8	1.9	60.9	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.8	58.0	m2.5	m78.9	54.1	10.4	6.8	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	62	2351	404	2630	427	521	411	484
Starvation Cap Reductn	0	0	0	173	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.47	0.11	0.92	0.39	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖		↖	↖	↕	↖
Traffic Volume (vph)	11	978	54	39	1991	19	154	0	59	10	0	12
Future Volume (vph)	11	978	54	39	1991	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1745	3458		1710	3484		1741		1533	1445	1539	
Flt Permitted	0.05	1.00		0.21	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	91	3458		371	3484		1373		1533	1445	1539	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1052	58	44	2237	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	1108	0	44	2258	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	77.9	77.9		87.1	87.1		19.9		19.9	19.9	19.9	
Effective Green, g (s)	80.8	80.8		90.6	90.6		24.3		24.3	21.1	21.1	
Actuated g/C Ratio	0.67	0.67		0.75	0.75		0.20		0.20	0.18	0.18	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	61	2328		377	2630		278		310	254	270	
v/s Ratio Prot		0.32		0.01	c0.65						0.00	
v/s Ratio Perm	0.13			0.08			c0.12		0.01	0.01		
v/c Ratio	0.20	0.48		0.12	0.86		0.60		0.04	0.04	0.01	
Uniform Delay, d1	7.4	9.4		4.9	10.2		43.4		38.5	41.1	40.8	
Progression Factor	0.72	0.69		0.77	0.78		1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.8	0.7		0.1	1.9		3.6		0.1	0.1	0.0	
Delay (s)	12.1	7.2		3.9	9.9		47.1		38.5	41.1	40.8	
Level of Service	B	A		A	A		D		D	D	D	
Approach Delay (s)		7.2			9.8			44.7			41.0	
Approach LOS		A			A			D			D	

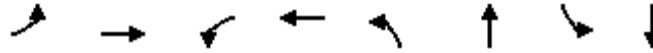
Intersection Summary

HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2034)

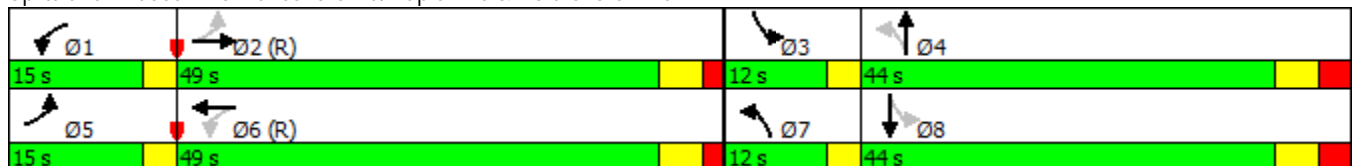


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	206	799	271	1473	89	106	80	176
Future Volume (vph)	206	799	271	1473	89	106	80	176
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	15.0	49.0	15.0	49.0	12.0	44.0	12.0	44.0
Total Split (%)	12.5%	40.8%	12.5%	40.8%	10.0%	36.7%	10.0%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.4	-4.4	-3.8	-3.8	-3.9	-3.9
Total Lost Time (s)	-2.0	1.0	-1.4	1.6	-0.8	3.2	-0.9	3.1
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	75.8	55.2	75.8	56.3	46.4	31.0	46.5	31.0
Actuated g/C Ratio	0.63	0.46	0.63	0.47	0.39	0.26	0.39	0.26
v/c Ratio	0.70	0.60	0.67	1.03	0.40	0.75	0.32	0.90dr
Control Delay	55.0	21.9	22.0	63.1	26.8	38.8	24.8	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	21.9	22.0	63.1	26.8	38.8	24.8	29.8
LOS	D	C	C	E	C	D	C	C
Approach Delay		28.4		57.0		36.2		29.2
Approach LOS		C		E		D		C

Intersection Summary

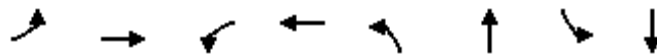
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 42.1
 Intersection LOS: D
 Intersection Capacity Utilization 96.1%
 ICU Level of Service F
 Analysis Period (min) 15
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	231	945	291	1669	97	366	87	720
v/c Ratio	0.70	0.60	0.67	1.03	0.40	0.75	0.32	0.90dr
Control Delay	55.0	21.9	22.0	63.1	26.8	38.8	24.8	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	21.9	22.0	63.1	26.8	38.8	24.8	29.8
Queue Length 50th (m)	45.0	49.3	28.3	~232.7	14.6	59.3	13.1	54.1
Queue Length 95th (m)	#75.9	60.6	#72.6	#298.3	22.3	83.4	20.5	66.8
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	342	1578	438	1620	251	610	282	1212
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	0.68	0.60	0.66	1.03	0.39	0.60	0.31	0.59

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

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↗↘	
Traffic Volume (vph)	206	799	42	271	1473	79	89	106	231	80	176	487
Future Volume (vph)	206	799	42	271	1473	79	89	106	231	80	176	487
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3427		1744	3449		1727	1604		1676	3063	
Flt Permitted	0.07	1.00		0.18	1.00		0.13	1.00		0.21	1.00	
Satd. Flow (perm)	134	3427		322	3449		242	1604		368	3063	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	231	898	47	291	1584	85	97	115	251	87	191	529
RTOR Reduction (vph)	0	3	0	0	3	0	0	73	0	0	189	0
Lane Group Flow (vph)	231	942	0	291	1666	0	97	293	0	87	531	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	63.7	50.2		67.1	51.9		35.7	27.2		35.5	27.1	
Effective Green, g (s)	73.4	55.2		72.8	56.3		42.4	31.0		42.5	31.0	
Actuated g/C Ratio	0.61	0.46		0.61	0.47		0.35	0.26		0.35	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	1576		427	1618		237	414		264	791	
v/s Ratio Prot	c0.11	0.27		0.11	c0.48		c0.04	c0.18		0.03	0.17	
v/s Ratio Perm	0.32			0.30			0.10			0.08		
v/c Ratio	0.70	0.60		0.68	1.03		0.41	0.71		0.33	0.90dr	
Uniform Delay, d1	33.1	24.1		15.5	31.9		28.5	40.4		28.0	39.9	
Progression Factor	1.71	0.79		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	1.5		4.4	30.4		1.2	5.4		0.7	2.3	
Delay (s)	62.6	20.6		20.0	62.3		29.6	45.8		28.7	42.2	
Level of Service	E	C		B	E		C	D		C	D	
Approach Delay (s)		28.8			56.0			42.4			40.7	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	42.4	147.8	119.9	193.8	89.3	32.5
Average Queue (m)	34.7	68.4	51.1	85.3	46.5	12.7
95th Queue (m)	50.8	161.9	98.2	168.2	78.2	24.7
Link Distance (m)		151.8	307.2	307.2	165.7	165.7
Upstream Blk Time (%)		15				
Queuing Penalty (veh)		0				
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	30	16				
Queuing Penalty (veh)	92	22				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B15	B15	NB	NB
Directions Served	T	T	T	T	T	T	L	R
Maximum Queue (m)	22.0	18.7	52.6	51.3	2.9	1.0	142.2	99.3
Average Queue (m)	5.1	2.6	22.0	27.1	0.1	0.0	96.6	18.9
95th Queue (m)	16.3	11.3	42.5	46.8	1.8	0.9	163.7	104.6
Link Distance (m)	307.2	307.2	56.1	56.1	39.2	39.2	160.9	160.9
Upstream Blk Time (%)			0	0			5	2
Queuing Penalty (veh)			1	1			0	0
Storage Bay Dist (m)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	B15	B15	B15	WB	SB
Directions Served	L	T	T		TR	LR
Maximum Queue (m)	16.3	6.9	4.7	0.9	2.4	25.2
Average Queue (m)	4.6	0.2	0.2	0.0	0.1	9.0
95th Queue (m)	13.2	3.2	3.0	0.8	1.6	20.2
Link Distance (m)		56.1	56.1	56.1	100.9	92.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	35.0					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	11.9	54.1	57.5	17.8	61.6	67.8	32.3	81.0	20.4	10.6
Average Queue (m)	2.3	21.0	26.5	5.2	30.8	35.9	25.8	22.7	3.6	2.2
95th Queue (m)	8.3	44.1	48.9	13.4	56.0	61.9	37.2	64.3	13.5	8.3
Link Distance (m)		100.9	100.9		244.6	244.6		138.3	66.9	66.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		1			0		17	1		
Queuing Penalty (veh)		0			0		10	1		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	75.4	82.7	83.4	32.4	172.0	171.9	43.7	97.1	36.2	90.1	129.6
Average Queue (m)	36.9	47.9	51.5	27.1	168.9	168.9	16.3	47.7	12.7	30.7	74.0
95th Queue (m)	68.1	73.6	77.3	40.0	170.6	170.6	34.3	82.7	27.4	66.9	119.8
Link Distance (m)		244.6	244.6		164.2	164.2		225.6		178.2	178.2
Upstream Blk Time (%)					70	61					0
Queuing Penalty (veh)					0	0					0
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				10	55		0	0	0	0	
Queuing Penalty (veh)				75	148		0	0	0	0	

Network Summary

Network wide Queuing Penalty: 351

Appendix L – 2034 Future Total Conditions – Synchro & SimTraffic Reports

3. Saturday Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
Future Total (2034)

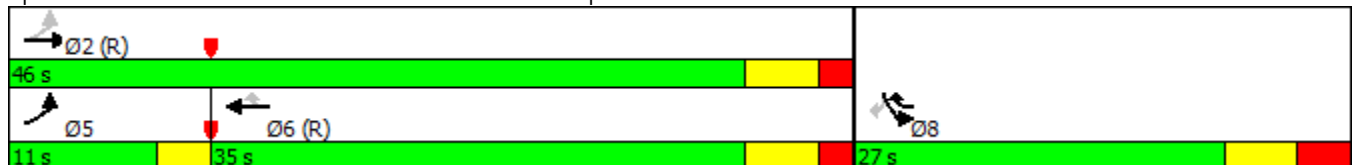


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	59	306	438	433	305	90
Future Volume (vph)	59	306	438	433	305	90
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.5	-4.5	-5.0	-5.0
Total Lost Time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	48.0	45.0	38.4	65.4	25.0	25.0
Actuated g/C Ratio	0.66	0.62	0.53	0.90	0.34	0.34
v/c Ratio	0.11	0.33	0.54	0.35	0.71	0.21
Control Delay	5.0	7.9	15.7	0.9	30.2	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	7.9	15.7	0.9	30.2	5.0
LOS	A	A	B	A	C	A
Approach Delay		7.4	8.3		24.5	
Approach LOS		A	A		C	

Intersection Summary

Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 12.5
 Intersection LOS: B
 Intersection Capacity Utilization 60.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp

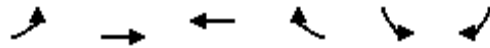


Queues

Saturday Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2034)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	63	329	456	451	367	108
v/c Ratio	0.11	0.33	0.54	0.35	0.71	0.21
Control Delay	5.0	7.9	15.7	0.9	30.2	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	7.9	15.7	0.9	30.2	5.0
Queue Length 50th (m)	2.7	19.2	43.0	0.0	43.0	0.0
Queue Length 95th (m)	6.2	32.2	73.2	3.1	64.0	7.7
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	573	996	851	1292	515	522
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	0.11	0.33	0.54	0.35	0.71	0.21

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Period
 Future Total (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	59	306	438	433	305	90
Future Volume (vph)	59	306	438	433	305	90
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-2.0	1.0	1.5	2.5	2.0	2.0
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	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1617	1617	1389	1506	1318
Flt Permitted	0.38	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	619	1617	1617	1389	1506	1318
Peak-hour factor, PHF	0.93	0.93	0.96	0.96	0.83	0.83
Adj. Flow (vph)	63	329	456	451	367	108
RTOR Reduction (vph)	0	0	0	70	0	71
Lane Group Flow (vph)	63	329	456	381	367	37
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	32.7	52.7	20.0	20.0
Effective Green, g (s)	45.0	45.0	37.2	61.7	25.0	25.0
Actuated g/C Ratio	0.62	0.62	0.51	0.85	0.34	0.34
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	500	996	824	1173	515	451
v/s Ratio Prot	0.02	c0.20	c0.28	0.11	c0.24	
v/s Ratio Perm	0.06			0.17		0.03
v/c Ratio	0.13	0.33	0.55	0.32	0.71	0.08
Uniform Delay, d1	6.2	6.7	12.2	1.2	20.9	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.9	2.7	0.7	8.2	0.4
Delay (s)	6.3	7.6	14.9	1.9	29.0	16.6
Level of Service	A	A	B	A	C	B
Approach Delay (s)		7.4	8.5		26.2	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	3.5
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2034)

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	497	114	734	137	414
Future Volume (vph)	497	114	734	137	414
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	65.0	65.0	65.0	30.0	
Total Split (%)	68.4%	68.4%	68.4%	31.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-2.9	-2.9	-3.3	-4.8	
Total Lost Time (s)	3.1	3.1	2.7	2.2	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	69.8	69.8	70.2	19.9	95.0
Actuated g/C Ratio	0.73	0.73	0.74	0.21	1.00
v/c Ratio	0.24	0.12	0.34	0.50	0.35
Control Delay	4.8	1.3	5.3	37.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	1.3	5.3	37.7	0.7
LOS	A	A	A	D	A
Approach Delay	4.2		5.3	9.9	
Approach LOS	A		A	A	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 6.3
 Intersection Capacity Utilization 46.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2034)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	540	124	765	156	470
v/c Ratio	0.24	0.12	0.34	0.50	0.35
Control Delay	4.8	1.3	5.3	37.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	1.3	5.3	37.7	0.7
Queue Length 50th (m)	13.9	0.0	21.3	25.4	0.0
Queue Length 95th (m)	25.3	5.1	37.3	39.6	0.0
Internal Link Dist (m)	288.3		39.2	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2258	1028	2271	440	1348
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.12	0.34	0.35	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Period
Future Total (2034)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	497	114	0	734	137	414
Future Volume (vph)	497	114	0	734	137	414
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	3.1	3.1		2.7	2.2	-0.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1354		3073	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1354		3073	1506	1348
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.88	0.88
Adj. Flow (vph)	540	124	0	765	156	470
RTOR Reduction (vph)	0	33	0	0	0	0
Lane Group Flow (vph)	540	91	0	765	156	470
Confl. Peds. (#/hr)		4	4			
Heavy Vehicles (%)	1%	0%	1%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	66.9	66.9		66.9	15.1	95.0
Effective Green, g (s)	69.8	69.8		70.2	19.9	95.0
Actuated g/C Ratio	0.73	0.73		0.74	0.21	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2257	994		2270	315	1348
v/s Ratio Prot	0.18			0.25	c0.10	
v/s Ratio Perm		0.07				c0.35
v/c Ratio	0.24	0.09		0.34	0.50	0.35
Uniform Delay, d1	4.1	3.6		4.3	33.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.2		0.4	1.2	0.7
Delay (s)	4.3	3.8		4.7	34.3	0.7
Level of Service	A	A		A	C	A
Approach Delay (s)	4.2			4.7	9.1	
Approach LOS	A			A	A	

Intersection Summary

HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	5.3
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 3: Northshore Blvd & Site Driveway

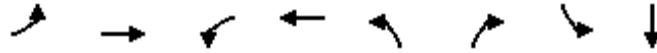
Saturday Peak Period
 Future Total (2034)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	885	968	21	19	25
Future Volume (Veh/h)	26	885	968	21	19	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	29	973	1019	22	21	27
Pedestrians					8	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.93				0.95	0.93
vC, conflicting volume	1049				1582	528
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	912				1328	355
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				84	96
cM capacity (veh/h)	701				135	601
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	29	486	486	679	362	48
Volume Left	29	0	0	0	0	21
Volume Right	0	0	0	0	22	27
cSH	701	1700	1700	1700	1700	240
Volume to Capacity	0.04	0.29	0.29	0.40	0.21	0.20
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0	5.5
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	23.7
Lane LOS	B					C
Approach Delay (s)	0.3			0.0		23.7
Approach LOS						C
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			37.4%		ICU Level of Service	A
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	9	858	27	932	49	39	11	0
Future Volume (vph)	9	858	27	932	49	39	11	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-3.5	-3.5	-2.2	-2.2	0.0	0.0
Total Lost Time (s)	2.2	2.2	0.5	2.5	4.8	4.8	7.0	7.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	87.8	87.8	95.2	93.7	12.5	12.5	10.3	10.3
Actuated g/C Ratio	0.80	0.80	0.87	0.85	0.11	0.11	0.09	0.09
v/c Ratio	0.02	0.36	0.06	0.34	0.36	0.21	0.07	0.03
Control Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
LOS	A	A	A	A	D	A	D	A
Approach Delay		5.1		1.4				25.7
Approach LOS		A		A				C

Intersection Summary

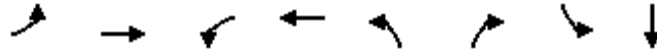
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 4.7
 Intersection Capacity Utilization 56.1%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2034)
























Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	10	1006	29	1008	56	45	12	9
v/c Ratio	0.02	0.36	0.06	0.34	0.36	0.21	0.07	0.03
Control Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	5.1	1.1	1.4	50.7	6.6	44.7	0.2
Queue Length 50th (m)	0.5	36.0	0.4	10.0	11.4	0.0	2.4	0.0
Queue Length 95th (m)	2.3	53.3	m0.9	11.3	22.1	4.7	8.0	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	416	2771	526	2962	441	486	518	557
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	0.02	0.36	0.06	0.34	0.13	0.09	0.02	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
4: Northshore Blvd & JBH Access

Saturday Peak Period
Future Total (2034)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	858	37	27	932	16	49	0	39	11	0	8
Future Volume (vph)	9	858	37	27	932	16	49	0	39	11	0	8
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		0.5	2.5		4.8		4.8	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1742	3468		1745	3479		1745		1375	1728	1561	
Flt Permitted	0.28	1.00		0.25	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	521	3468		468	3479		1381		1375	1728	1561	
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	964	42	29	991	17	56	0	45	12	0	9
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	8	0
Lane Group Flow (vph)	10	1005	0	29	1008	0	56	0	4	12	1	0
Confl. Peds. (#/hr)	3						3		9	9		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	80.6	80.6		88.3	88.3		8.7		8.7	8.7	8.7	
Effective Green, g (s)	84.4	84.4		91.8	91.8		10.9		10.9	8.7	8.7	
Actuated g/C Ratio	0.77	0.77		0.83	0.83		0.10		0.10	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	399	2660		474	2903		136		136	136	123	
v/s Ratio Prot		c0.29		0.00	c0.29						0.00	
v/s Ratio Perm	0.02			0.05			c0.04		0.00	0.01		
v/c Ratio	0.03	0.38		0.06	0.35		0.41		0.03	0.09	0.01	
Uniform Delay, d1	3.0	4.2		1.9	2.1		46.5		44.8	47.0	46.7	
Progression Factor	1.00	1.00		0.52	0.47		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.1	0.3		2.0		0.1	0.3	0.0	
Delay (s)	3.2	4.6		1.1	1.3		48.6		44.9	47.3	46.7	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		4.6			1.3			46.9			47.0	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			5.4				HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)		9.7			
Intersection Capacity Utilization			56.1%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Total (2034)

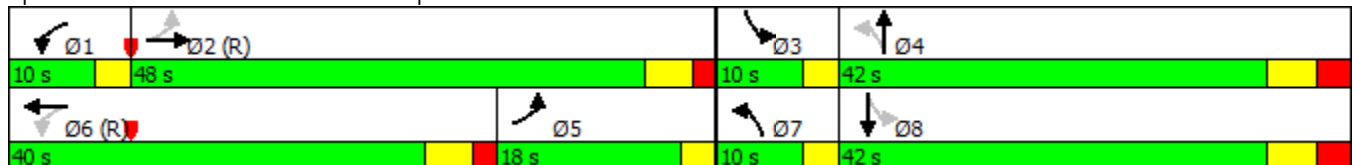


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	176	673	119	691	38	60	95	57
Future Volume (vph)	176	673	119	691	38	60	95	57
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	18.0	48.0	10.0	40.0	10.0	42.0	10.0	42.0
Total Split (%)	16.4%	43.6%	9.1%	36.4%	9.1%	38.2%	9.1%	38.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-4.1	-4.1	-3.2	-3.2	-5.0	-5.0	-4.1	-4.1
Total Lost Time (s)	-1.1	1.9	-0.2	2.8	-2.0	2.0	-1.1	2.9
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	68.9	65.9	62.5	59.5	31.7	17.7	30.8	20.8
Actuated g/C Ratio	0.63	0.60	0.57	0.54	0.29	0.16	0.28	0.19
v/c Ratio	0.34	0.38	0.31	0.47	0.13	0.54	0.35	0.42
Control Delay	12.1	8.9	14.2	16.9	27.8	27.2	32.7	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	8.9	14.2	16.9	27.8	27.2	32.7	10.5
LOS	B	A	B	B	C	C	C	B
Approach Delay		9.5		16.5		27.3		15.8
Approach LOS		A		B		C		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 14.7
 Intersection LOS: B
 Intersection Capacity Utilization 71.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

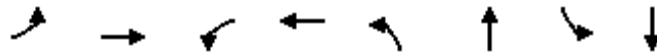


Queues

Saturday Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2034)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	787	128	863	43	180	101	323
v/c Ratio	0.34	0.38	0.31	0.47	0.13	0.54	0.35	0.42
Control Delay	12.1	8.9	14.2	16.9	27.8	27.2	32.7	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	8.9	14.2	16.9	27.8	27.2	32.7	10.5
Queue Length 50th (m)	13.3	42.4	11.9	55.2	6.8	18.1	16.7	6.0
Queue Length 95th (m)	30.5	70.4	24.4	81.7	13.7	36.2	27.7	17.3
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	562	2067	414	1841	327	641	286	1228
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	0.34	0.38	0.31	0.47	0.13	0.28	0.35	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Period
Future Total (2034)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	176	673	59	119	691	112	38	60	101	95	57	246
Future Volume (vph)	176	673	59	119	691	112	38	60	101	95	57	246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-1.1	1.9		-0.2	2.8		-2.0	2.0		-1.1	2.9	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.91		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)	1742	3442		1709	3387		1691	1613		1671	2982	
Flt Permitted	0.31	1.00		0.27	1.00		0.45	1.00		0.38	1.00	
Satd. Flow (perm)	575	3442		477	3387		801	1613		662	2982	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.94	0.94	0.94
Adj. Flow (vph)	189	724	63	128	743	120	43	67	113	101	61	262
RTOR Reduction (vph)	0	4	0	0	8	0	0	72	0	0	212	0
Lane Group Flow (vph)	189	783	0	128	855	0	43	108	0	101	111	0
Confl. Peds. (#/hr)	13		10	10		13	7		17	17		7
Heavy Vehicles (%)	0%	0%	0%	2%	0%	2%	3%	0%	2%	4%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	63.6	60.6		55.1	55.1		18.1	13.9		23.7	16.7	
Effective Green, g (s)	67.7	64.7		58.3	58.3		28.1	18.9		28.0	20.8	
Actuated g/C Ratio	0.62	0.59		0.53	0.53		0.26	0.17		0.25	0.19	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	556	2024		395	1795		279	277		270	563	
v/s Ratio Prot	0.06	c0.23		0.04	c0.25		0.01	c0.07		c0.04	0.04	
v/s Ratio Perm	0.15			0.13			0.03			0.06		
v/c Ratio	0.34	0.39		0.32	0.48		0.15	0.39		0.37	0.20	
Uniform Delay, d1	13.1	12.1		13.9	16.2		31.3	40.4		32.8	37.6	
Progression Factor	0.71	0.68		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		0.5	0.9		0.3	0.9		0.9	0.2	
Delay (s)	9.6	8.7		14.4	17.2		31.6	41.3		33.7	37.7	
Level of Service	A	A		B	B		C	D		C	D	
Approach Delay (s)		8.9			16.8			39.5			36.8	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	2.6
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	25.0	50.1	70.7	30.0	74.6	19.5
Average Queue (m)	8.8	22.4	35.2	13.2	40.9	8.4
95th Queue (m)	18.2	40.2	58.8	23.7	66.0	15.8
Link Distance (m)		156.8	304.4	304.4	169.3	169.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)		1				
Queuing Penalty (veh)		0				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	L
Maximum Queue (m)	30.5	27.8	51.4	48.8	52.2
Average Queue (m)	13.1	10.4	16.6	16.6	26.7
95th Queue (m)	26.3	24.5	39.0	38.6	43.7
Link Distance (m)	304.4	304.4	55.6	55.6	155.3
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	B15	B15	B15	WB	SB
Directions Served	L	T	T		TR	LR
Maximum Queue (m)	11.4	6.9	19.7	3.0	2.8	19.6
Average Queue (m)	3.9	0.3	0.8	0.1	0.1	8.3
95th Queue (m)	11.5	5.8	10.6	2.1	1.8	16.9
Link Distance (m)		55.6	55.6	55.6	95.2	80.4
Upstream Blk Time (%)		0	0			
Queuing Penalty (veh)		0	0			
Storage Bay Dist (m)	35.0					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: Northshore Blvd & JBH Access

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	8.5	51.8	56.9	13.7	41.9	45.0	29.7	21.4	12.3	9.0
Average Queue (m)	1.8	18.3	21.7	4.1	15.2	17.4	11.5	5.6	3.2	1.8
95th Queue (m)	7.2	41.5	46.6	11.7	33.8	37.3	24.6	13.9	10.5	7.7
Link Distance (m)		95.2	95.2		251.3	251.3		123.8	68.4	68.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		0					1			
Queuing Penalty (veh)		0					0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	59.8	58.4	65.7	32.3	106.4	95.1	26.0	60.2	40.9	35.2	62.8
Average Queue (m)	26.4	27.0	32.7	20.5	51.2	44.5	8.6	25.0	15.5	9.6	24.2
95th Queue (m)	49.7	55.5	61.0	36.7	92.1	80.4	20.6	47.5	32.8	24.0	46.4
Link Distance (m)		251.3	251.3		164.4	164.4		267.6		280.4	280.4
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)				3	18				0		
Queuing Penalty (veh)				12	22				0		

Network Summary

Network wide Queuing Penalty: 35

Appendix M – 2034 Future Total Conditions with Mitigation Measures – Synchro Reports

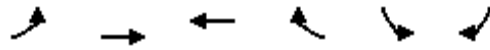
1. Weekday AM Peak Hour
2. Weekday PM Peak Hour

Appendix M – 2034 Future Total Conditions with Mitigation Measures – Synchro Reports

1. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2034) Mitigated

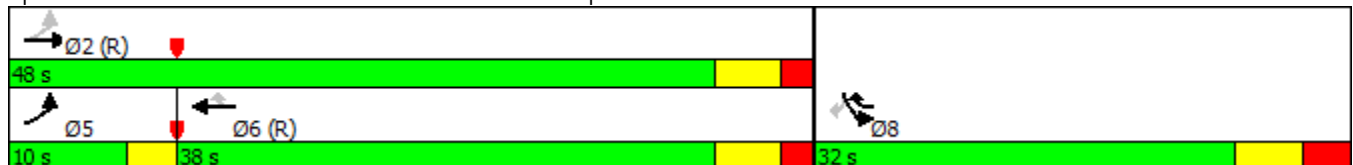


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Traffic Volume (vph)	124	427	476	566	366	59
Future Volume (vph)	124	427	476	566	366	59
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	10.0	48.0	38.0	32.0	32.0	32.0
Total Split (%)	12.5%	60.0%	47.5%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.6	-2.6	-3.4	-3.4	-4.0	-4.0
Total Lost Time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	47.6	44.6	35.6	66.6	29.0	29.0
Actuated g/C Ratio	0.60	0.56	0.44	0.83	0.36	0.36
v/c Ratio	0.37	0.52	0.75	0.52	0.75	0.13
Control Delay	10.2	13.7	26.9	1.9	33.1	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	13.7	26.9	1.9	33.1	5.6
LOS	B	B	C	A	C	A
Approach Delay		12.9	13.3		29.3	
Approach LOS		B	B		C	

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 16.6
 Intersection LOS: B
 Intersection Capacity Utilization 69.4%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	133	459	541	643	407	66
v/c Ratio	0.37	0.52	0.75	0.52	0.75	0.13
Control Delay	10.2	13.7	26.9	1.9	33.1	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	13.7	26.9	1.9	33.1	5.6
Queue Length 50th (m)	8.1	40.2	66.3	1.9	53.2	0.0
Queue Length 95th (m)	15.4	64.2	101.2	5.6	#95.3	7.5
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	365	884	718	1234	540	511
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	0.36	0.52	0.75	0.52	0.75	0.13

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2034) Mitigated



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	124	427	476	566	366	59
Future Volume (vph)	124	427	476	566	366	59
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	0.4	3.4	2.6	3.6	3.0	3.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1522	1586	1617	1375	1491	1296
Flt Permitted	0.24	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	385	1586	1617	1375	1491	1296
Peak-hour factor, PHF	0.93	0.93	0.88	0.88	0.90	0.90
Adj. Flow (vph)	133	459	541	643	407	66
RTOR Reduction (vph)	0	0	0	107	0	42
Lane Group Flow (vph)	133	459	541	536	407	24
Heavy Vehicles (%)	2%	3%	1%	1%	1%	4%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	42.0	42.0	32.2	57.2	25.0	25.0
Effective Green, g (s)	44.6	44.6	35.6	64.0	29.0	29.0
Actuated g/C Ratio	0.56	0.56	0.45	0.80	0.36	0.36
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	348	884	719	1100	540	469
v/s Ratio Prot	0.04	c0.29	c0.33	0.17	c0.27	
v/s Ratio Perm	0.17			0.22		0.02
v/c Ratio	0.38	0.52	0.75	0.49	0.75	0.05
Uniform Delay, d1	10.8	11.0	18.5	2.6	22.4	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	2.2	7.1	1.5	9.4	0.2
Delay (s)	11.5	13.2	25.7	4.2	31.8	16.8
Level of Service	B	B	C	A	C	B
Approach Delay (s)		12.8	14.0		29.7	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2034) Mitigated

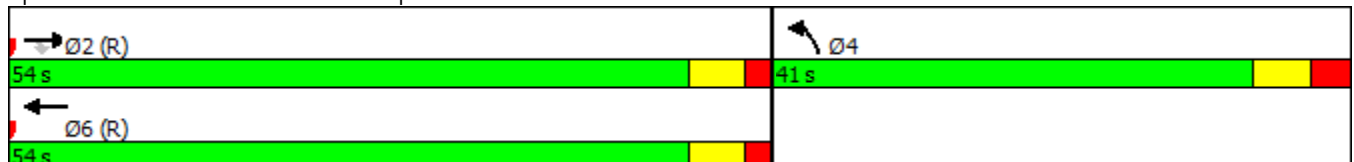
	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	676	117	754	288	1237
Future Volume (vph)	676	117	754	288	1237
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	43.0	43.0	43.0	25.0	
Total Split (s)	54.0	54.0	54.0	41.0	
Total Split (%)	56.8%	56.8%	56.8%	43.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-4.6	-4.6	-4.1	-5.0	
Total Lost Time (s)	1.4	1.4	1.9	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	61.4	61.4	60.9	30.2	95.0
Actuated g/C Ratio	0.65	0.65	0.64	0.32	1.00
v/c Ratio	0.40	0.16	0.44	0.66	1.02
Control Delay	9.7	2.2	10.3	34.1	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	2.2	10.3	34.1	33.6
LOS	A	A	B	C	C
Approach Delay	8.6		10.3	33.7	
Approach LOS	A		B	C	

Intersection Summary

Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 21.2
 Intersection Capacity Utilization 56.0%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2034) Mitigated



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	786	136	857	316	1359
v/c Ratio	0.40	0.16	0.44	0.66	1.02
Control Delay	9.7	2.2	10.3	34.1	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	2.2	10.3	34.1	33.6
Queue Length 50th (m)	32.7	0.0	37.3	49.5	~9.6
Queue Length 95th (m)	52.4	6.7	61.4	67.6	#86.5
Internal Link Dist (m)	288.3		40.8	139.6	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	1985	853	1969	618	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.16	0.44	0.51	1.02

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2034) Mitigated



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	676	117	0	754	288	1237
Future Volume (vph)	676	117	0	754	288	1237
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	1.4	1.4		1.9	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3073	1247		3073	1506	1334
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3073	1247		3073	1506	1334
Peak-hour factor, PHF	0.86	0.86	0.88	0.88	0.91	0.91
Adj. Flow (vph)	786	136	0	857	316	1359
RTOR Reduction (vph)	0	48	0	0	0	0
Lane Group Flow (vph)	786	88	0	857	316	1359
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	1%	9%	2%	1%	0%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	56.8	56.8		56.8	25.2	95.0
Effective Green, g (s)	61.4	61.4		60.9	30.2	95.0
Actuated g/C Ratio	0.65	0.65		0.64	0.32	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1986	805		1969	478	1334
v/s Ratio Prot	0.26			0.28	0.21	
v/s Ratio Perm		0.07				c1.02
v/c Ratio	0.40	0.11		0.44	0.66	1.02
Uniform Delay, d1	8.0	6.4		8.5	28.0	47.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3		0.7	3.4	29.4
Delay (s)	8.6	6.7		9.2	31.4	76.9
Level of Service	A	A		A	C	E
Approach Delay (s)	8.3			9.2	68.4	
Approach LOS	A			A	E	

Intersection Summary

HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	3.9
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

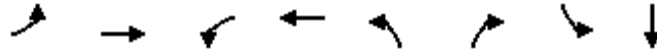
AM Peak Period
Future Total (2034) Mitigated



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	1843	1107	31	24	25
Future Volume (Veh/h)	70	1843	1107	31	24	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	74	1940	1258	35	26	27
Pedestrians			2		3	
Lane Width (m)			3.3		3.3	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	112			
pX, platoon unblocked	0.90				0.95	0.90
vC, conflicting volume	1296				2398	650
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099				1877	377
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				51	95
cM capacity (veh/h)	575				53	560
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	74	970	970	839	454	53
Volume Left	74	0	0	0	0	26
Volume Right	0	0	0	0	35	27
cSH	575	1700	1700	1700	1700	99
Volume to Capacity	0.13	0.57	0.57	0.49	0.27	0.54
Queue Length 95th (m)	3.3	0.0	0.0	0.0	0.0	18.6
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	77.7
Lane LOS	B					F
Approach Delay (s)	0.4			0.0		77.7
Approach LOS						F
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			60.9%		ICU Level of Service	B
Analysis Period (min)			15			

Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	1622	45	1024	102	22	13	0
Future Volume (vph)	11	1622	45	1024	102	22	13	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	59.0	59.0	11.0	70.0	40.0	40.0	40.0	40.0
Total Split (%)	53.6%	53.6%	10.0%	63.6%	36.4%	36.4%	36.4%	36.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.8	-3.8	-2.9	-2.9	-2.3	-2.3	-1.9	-1.9
Total Lost Time (s)	2.2	2.2	1.1	3.1	4.7	4.7	5.1	5.1
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	78.0	78.0	87.5	85.5	16.7	16.7	16.3	16.3
Actuated g/C Ratio	0.71	0.71	0.80	0.78	0.15	0.15	0.15	0.15
v/c Ratio	0.04	0.82	0.22	0.41	0.54	0.09	0.05	0.04
Control Delay	7.4	16.8	18.5	2.2	52.0	0.7	37.8	0.2
Queue Delay	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	18.0	18.5	2.2	52.0	0.7	37.8	0.2
LOS	A	B	B	A	D	A	D	A
Approach Delay		17.9		2.9				19.7
Approach LOS		B		A				B

Intersection Summary

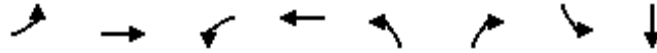
Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 13.8
 Intersection LOS: B
 Intersection Capacity Utilization 82.8%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 4: Northshore Blvd & JBH Access



Queues
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1975	47	1090	111	24	14	13
v/c Ratio	0.04	0.82	0.22	0.41	0.54	0.09	0.05	0.04
Control Delay	7.4	16.8	18.5	2.2	52.0	0.7	37.8	0.2
Queue Delay	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	18.0	18.5	2.2	52.0	0.7	37.8	0.2
Queue Length 50th (m)	0.7	144.3	1.6	13.8	22.3	0.0	2.6	0.0
Queue Length 95th (m)	3.3	#237.6	m5.4	23.1	37.6	0.0	7.7	0.0
Internal Link Dist (m)		87.5		246.1				55.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	341	2406	220	2676	432	470	546	565
Starvation Cap Reductn	0	224	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.91	0.21	0.41	0.26	0.05	0.03	0.02

Intersection Summary

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

Queue shown is maximum after two cycles.






















m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period

Future Total (2034) Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1622	234	45	1024	11	102	0	22	13	0	12
Future Volume (vph)	11	1622	234	45	1024	11	102	0	22	13	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.2	2.2		1.1	3.1		4.7		4.7	5.1	5.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	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	0.99	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1743	3385		1711	3445		1711		1319	1724	1561	
Flt Permitted	0.26	1.00		0.05	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	481	3385		93	3445		1349		1319	1724	1561	
Peak-hour factor, PHF	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1726	249	47	1078	12	111	0	24	14	0	13
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	20	0	11	0
Lane Group Flow (vph)	12	1969	0	47	1090	0	111	0	4	14	2	0
Confl. Peds. (#/hr)	2		1	1		2			11	11		
Heavy Vehicles (%)	0%	1%	0%	2%	1%	9%	2%	0%	4%	0%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	73.4	73.4		82.6	82.6		14.4		14.4	14.4	14.4	
Effective Green, g (s)	77.2	77.2		85.5	85.5		16.7		16.7	16.3	16.3	
Actuated g/C Ratio	0.70	0.70		0.78	0.78		0.15		0.15	0.15	0.15	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	337	2375		191	2677		204		200	255	231	
v/s Ratio Prot		c0.58		0.02	c0.32						0.00	
v/s Ratio Perm	0.02			0.17			c0.08		0.00	0.01		
v/c Ratio	0.04	0.83		0.25	0.41		0.54		0.02	0.05	0.01	
Uniform Delay, d1	5.0	11.7		13.9	4.0		43.1		39.7	40.2	40.0	
Progression Factor	1.00	1.00		4.48	0.41		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.2	3.5		0.6	0.4		2.9		0.0	0.1	0.0	
Delay (s)	5.2	15.2		63.0	2.0		46.1		39.7	40.3	40.0	
Level of Service	A	B		E	A		D		D	D	D	
Approach Delay (s)		15.1			4.5			44.9			40.2	
Approach LOS		B			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			12.9				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)		10.3			
Intersection Capacity Utilization			82.8%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2034) Mitigated

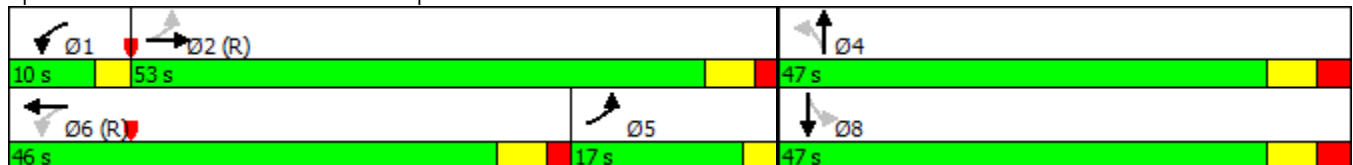


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	242	1292	153	806	31	158	37	85
Future Volume (vph)	242	1292	153	806	31	158	37	85
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	40.0	40.0	40.0	40.0
Total Split (s)	17.0	53.0	10.0	46.0	47.0	47.0	47.0	47.0
Total Split (%)	15.5%	48.2%	9.1%	41.8%	42.7%	42.7%	42.7%	42.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.9	-3.9	-4.3	-4.3	-4.8	-4.8	-3.6	-3.6
Total Lost Time (s)	-0.9	2.1	-1.3	1.7	2.2	2.2	3.4	3.4
Lead/Lag	Lag	Lag	Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	53.9	50.9	47.3	44.3	44.8	44.8	43.6	43.6
Actuated g/C Ratio	0.49	0.46	0.43	0.40	0.41	0.41	0.40	0.40
v/c Ratio	0.67	0.97	0.70	0.69	0.12	0.98	0.74	0.29
Control Delay	30.9	33.1	37.1	30.2	21.9	53.5	91.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	33.1	37.1	30.2	21.9	53.5	91.6	6.9
LOS	C	C	D	C	C	D	F	A
Approach Delay		32.7		31.3		52.1		15.4
Approach LOS		C		C		D		B

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 34.1
 Intersection LOS: C
 Intersection Capacity Utilization 95.8%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	260	1521	172	953	36	728	45	400
v/c Ratio	0.67	0.97	0.70	0.69	0.12	0.98	0.74	0.29
Control Delay	30.9	33.1	37.1	30.2	21.9	53.5	91.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	33.1	37.1	30.2	21.9	53.5	91.6	6.9
Queue Length 50th (m)	20.5	105.8	22.9	87.1	4.7	126.6	8.1	7.6
Queue Length 95th (m)	m33.0	#210.5	#46.0	108.1	11.0	#185.4	#26.1	13.7
Internal Link Dist (m)		246.1		148.4		254.5		269.6
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	387	1576	247	1378	292	746	61	1368
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	0.67	0.97	0.70	0.69	0.12	0.98	0.74	0.29

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2034) Mitigated



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	242	1292	123	153	806	42	31	158	461	37	85	243
Future Volume (vph)	242	1292	123	153	806	42	31	158	461	37	85	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-0.9	2.1		-1.3	1.7		2.2	2.2		3.4	3.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3393		1711	3413		1500	1598		1601	3011	
Flt Permitted	0.19	1.00		0.12	1.00		0.45	1.00		0.09	1.00	
Satd. Flow (perm)	335	3393		218	3413		717	1598		155	3011	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.85	0.85	0.85	0.82	0.82	0.82
Adj. Flow (vph)	260	1389	132	172	906	47	36	186	542	45	104	296
RTOR Reduction (vph)	0	6	0	0	4	0	0	95	0	0	175	0
Lane Group Flow (vph)	260	1515	0	172	949	0	36	633	0	45	225	0
Confl. Peds. (#/hr)	4		6	6		4	5		12	12		5
Heavy Vehicles (%)	2%	1%	5%	2%	1%	8%	16%	1%	0%	9%	1%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	50.0	47.0		40.0	40.0		40.0	40.0		40.0	40.0	
Effective Green, g (s)	53.9	50.9		44.3	44.3		44.8	44.8		43.6	43.6	
Actuated g/C Ratio	0.49	0.46		0.40	0.40		0.41	0.41		0.40	0.40	
Clearance Time (s)	3.0	6.0		3.0	6.0		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	387	1570		241	1374		292	650		61	1193	
v/s Ratio Prot	0.11	c0.45		c0.07	0.28			c0.40			0.07	
v/s Ratio Perm	0.22			0.21			0.05			0.29		
v/c Ratio	0.67	0.96		0.71	0.69		0.12	0.97		0.74	0.19	
Uniform Delay, d1	31.0	28.7		26.0	27.2		20.3	32.0		28.3	21.7	
Progression Factor	0.76	0.74		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	10.8		9.6	2.9		0.2	28.5		36.8	0.1	
Delay (s)	26.4	32.1		35.6	30.1		20.5	60.5		65.1	21.7	
Level of Service	C	C		D	C		C	E		E	C	
Approach Delay (s)		31.3			30.9			58.6			26.1	
Approach LOS		C			C			E			C	

Intersection Summary

HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	4.2
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Appendix M – 2034 Future Total Conditions with
Mitigation Measures – Synchro Reports

2. Weekday PM Peak Hour

Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	143	307	761	1260	232	121
Future Volume (vph)	143	307	761	1260	232	121
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-3.4	-3.4	-4.6	-4.6	-5.0	-5.0
Total Lost Time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Act Effect Green (s)	92.4	89.4	79.6	104.2	26.0	26.0
Actuated g/C Ratio	0.77	0.74	0.66	0.87	0.22	0.22
v/c Ratio	0.38	0.26	0.75	1.07	0.89	0.37
Control Delay	9.3	5.4	9.6	53.1	74.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	5.4	9.6	53.1	74.7	8.9
LOS	A	A	A	D	E	A
Approach Delay		6.7	36.7		52.2	
Approach LOS		A	D		D	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 34.4
 Intersection LOS: C
 Intersection Capacity Utilization 103.4%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



Queues
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	146	313	810	1340	290	151
v/c Ratio	0.38	0.26	0.75	1.07	0.89	0.37
Control Delay	9.3	5.4	9.6	53.1	74.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	5.4	9.6	53.1	74.7	8.9
Queue Length 50th (m)	7.4	20.1	36.0	~226.9	66.8	0.0
Queue Length 95th (m)	12.4	29.8	m104.9	#415.4	#93.5	11.5
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	389	1217	1083	1252	326	407
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	0.38	0.26	0.75	1.07	0.89	0.37

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.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2034) Mitigated



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	143	307	761	1260	232	121
Future Volume (vph)	143	307	761	1260	232	121
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	-0.4	2.6	1.4	2.4	2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	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
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1552	1634	1634	1364	1506	1334
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	358	1634	1634	1364	1506	1334
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	146	313	810	1340	290	151
RTOR Reduction (vph)	0	0	0	64	0	118
Lane Group Flow (vph)	146	313	810	1276	290	33
Confl. Peds. (#/hr)	1			1		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	92.4	89.4	79.6	105.2	26.0	26.0
Actuated g/C Ratio	0.77	0.75	0.66	0.88	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	389	1217	1083	1223	326	289
v/s Ratio Prot	c0.04	0.19	0.50	c0.22	0.19	
v/s Ratio Perm	0.25			0.71		0.02
v/c Ratio	0.38	0.26	0.75	1.04	0.89	0.11
Uniform Delay, d1	19.5	4.8	13.5	7.4	45.6	37.7
Progression Factor	1.00	1.00	0.50	2.70	1.00	1.00
Incremental Delay, d2	0.6	0.5	2.4	30.6	28.3	0.8
Delay (s)	20.1	5.3	9.2	50.6	73.9	38.5
Level of Service	C	A	A	D	E	D
Approach Delay (s)		10.0	35.0		61.8	
Approach LOS		B	D		E	
Intersection Summary						
HCM 2000 Control Delay			35.1		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.00			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	5.0
Intersection Capacity Utilization			103.4%		ICU Level of Service	G
Analysis Period (min)			15			
c Critical Lane Group						

Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2034) Mitigated

	→	↘	←	↙	↗
Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑↑	↑	↑
Traffic Volume (vph)	461	78	1764	257	587
Future Volume (vph)	461	78	1764	257	587
Turn Type	NA	Perm	NA	Prot	Free
Protected Phases	2		6	4	
Permitted Phases		2			Free
Detector Phase	2	2	6	4	
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	
Minimum Split (s)	50.0	50.0	50.0	25.0	
Total Split (s)	89.0	89.0	89.0	31.0	
Total Split (%)	74.2%	74.2%	74.2%	25.8%	
Yellow Time (s)	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	3.0	
Lost Time Adjust (s)	-3.5	-3.5	-3.3	-5.0	
Total Lost Time (s)	2.5	2.5	2.7	2.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	87.5	87.5	87.3	28.0	120.0
Actuated g/C Ratio	0.73	0.73	0.73	0.23	1.00
v/c Ratio	0.22	0.08	0.87	0.80	0.48
Control Delay	2.7	0.1	6.7	61.5	1.2
Queue Delay	0.0	0.0	0.4	0.0	0.0
Total Delay	2.7	0.1	7.1	61.5	1.2
LOS	A	A	A	E	A
Approach Delay	2.4		7.1	19.6	
Approach LOS	A		A	B	

Intersection Summary

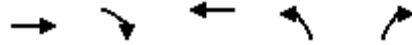
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 78.0%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service D

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2034) Mitigated



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	490	83	1960	282	645
v/c Ratio	0.22	0.08	0.87	0.80	0.48
Control Delay	2.7	0.1	6.7	61.5	1.2
Queue Delay	0.0	0.0	0.4	0.0	0.0
Total Delay	2.7	0.1	7.1	61.5	1.2
Queue Length 50th (m)	8.4	0.0	75.0	62.2	0.0
Queue Length 95th (m)	m10.3	m0.0	26.5	#101.9	0.0
Internal Link Dist (m)	291.5		40.0	145.1	
Turn Bay Length (m)		70.0			
Base Capacity (vph)	2263	1013	2258	363	1348
Starvation Cap Reductn	0	0	63	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.08	0.89	0.78	0.48

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2034) Mitigated



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	461	78	0	1764	257	587
Future Volume (vph)	461	78	0	1764	257	587
Ideal Flow (vphp)	1690	1690	1690	1690	1640	1640
Total Lost time (s)	2.5	2.5		2.7	2.0	-1.0
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	3104	1359		3104	1506	1348
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	3104	1359		3104	1506	1348
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	490	83	0	1960	282	645
RTOR Reduction (vph)	0	22	0	0	0	0
Lane Group Flow (vph)	490	61	0	1960	282	645
Confl. Peds. (#/hr)		1	1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	84.0	84.0		84.0	23.0	120.0
Effective Green, g (s)	87.5	87.5		87.3	28.0	120.0
Actuated g/C Ratio	0.73	0.73		0.73	0.23	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	2263	990		2258	351	1348
v/s Ratio Prot	0.16			c0.63	c0.19	
v/s Ratio Perm		0.04				0.48
v/c Ratio	0.22	0.06		0.87	0.80	0.48
Uniform Delay, d1	5.2	4.6		12.1	43.4	0.0
Progression Factor	0.47	0.00		0.29	1.00	1.00
Incremental Delay, d2	0.2	0.1		2.8	12.5	1.2
Delay (s)	2.7	0.1		6.2	55.9	1.2
Level of Service	A	A		A	E	A
Approach Delay (s)	2.3			6.2	17.9	
Approach LOS	A			A	B	

Intersection Summary

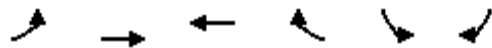
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.7
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

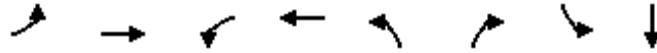
PM Peak Period
Future Total (2034) Mitigated



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	1027	2136	21	16	21
Future Volume (Veh/h)	21	1027	2136	21	16	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	24	1154	2297	23	17	23
Pedestrians					3	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)		111	118			
pX, platoon unblocked	0.26				0.28	0.26
vC, conflicting volume	2323				2936	1163
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410				2143	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				0	92
cM capacity (veh/h)	302				11	284
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	24	577	577	1531	789	40
Volume Left	24	0	0	0	0	17
Volume Right	0	0	0	0	23	23
cSH	302	1700	1700	1700	1700	25
Volume to Capacity	0.08	0.34	0.34	0.90	0.46	1.62
Queue Length 95th (m)	2.0	0.0	0.0	0.0	0.0	37.6
Control Delay (s)	17.9	0.0	0.0	0.0	0.0	645.4
Lane LOS	C					F
Approach Delay (s)	0.4			0.0		645.4
Approach LOS						F
Intersection Summary						
Average Delay			7.4			
Intersection Capacity Utilization			69.7%		ICU Level of Service	C
Analysis Period (min)			15			

Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↗	↖	↗
Traffic Volume (vph)	11	978	39	1991	154	59	10	0
Future Volume (vph)	11	978	39	1991	154	59	10	0
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	Perm	NA
Protected Phases		2	1	6				8
Permitted Phases	2		6		4	4	8	
Detector Phase	2	2	1	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0	11.0	32.0	38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0	11.0	80.0	40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%	9.2%	66.7%	33.3%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.9	-2.9	-3.5	-3.5	-4.4	-4.4	-1.2	-1.2
Total Lost Time (s)	3.1	3.1	0.5	2.5	2.6	2.6	5.8	5.8
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	81.5	81.5	92.6	90.6	24.3	24.3	21.1	21.1
Actuated g/C Ratio	0.68	0.68	0.77	0.76	0.20	0.20	0.18	0.18
v/c Ratio	0.19	0.47	0.11	0.86	0.60	0.18	0.04	0.04
Control Delay	15.6	7.6	4.1	10.0	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0
Total Delay	15.6	7.6	4.1	11.7	51.7	9.5	37.7	0.2
LOS	B	A	A	B	D	A	D	A
Approach Delay		7.7		11.5				17.4
Approach LOS		A		B				B

Intersection Summary

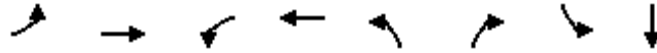
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 12.2
 Intersection LOS: B
 Intersection Capacity Utilization 77.5%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



Queues
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1110	44	2258	167	64	11	13
v/c Ratio	0.19	0.47	0.11	0.86	0.60	0.18	0.04	0.04
Control Delay	15.6	7.6	4.1	10.0	51.7	9.5	37.7	0.2
Queue Delay	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0
Total Delay	15.6	7.6	4.1	11.7	51.7	9.5	37.7	0.2
Queue Length 50th (m)	0.7	38.8	2.0	67.4	36.0	0.0	2.2	0.0
Queue Length 95th (m)	m2.7	55.7	m2.8	m300.6	54.1	10.4	6.8	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	62	2351	404	2630	427	521	411	484
Starvation Cap Reductn	0	0	0	214	0	0	0	0
Spillback Cap Reductn	0	0	0	19	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.47	0.11	0.93	0.39	0.12	0.03	0.03

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 4: JBH Access & Northshore Blvd

PM Peak Period
 Future Total (2034) Mitigated



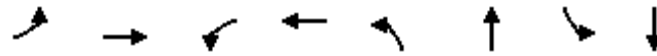
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	978	54	39	1991	19	154	0	59	10	0	12
Future Volume (vph)	11	978	54	39	1991	19	154	0	59	10	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		0.5	2.5		2.6		2.6	5.8	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1745	3458		1710	3484		1741		1533	1445	1539	
Flt Permitted	0.05	1.00		0.21	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	91	3458		371	3484		1373		1533	1445	1539	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1052	58	44	2237	21	167	0	64	11	0	13
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	51	0	11	0
Lane Group Flow (vph)	12	1108	0	44	2258	0	167	0	13	11	2	0
Confl. Peds. (#/hr)	1		2	2		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	100%	0%	20%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	77.9	77.9		87.1	87.1		19.9		19.9	19.9	19.9	
Effective Green, g (s)	80.8	80.8		90.6	90.6		24.3		24.3	21.1	21.1	
Actuated g/C Ratio	0.67	0.67		0.75	0.75		0.20		0.20	0.18	0.18	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	61	2328		377	2630		278		310	254	270	
v/s Ratio Prot		0.32		0.01	c0.65						0.00	
v/s Ratio Perm	0.13			0.08			c0.12		0.01	0.01		
v/c Ratio	0.20	0.48		0.12	0.86		0.60		0.04	0.04	0.01	
Uniform Delay, d1	7.4	9.4		4.9	10.2		43.4		38.5	41.1	40.8	
Progression Factor	0.71	0.67		0.90	0.63		1.00		1.00	1.00	1.00	
Incremental Delay, d2	6.8	0.7		0.1	2.0		3.6		0.1	0.1	0.0	
Delay (s)	12.0	6.9		4.5	8.4		47.1		38.5	41.1	40.8	
Level of Service	B	A		A	A		D		D	D	D	
Approach Delay (s)		7.0			8.3			44.7			41.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2034) Mitigated

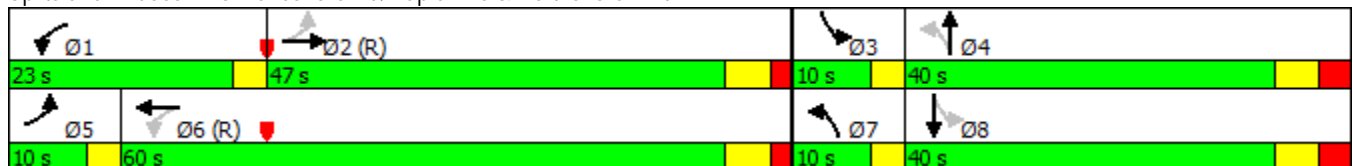


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↕	↖	↕	↖	↕	↖	↕
Traffic Volume (vph)	206	799	271	1473	89	106	80	176
Future Volume (vph)	206	799	271	1473	89	106	80	176
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases	2		6		4		8	
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	6.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0
Minimum Split (s)	10.0	38.0	10.0	38.0	10.0	40.0	10.0	40.0
Total Split (s)	10.0	47.0	23.0	60.0	10.0	40.0	10.0	40.0
Total Split (%)	8.3%	39.2%	19.2%	50.0%	8.3%	33.3%	8.3%	33.3%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0
Lost Time Adjust (s)	-5.0	-5.0	-4.4	-4.4	-3.8	-3.8	-3.9	-3.9
Total Lost Time (s)	-2.0	1.0	-1.4	1.6	-0.8	3.2	-0.9	3.1
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	71.0	54.3	75.2	59.4	46.4	32.5	46.5	32.6
Actuated g/C Ratio	0.59	0.45	0.63	0.50	0.39	0.27	0.39	0.27
v/c Ratio	0.80	0.61	0.66	0.98	0.41	0.73	0.32	0.99dr
Control Delay	61.8	23.5	21.2	47.1	28.2	37.6	25.7	36.1
Queue Delay	0.0	0.0	0.0	20.1	0.0	0.0	0.0	0.0
Total Delay	61.8	23.5	21.2	67.2	28.2	37.6	25.7	36.1
LOS	E	C	C	E	C	D	C	D
Approach Delay		31.1		60.4		35.7		35.0
Approach LOS		C		E		D		D

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 45.3
 Intersection LOS: D
 Intersection Capacity Utilization 96.1%
 ICU Level of Service F
 Analysis Period (min) 15
 dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2034) Mitigated



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	231	945	291	1669	97	366	87	720
v/c Ratio	0.80	0.61	0.66	0.98	0.41	0.73	0.32	0.99dr
Control Delay	61.8	23.5	21.2	47.1	28.2	37.6	25.7	36.1
Queue Delay	0.0	0.0	0.0	20.1	0.0	0.0	0.0	0.0
Total Delay	61.8	23.5	21.2	67.2	28.2	37.6	25.7	36.1
Queue Length 50th (m)	45.4	52.4	29.0	199.0	14.4	58.3	12.9	64.0
Queue Length 95th (m)	#94.0	64.3	58.0	#256.2	24.7	89.3	22.6	82.8
Internal Link Dist (m)		242.3		148.2		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	287	1553	489	1708	234	557	273	1052
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	117	0	0	0	2
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.61	0.60	1.05	0.41	0.66	0.32	0.69

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

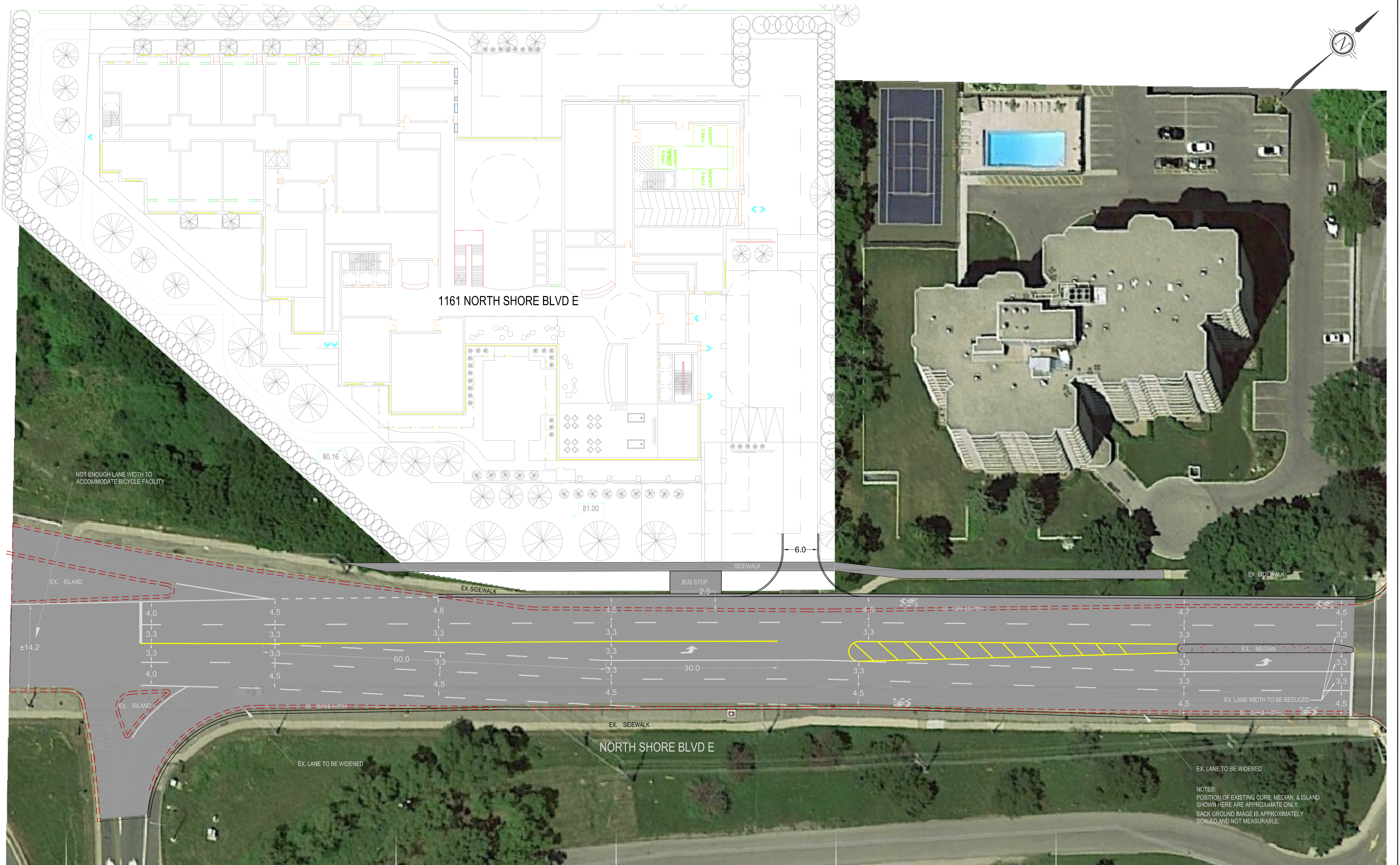
PM Peak Period
Future Total (2034) Mitigated



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	206	799	42	271	1473	79	89	106	231	80	176	487
Future Volume (vph)	206	799	42	271	1473	79	89	106	231	80	176	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	-2.0	1.0		-1.4	1.6		-0.8	3.2		-0.9	3.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	3427		1744	3449		1727	1604		1675	3063	
Flt Permitted	0.07	1.00		0.17	1.00		0.15	1.00		0.23	1.00	
Satd. Flow (perm)	136	3427		314	3449		267	1604		409	3063	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	231	898	47	291	1584	85	97	115	251	87	191	529
RTOR Reduction (vph)	0	3	0	0	3	0	0	68	0	0	117	0
Lane Group Flow (vph)	231	942	0	291	1666	0	97	298	0	87	603	0
Confl. Peds. (#/hr)	11		8	8		11	6		15	15		6
Heavy Vehicles (%)	0%	1%	0%	0%	0%	4%	1%	0%	1%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	59.6	49.2		68.3	54.9		35.8	28.8		35.6	28.7	
Effective Green, g (s)	69.6	54.2		72.7	59.3		42.5	32.6		42.6	32.6	
Actuated g/C Ratio	0.58	0.45		0.61	0.49		0.35	0.27		0.36	0.27	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	285	1547		434	1704		225	435		259	832	
v/s Ratio Prot	c0.10	0.27		c0.11	c0.48		c0.04	0.19		0.03	c0.20	
v/s Ratio Perm	0.37			0.29			0.11			0.09		
v/c Ratio	0.81	0.61		0.67	0.98		0.43	0.68		0.34	0.99dr	
Uniform Delay, d1	35.1	24.9		15.7	29.7		28.3	39.1		27.8	39.6	
Progression Factor	1.46	0.82		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.7	1.7		4.0	17.1		1.3	4.4		0.8	3.2	
Delay (s)	66.1	22.1		19.7	46.8		29.7	43.5		28.6	42.8	
Level of Service	E	C		B	D		C	D		C	D	
Approach Delay (s)		30.7			42.8			40.6			41.3	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	2.3
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

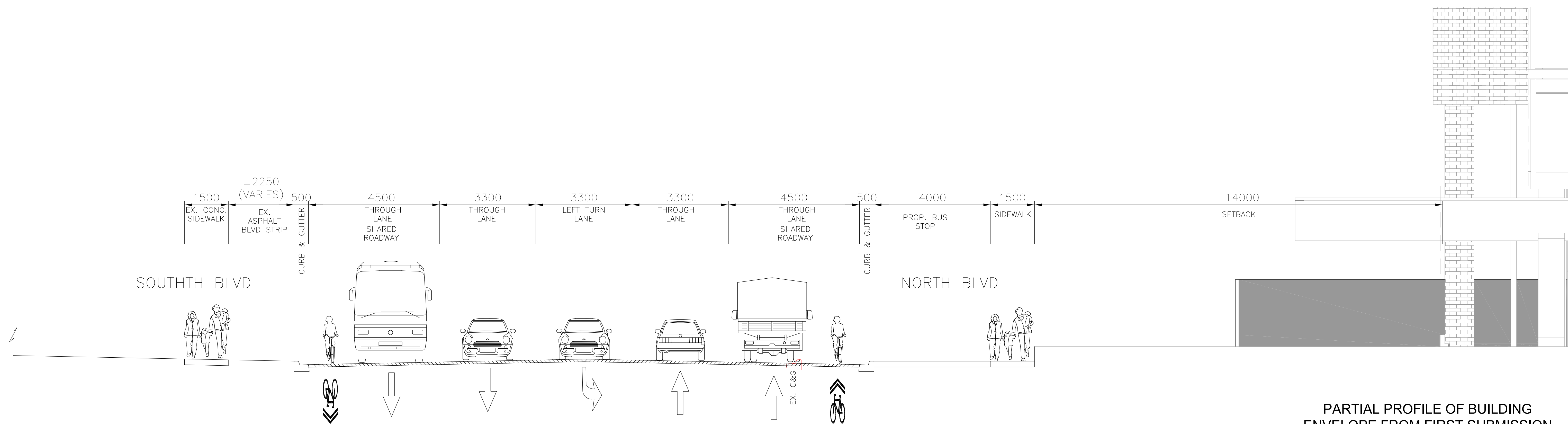
Appendix N – Proposed North Shore Boulevard
Eastbound Left Turn Lane Option



PROPOSED LEFT TURN LANE OPTION FOR 1161 NORTH SHORE BOULEVARD EAST

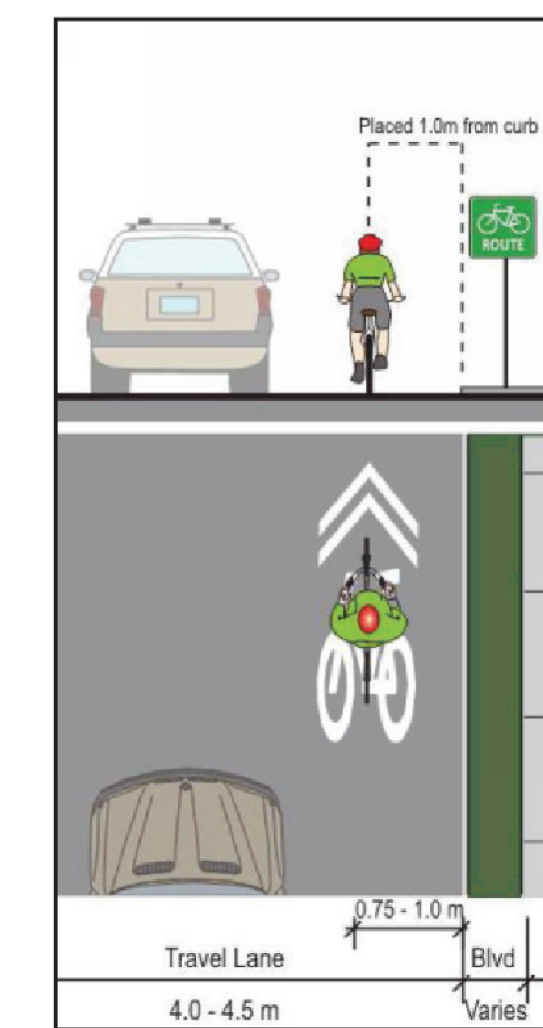
PRELIMINARY
 FOR DISCUSSION ONLY
 SK-1
 SCALE : N.T.S

Appendix O – Cross Section Profile of Proposed Left
Turn Storage Lane Option for Subject Site



**PROPOSED LEFT TURN LANE
OPTION FOR 1161 NORTH SHORE
BOULEVARD EAST**

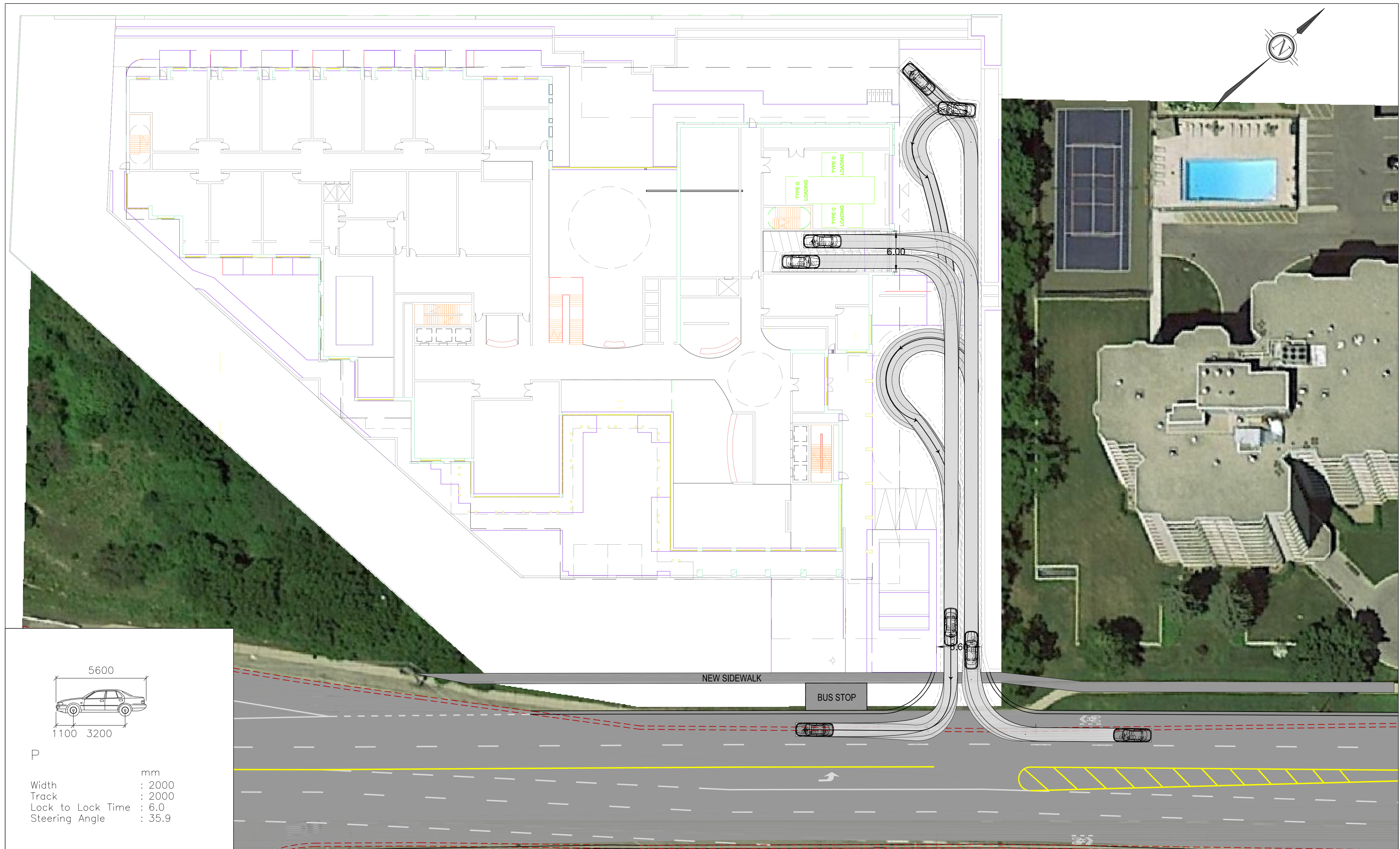
PARTIAL PROFILE OF BUILDING
ENVELOPE FROM FIRST SUBMISSION



**TYPICAL DETAILS
SHARED BICYCLE LANE**

Appendix P – AutoTURN Vehicle Turning Templates

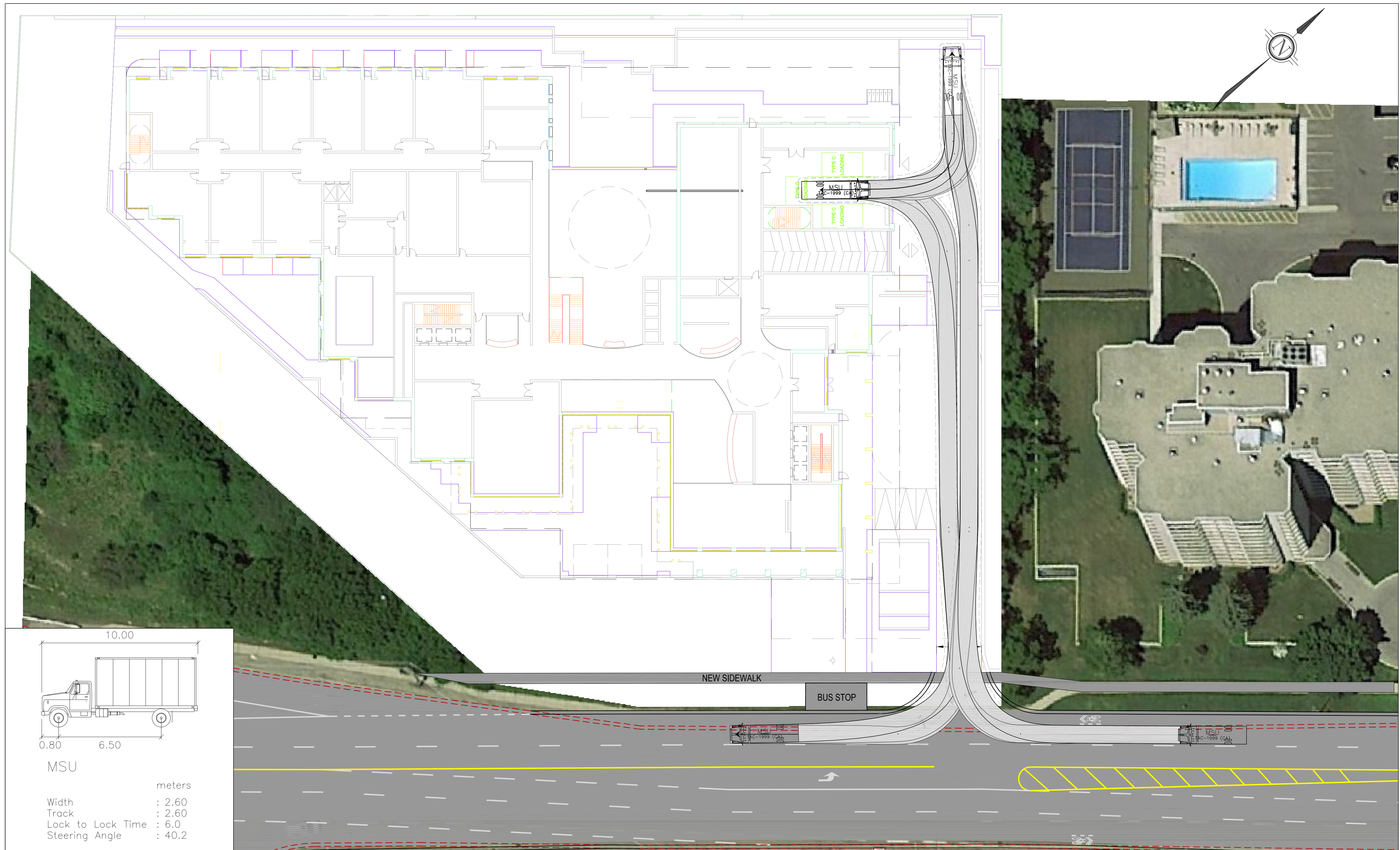
SEDAN SIMULATION



1161 NORTH SHORE BLVD E AUTO TURN SIMULATIONS

SCALE : N.T.S
SHEET 5/5

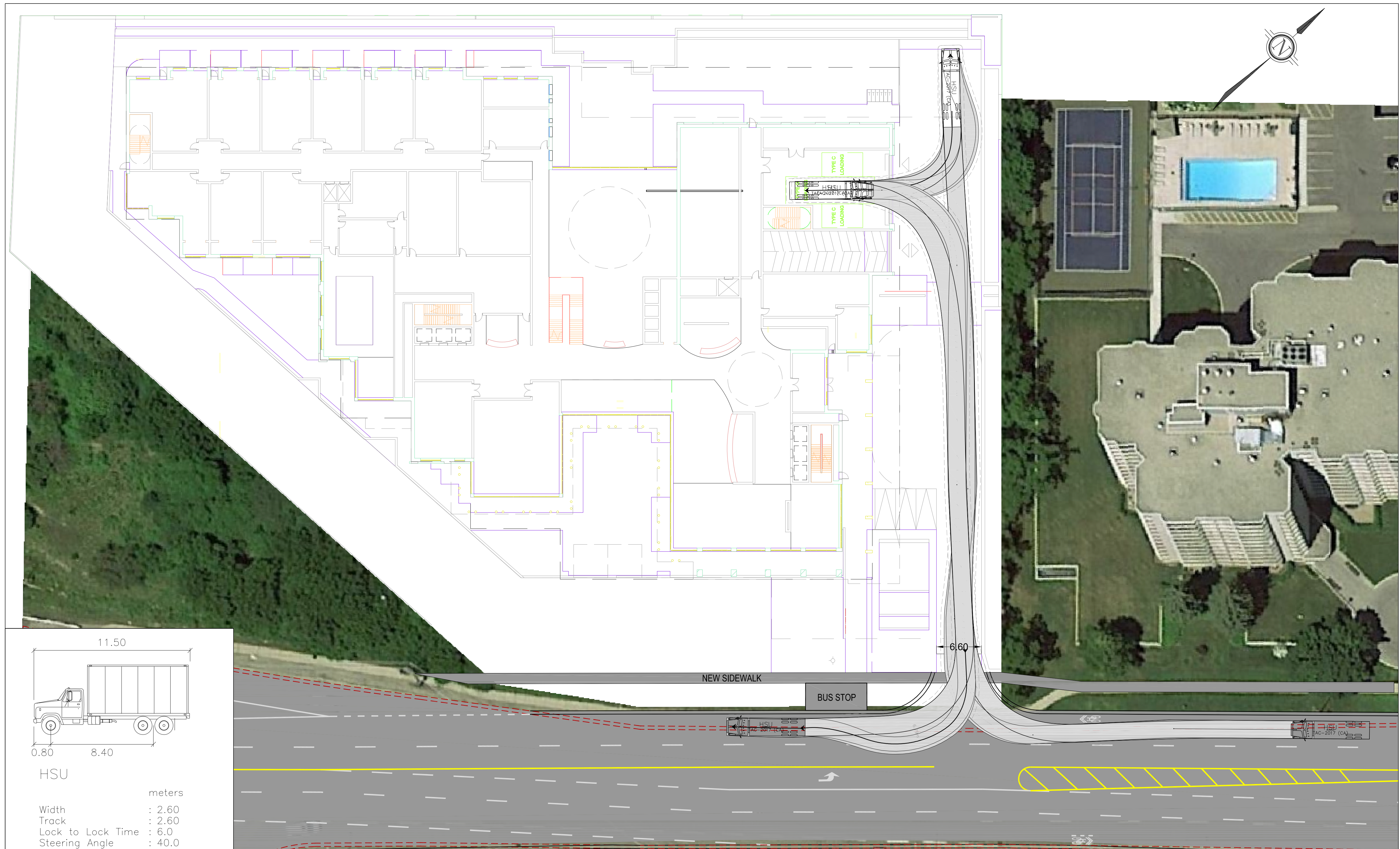
COMMERCIAL TRUCK SIMULATION



1161 NORTH SHORE BLVD E AUTO TURN SIMULATIONS

SCALE : N.T.S
SHEET 2/5

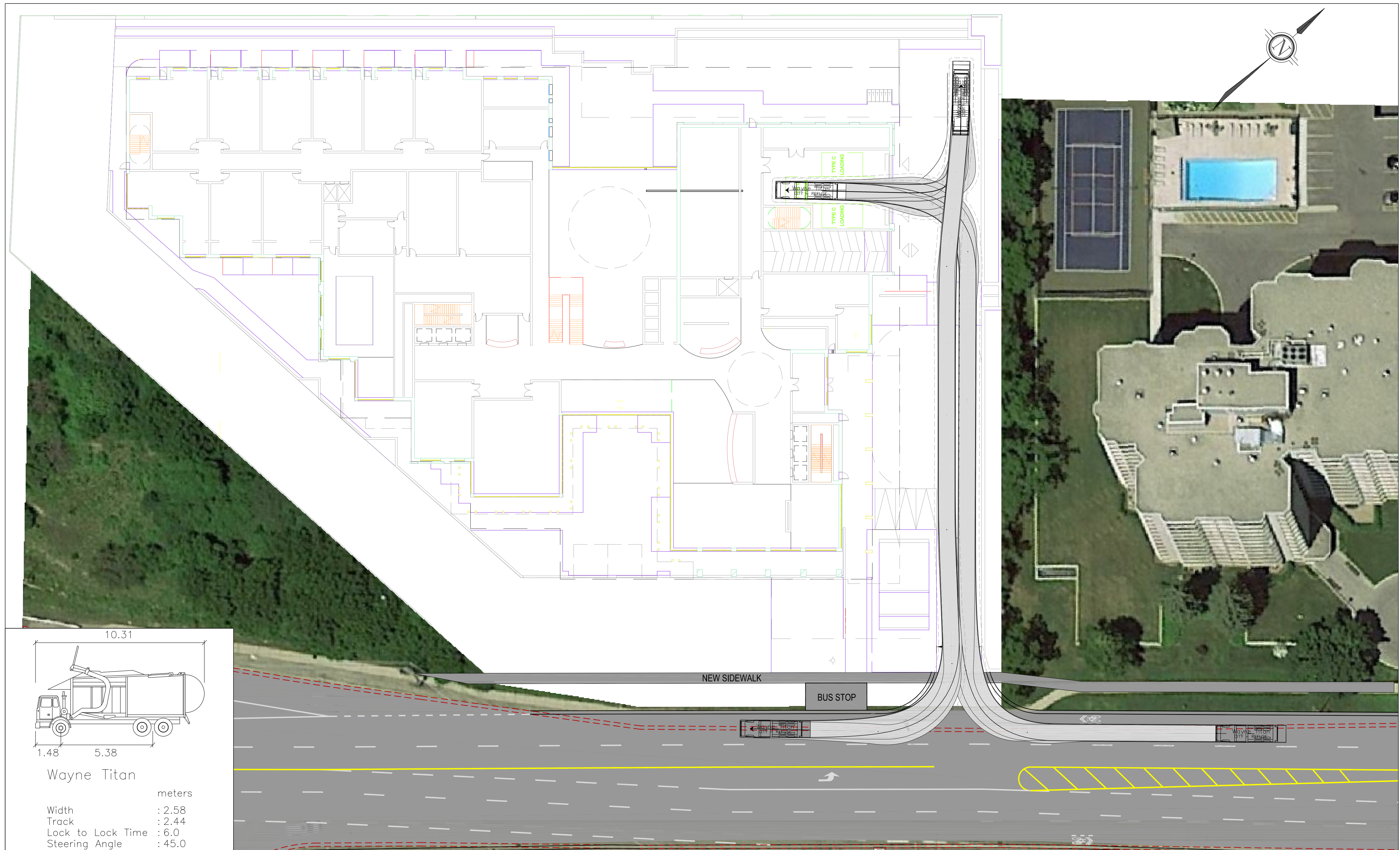
COMMERCIAL TRUCK (HSU) SIMULATION



1161 NORTH SHORE BLVD E
AUTO TURN SIMULATIONS

SCALE : N.T.S
SHEET 5/5

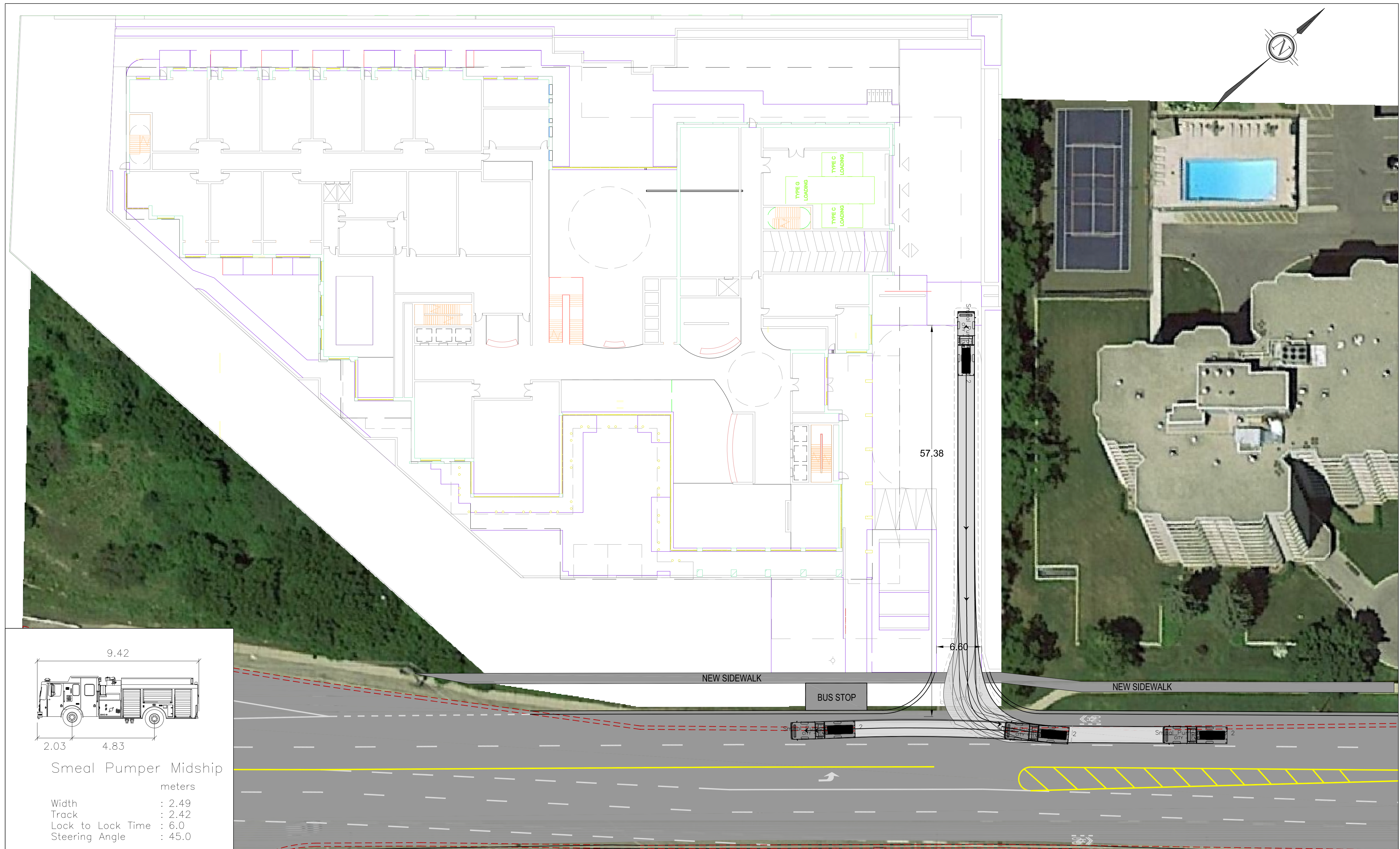
FRONT-LOAD GARBAGE TRUCK SIMULATION



1161 NORTH SHORE BLVD E
AUTO TURN SIMULATIONS

SCALE : N.T.S
SHEET 3/5

FIRE TRUCK - PUMPER SIMULATION



9.42
2.03 4.83

Smeal Pumper Midship

	units
Width	: 2.49 meters
Track	: 2.42
Lock to Lock Time	: 6.0
Steering Angle	: 45.0

1161 NORTH SHORE BLVD E
AUTO TURN SIMULATIONS

SCALE : N.T.S
SHEET 1/5