418 & 422 Guelph Line
Burlington, Ontario
Transportation Impact Study & Parking Study

Paradigm Transportation Solutions Limited

October 2019

ptsl.com

Project Summary

Project Number
190014

October 2019

Client
Waldemar Limited Partnership
3410 South Service Road, Suite G5
Burlington ON L4N 3T2

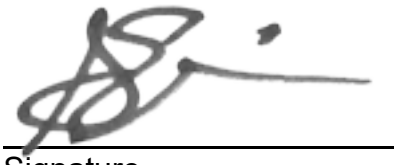
Client Contact
Kyle Bittman

Consultant Project Team
Stew Elkins, BES
Jill Juhlke, C.E.T.

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 905.381.2229
www.ptsl.com

418 & 422 Guelph Line, Burlington, Ontario Transportation Impact Study & Parking Study

Signatures and Seals



Signature

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Executive Summary

Content

Waldemar Limited Partnership retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Assessment for the proposed redevelopment of 418 & 422 Guelph Line in the City of Burlington, Ontario.

The purpose of this study is to determine the net impacts of the development traffic on the surrounding road network, document the parking needs of the development and determine the adequacy of the parking supply.

The findings, conclusions and recommendations of this study are summarized below and outlined in detail in the body of the report.

Development Concept

The subject site is currently occupied by a former bowling alley and two-storey commercial/residential building. Access is currently provided via three all-moves driveway connections to Guelph Line. The existing land uses and driveway connections will be removed to facilitate redevelopment of the site.

The site is proposed to be redeveloped to comprise a 13-storey building with 170 residential units. Access is proposed via one all-moves driveway connection to Guelph Line.

A total of 219 parking spaces are proposed to service the site: within two underground parking levels and on floors one and two (above-grade). Internal lockers will be provided underground and on the second floor to accommodate bicycle storage. Short-term bike parking (bike rack) will be located adjacent to the main entrance.

Conclusions

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

Transportation Overview

- Under existing conditions, all intersections in the study area are operating at acceptable levels of service and well within capacity. No critical movements are noted;

- The redevelopment is forecast to generate 48 trips in the AM peak hour and 53 trips in the PM peak hour after accounting for trips by transit and other alternate modes;
- Under 2024 background traffic conditions, in the PM peak hour, the eastbound left-turn movement on New Street at Guelph Line is forecast to operate at LOS F and with a v/c ratio of 1.00. The 95th percentile back of queue is forecast to exceed available lane storage by approximately 11 metres;
- Under 2024 total traffic conditions, in the PM peak hour, the eastbound left-turn movement on New Street at Guelph Line is forecast to operate the same as under background conditions;
- The proposed driveway connection to Guelph Line is forecast to operate with acceptable levels of service and within capacity during both peak hours;
- Overall, the development of the subject site is anticipated to have a minimal impact on traffic operations at the study area intersections;
- With optimization of the signal timing and phasing plan at New Street and Guelph Line, the critical eastbound left-turn movement is forecast to operate with an acceptable LOS and v/c ratio; and
- Northbound left-turns from Guelph Line into the site can be accommodated within the existing two-way left-turn lane on Guelph Line north of St. Clair Avenue.

Parking Overview

Under the existing By-law, a total of 284 spaces are required for the site. The development is proposing to provide 219 spaces. This is a variance of 65 spaces, or 23% of the By-law required supply.

Under the amended By-law, a total of 226 spaces are required for the site. The development is proposing to provide 219 spaces. This is a variance of seven spaces, or 3% of the By-law required supply.

The results of the methodologies utilized in the parking analysis provide a general understanding of parking behaviour. The analysis indicates that the proposed supply of 219 parking spaces will exceed the parking demand for the following reasons:

- The current By-law parking requirement of 284 spaces is conservative compared to actual needs. This is substantiated by the approved reduction in residential parking rates contained within the amended By-law 2020.XXX, the ITE data and the TTS data;



- Under the ITE Parking Generation Manual average rates, the subject site will require 0.98 parking spaces per dwelling unit (inclusive of visitors), or a total supply of 167 spaces. This results in a surplus of 52 spaces compared to the proposed parking supply of 219 spaces;
- Vehicle ownership rates and assume parking demand for apartments within the surrounding area are 0.86 autos per unit. On this basis, a total of 146 residential parking spaces will be required to service the residential parking demand of the site. This results in a surplus of 74 spaces. When the visitor parking requirements of 60 spaces under the current in-force By-law and 43 spaces under the amended By-law are applied, it results in an overall parking surplus of 13 and 30 spaces respectively;
- There is an established sidewalk network through the neighbourhood which provides good connectivity to surrounding streets and transit services on New Street and Guelph Line which may help to reduce auto ownership and assumed parking demand; and
- Implementation of the recommended parking management initiatives will help ensure an adequate supply of both residential and visitor parking is provided at the site.

Recommendations

Based on the findings of this study, it is recommended that:

- The City of Burlington monitor the signal timing plan at the intersection of Guelph Line and New Street; and
- The City of Burlington support the proposed parking supply of 219 parking spaces, recognizing the development's target market and the proximity to local and inter-regional transit services; and
- The applicant implement the parking management initiatives.

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1 Introduction

1.1 Overview

Waldemar Limited Partnership retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study and Parking Study for the proposed redevelopment of 418 & 422 Guelph Line in the City of Burlington, Ontario. **Figure 1.1** illustrates the location of the subject site and study area.

The subject site is currently occupied by a former bowling alley and two-storey commercial/residential dwelling. Access is currently provided via three all-moves driveway connections to Guelph Line. The existing land uses and driveway connections will be removed to permit redevelopment of the site.

The redevelopment is proposed to comprise a 13-storey building with 170 residential units. Access is proposed via one all-moves driveway connection to Guelph Line.

1.2 Purpose and Scope

The purpose of this study is to determine the transportation impacts of the development traffic on the surrounding road network and to assess the adequacy of the proposed parking supply. This study will identify any improvements necessary to accommodate the development of the site.

More specifically, the scope of this study is to:

- Document the current traffic and site conditions in the vicinity of the development;
- Estimate the background traffic growth in the area;
- Estimate the additional traffic forecast to be generated by the redevelopment of the subject site;
- Assign the forecast traffic to the surrounding road network based on the existing travel patterns in the study area;
- Assess the AM and PM peak hour future background and total traffic within the study area for a horizon year five years from the date of study (2024);
- Identify any operational or safety concerns and any mitigation measures that may be required to improve operations;
- Review the City of Burlington's Zoning By-Law requirements for parking;



- Provide a technical analysis using secondary source parking information to estimate the potential parking demand; and
- Review the adequacy of the proposed parking supply

Pre-study consultation was undertaken with City of Burlington (the City) Staff via e-mail in March 2019. **Appendix A** contains the pre-study correspondence.

This TIS has been carried out in general accordance with the Region of Halton's Transportation Impact Study Guidelines[1] and comments received from City Staff during pre-study consultation.

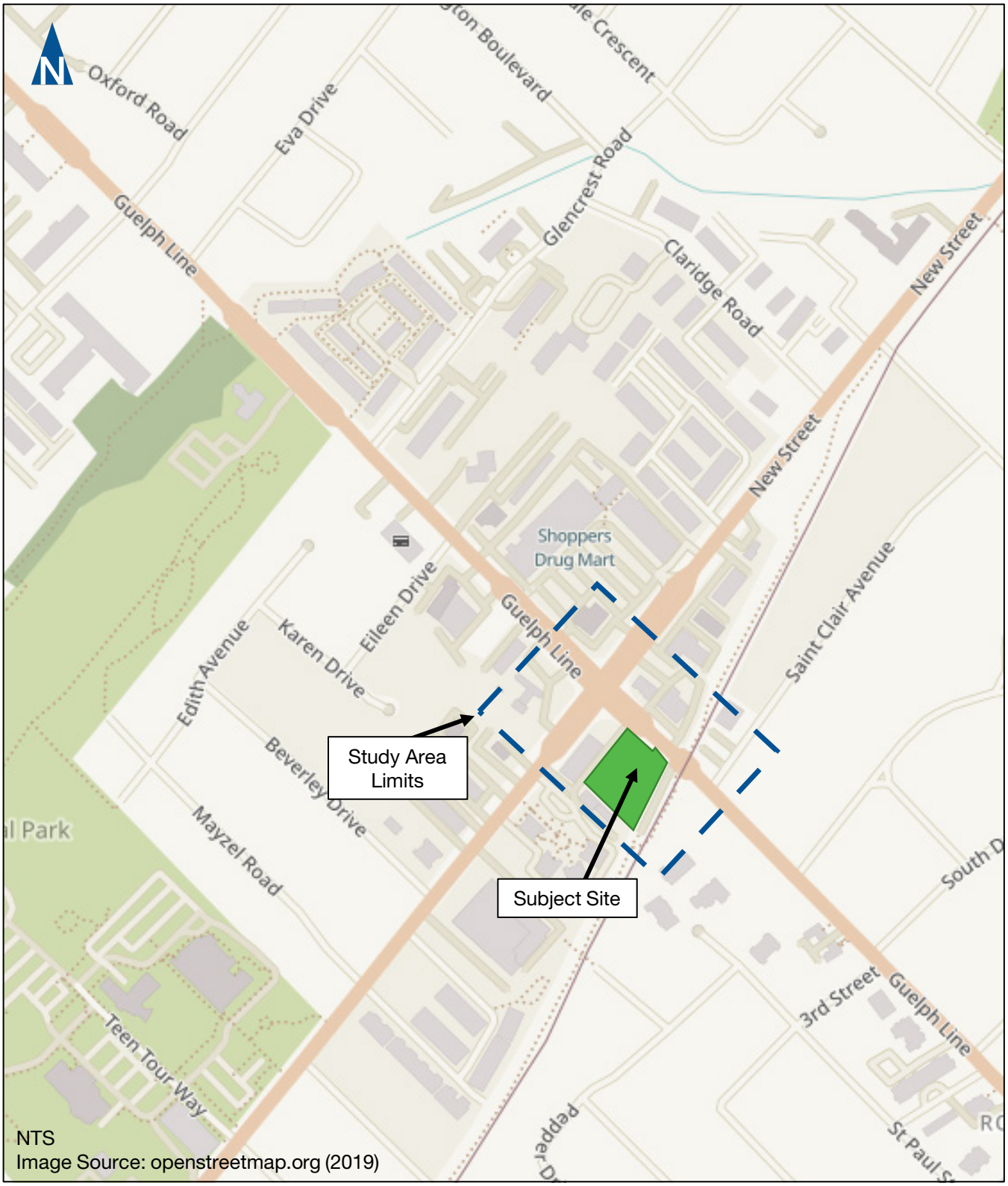
1.3 Study Area

The intersections evaluated in this study as confirmed by City Staff are as follows:

- Guelph Line and New Street;
- Guelph Line and St. Clair Avenue; and
- The site driveway connection to Guelph Line

[1] Regional Municipality of Halton. January 2015. *Transportation Impact Study Guidelines.*





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Location of Subject Site

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Figure 1.1

2 Existing Conditions

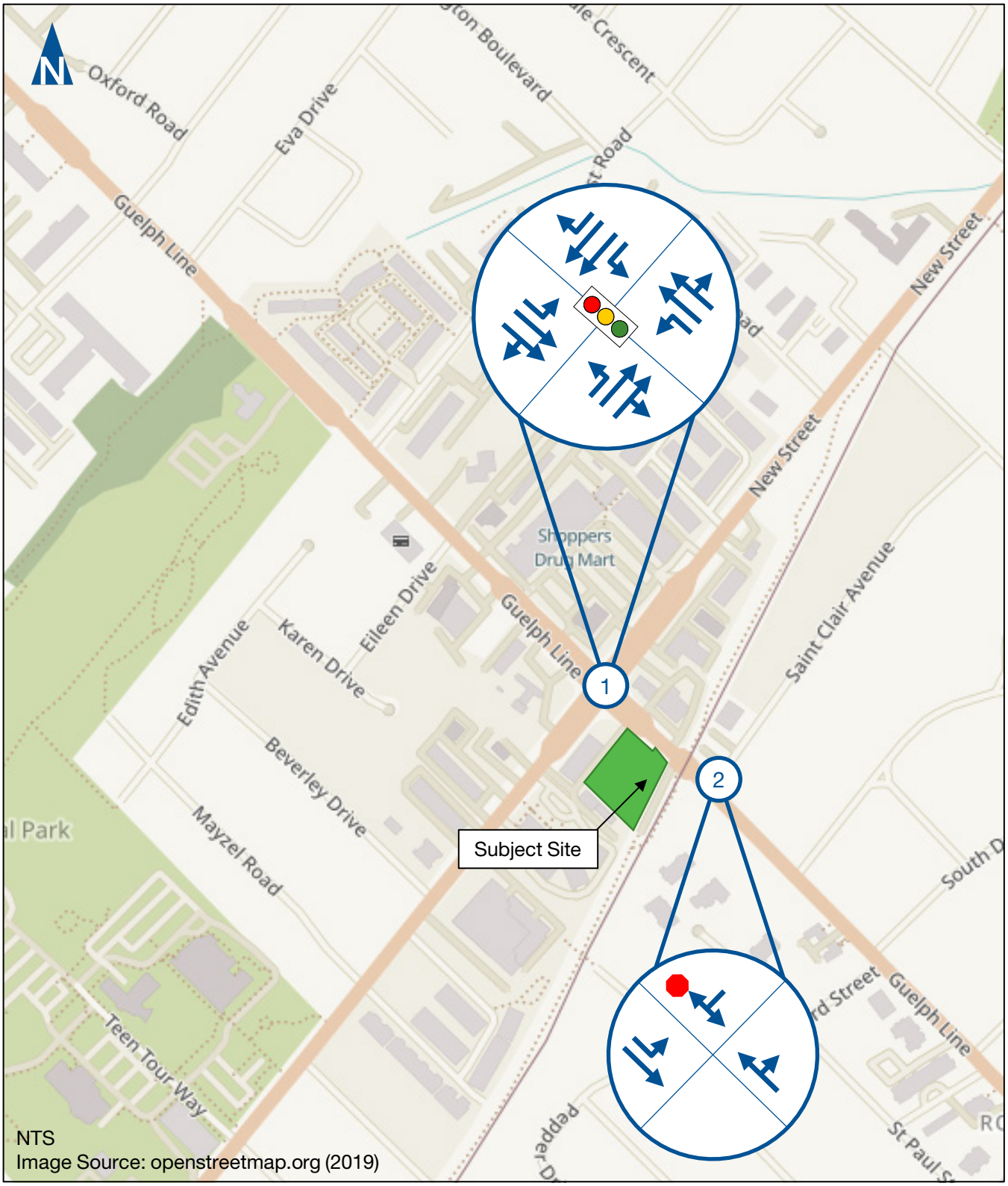
This section documents current traffic conditions, operational deficiencies and constraints experienced by the public travelling at the intersections within the study area. The operational deficiencies and constraints identified at this stage will be fundamental to the process of defining the required remedial measures.

2.1 Road Network

The main roadways within the vicinity of the subject site that have been assessed include Guelph Line, New Street and St. Clair Avenue all of which operate under the jurisdiction of the City of Burlington. The characteristics of these roadways are as follows:

- **Guelph Line** is a four-lane, north-south roadway with an urban cross-section and a posted speed limit of 50 km/h. North of St. Clair Avenue the roadway operates with two lanes per direction. South of St. Clair Avenue, the roadway narrows to a two-lane cross-section, with one travel lane per direction. A two-way left-turn lane is provided between St. Clair Avenue and New Street. No stopping is permitted on the roadway between New Street and St. Clair Avenue.
- **New Street** is a four-lane, east-west roadway with an urban cross-section and a posted speed limit of 50 km/h west of Guelph Line. The speed limit increases to 60 km/h east of Guelph Line. The roadway operates with two lanes per travel direction. No stopping is permitted on either side of the roadway within the vicinity of Guelph Line.
- **Saint (St.) Clair Avenue** is a two-lane, east-west roadway with an urban cross-section and a posted speed limit of 40 km/h. The roadway operates with one travel lane per direction. Trucks are restricted from using the roadway between Guelph Line and Rossmore Boulevard. Parking in not permitted on either side of the roadway between 8:00 AM and 6:00 PM, except on Sundays and holidays.

Figure 2.1 illustrates the existing lane configurations and traffic controls at the study area intersections.



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Existing Lane Configurations and Traffic Control

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Figure 2.1

2.2 Existing Transit Services

Burlington Transit is the public transit operator in the City of Burlington and operates six bus routes within the vicinity of the subject site. Four of these services provide direct connections to regional transit service (GO Transit) at the Burlington and Appleby GO stations. **Table 2.1** summarizes the route descriptions, service hours and headways. **Figure 2.2** illustrates the existing transit services in relation to the subject site.

The nearest transit stops are located immediately in front of the proposed development, and at the intersection of New Street and Guelph Line (approximately one to two-minute walk). **Figure 2.3** illustrates the existing transit stops near the subject site.

TABLE 2.1: BURLINGTON TRANSIT ROUTE & SERVICE INFORMATION

Route	Description	Day of Service	Service Hours	Headways
3/3A (Guelph-Downtown)	Service between Burlington GO Station and the Highway 407 Carpool Lot.	Weekdays	4:30 AM to 10:50 PM	30 minutes
		Saturday	6:30 AM to 10:50 PM	30 minutes
		Sunday	7:15 AM to 8:30 PM	30 – 60 minutes
10 (New-Maple)	Service between Burlington GO Station and Appleby GO Station.	Weekdays	4:50 AM to 10:55 PM	20-30 minutes
		Saturday	6:55 AM to 10:50 PM	30 minutes
		Sunday	7:55 AM to 10:20 PM	30 minutes
50 (Burlington South – Late Night Service)	Late night loop service from Burlington GO Station.	Weekdays	10:55 PM to 12:55 PM	60 minutes
		Saturday		
		Sunday	No Service	No Service
52 (Burlington Northwest – Late Night Service)	Late night loop service from Burlington Transit Downtown Terminal via Burlington GO Station.	Weekdays	10:55 PM to 12:55 PM	60 minutes
		Saturday		
		Sunday	No Service	No Service
Route 301 (Pinedale – Community Route)	Service between Seniors Centre and Lakeshore Place.	Weekdays	11:00 AM to 1:30 PM	60 minutes
		Saturday	No Service	No Service
		Sunday	No Service	No Service
Route 302 (Tansley Woods – Community Route)	Service between Seniors Centre and Tansley Woods Community Centre.	Weekdays	11:00 AM to 1:30 PM	60 minutes
		Saturday	No Service	No Service
		Sunday	No Service	No Service



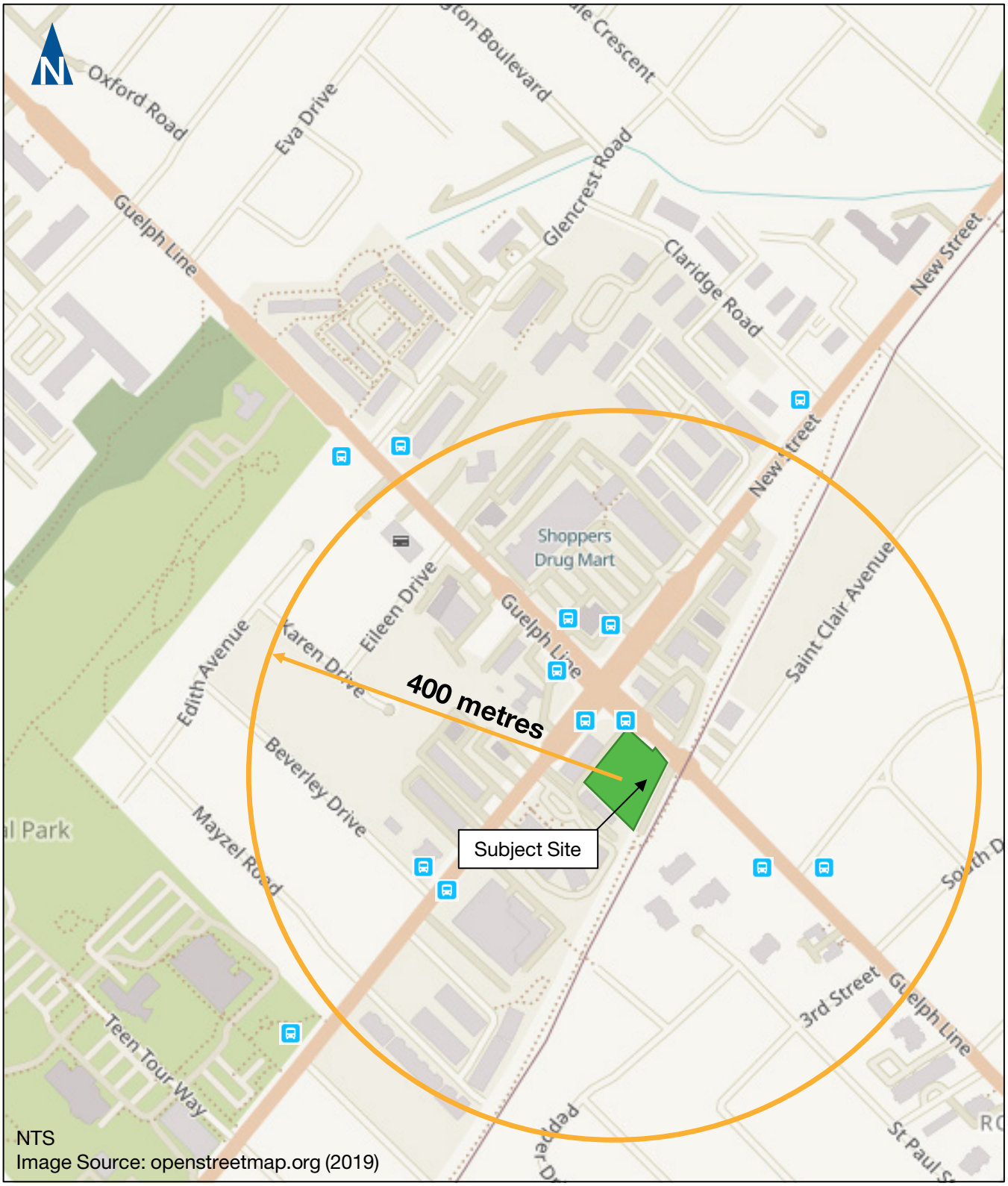
NTS
Image Source: burlingtontransit.ca (2019)

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Existing Transit Services

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Figure 2.2



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Location of Transit Stops

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Figure 2.3

2.3 Active Transportation

2.3.1 Walking

Sidewalks are provided on both sides of Guelph Line and New Street. These sidewalks are hard-surfaced are were noted to be in good condition during the site visit. The signalized intersection of Guelph Line and New Street also features delineated crosswalks and pedestrian signal heads on all four approaches. Pedestrian push buttons are not provided as the walk signal is provided during each cycle of the traffic signal.

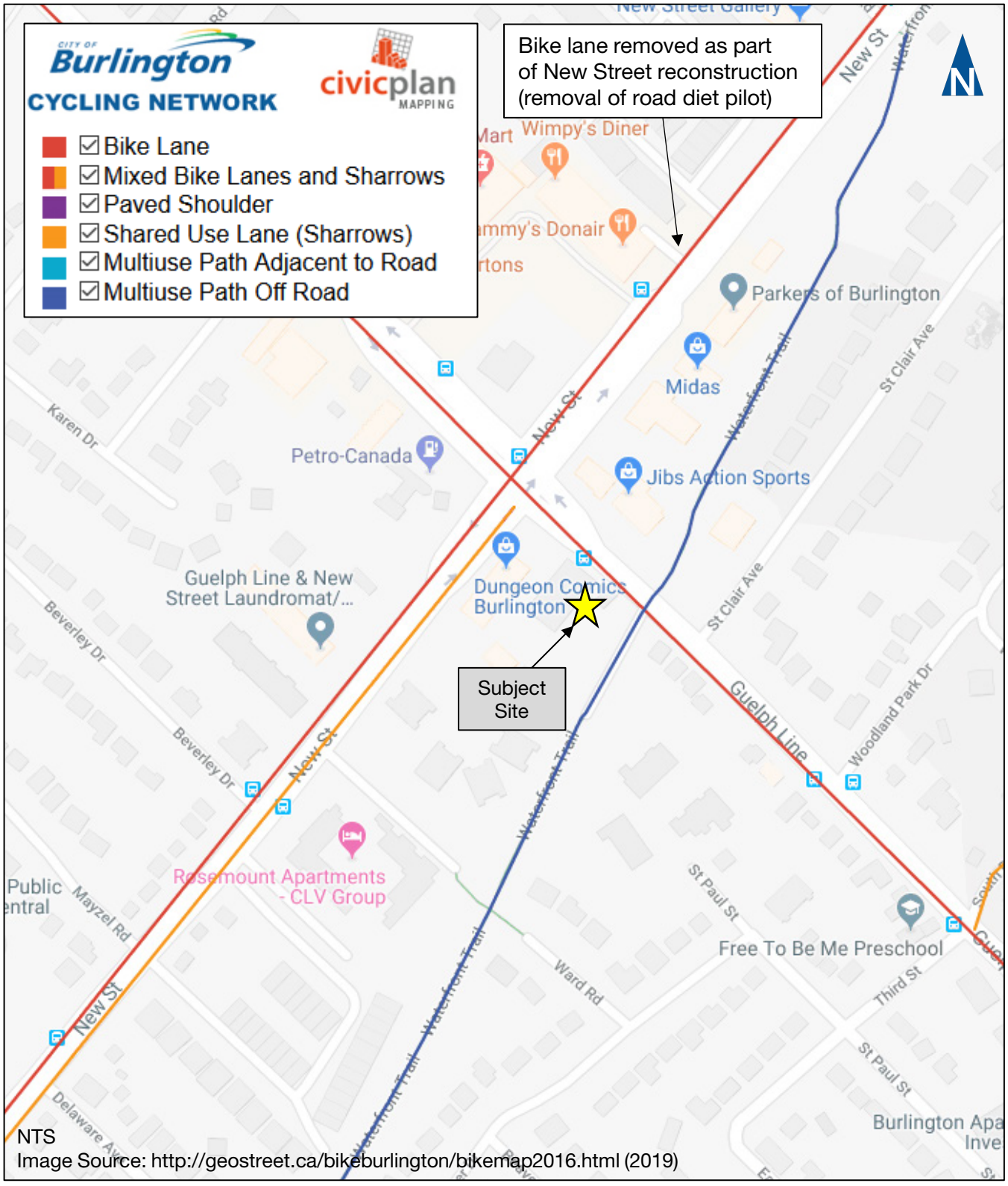
The subject site is also located immediately north of a spur of the Waterfront Trail. This paved multi-use path connects the Waterfront Trail in downtown Burlington to the Appleby GO Station.

2.3.2 Cycling

The City's cycling infrastructure consists of on-street and off-street facilities. On-street facilities include bike lanes, paved shoulders, and shared use lanes (sharrows). Off-road facilities include multi-use paths, either adjacent to a roadway, or on a designated routing off-road.

Bike lanes are provided on both sides of Guelph Line (north and south of New Street). Bike lanes are also provided on the north side of New Street, west of Guelph Line. Sharrows are provided on the south side of New Street west of Guelph Line; transitioning to a dedicated lane approximately 120 metres upstream (west) of Guelph Line. Cyclists are permitted to travel along the Waterfront Trail spur noted in **Section 2.3.1**.

Figure 2.4 illustrates the existing cycling infrastructure near the subject site.



NTS
Image Source: http://geostreet.ca/bikeburlington/bikemap2016.html (2019)

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Existing Cycling Network

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Figure 2.4

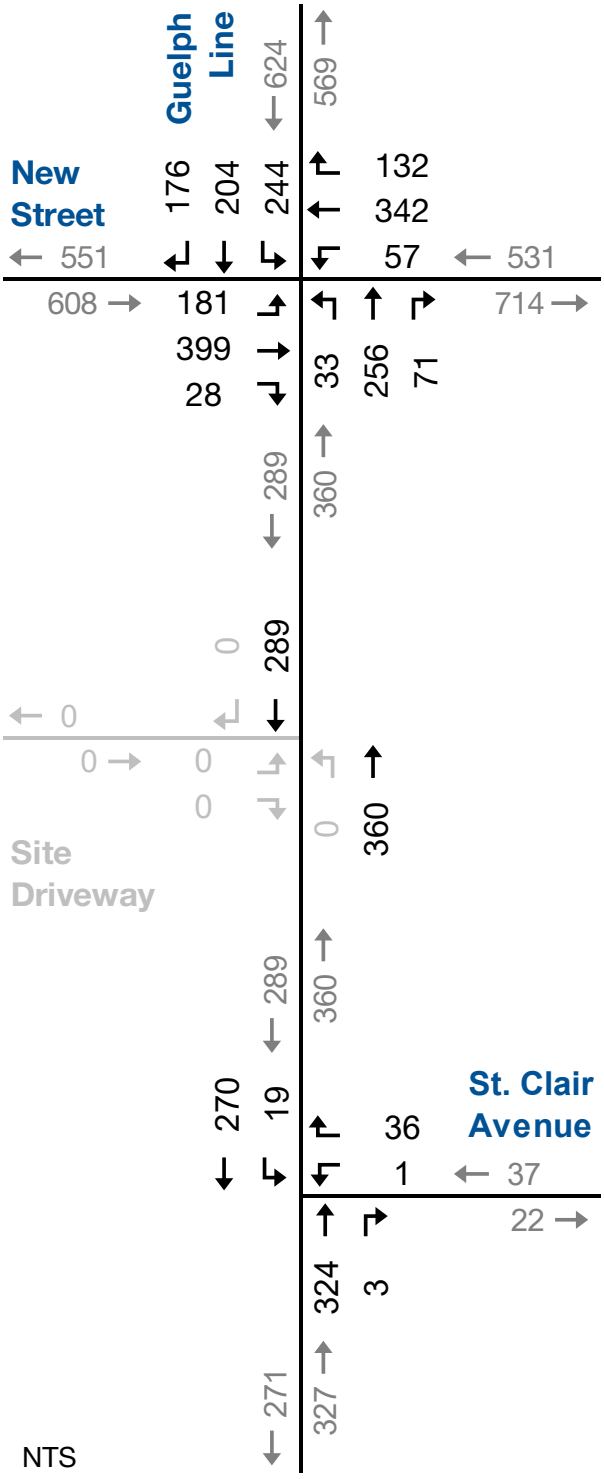
2.4 Existing Traffic Volumes

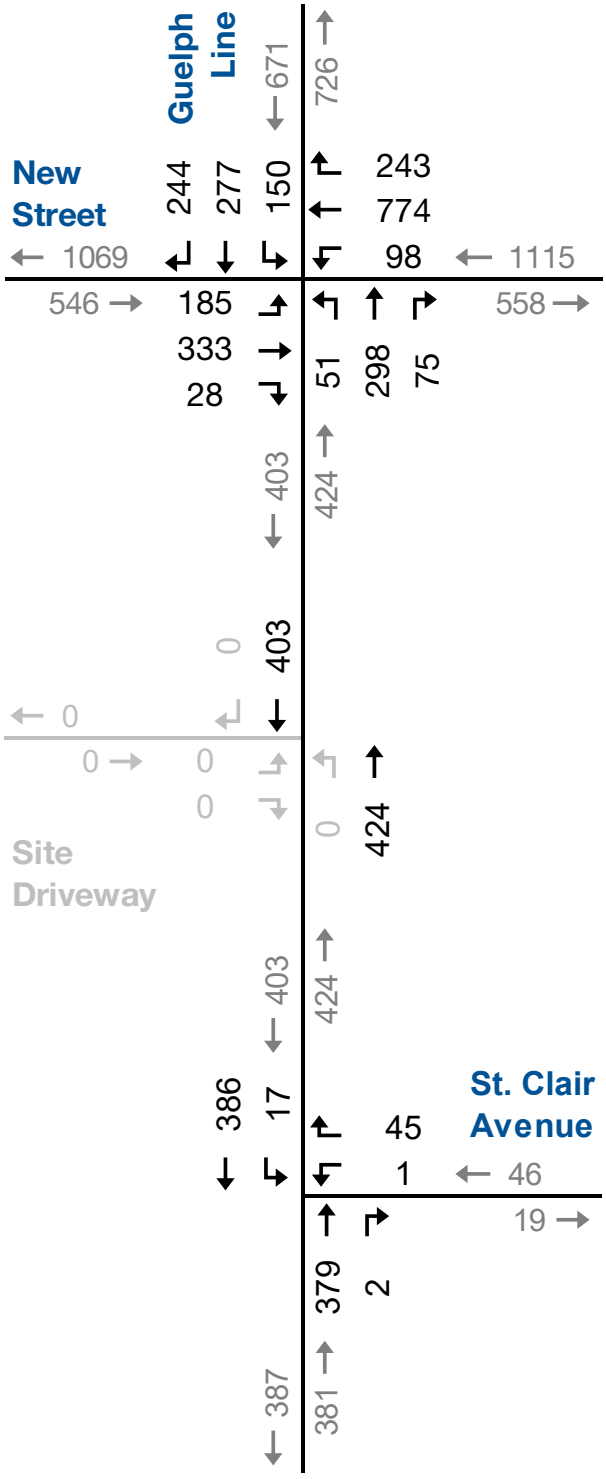
To assess intersection operations, turning movement counts (TMCs) are used to quantify the movement of vehicles, cyclists and pedestrians through the intersection. Existing TMC data at an intersection or road segment forms the foundation for analysis. The counts are usually taken over an eight-hour period to capture peak periods at an intersection. This facilitates completing level-of-service analysis under its worst case operating conditions.

Paradigm conducted eight-hour turning movement counts on Wednesday, 20 March 2019 from 7:00 AM to 9:00 AM, 11:00 AM to 2:00 PM and 3:00 PM to 6:00 PM. All traffic movements, including pedestrians, were counted in 15-minute intervals and vehicles were classified by type (e.g. car, truck, etc.).

Due to a lack of intersecting streets and driveways, volume balancing was applied to ensure equal upstream and downstream traffic volumes between the study intersections. **Figure 2.5** illustrates the base year traffic volumes for the AM and PM peak hours. **Appendix B** contains the turning movement count data.







Existing Traffic Volumes

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Figure 2.5

2.5 Existing Traffic Operations

The operations of the study area intersections were evaluated using Synchro 9 with Highway Capacity Manual (HCM) 2000 procedures. The key parameters used in the analysis include:

- Existing lane configurations and turning lane storage lengths as documented during the site visit;
- Signal timing plans as provided by the City of Burlington, and included in **Appendix B**;
- Heavy vehicle percentages and conflicting pedestrian volumes as derived from the existing turning movement counts; and
- Synchro default values for all other inputs

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

Table 2.2 contains the level of service criteria for signalized and unsignalized intersections. The highest possible rating is LOS A, under which the average total delay is equal to or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersection, 50 seconds for unsignalized intersection or when the volume-to-capacity (v/c) ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is generally used a guideline for the determination of road improvements needs on through lanes, while LOS F may be acceptable for left-turn movement at peak times, depending on delays.

TABLE 2.2: VEHICLE LEVEL OF SERVICE DEFINITIONS

Level of Service	Signalized Intersections Average Total Delay (sec/veh)	Unsignalized Intersections Average Total Delay (sec/veh)
A	< = 10	< = 10
B	> 10 & < = 20	> 10 & < = 15
C	> 20 & < = 35	> 15 & < = 25
D	> 35 & < = 55	> 25 & < = 35
E	> 55 & < = 80	> 35 & < = 50
F	> 80	> 50

Under Region of Halton TIS Guidelines, the following criteria define critical movements:

- For signalized intersections:
  - Volume-to-capacity (v/c) ratios for overall intersection operations, through movements, or shared through/turning movements that operate at 0.85 or above;
  - Volume-to-capacity (v/c) ratios for exclusive movements that operate at 0.90 or above; or
  - Queues (95th percentile) for individual movements projected to exceed available turning lane storage
- For unsignalized intersections:
  - Level of service (LOS), based on average control delay per vehicle, on individual movements that exceeds LOS D; or
  - Queues (95th percentile) for individual movements projected to exceed available turning lane storage

Table 2.3 summarizes the existing intersection operations for the AM and PM peak hours. The analysis indicates the study area intersections are operating with acceptable levels of service and within capacity. No critical movements are noted.

Appendix C contains the detailed Synchro reports.



TABLE 2.3: EXISTING TRAFFIC OPERATIONS SUMMARY

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	C	C	>	**C**	C	D	C	**C**	B	B	>	**B**	B	B	>	**B**	**C**
			Delay	33	35	>	**34**	27	35	31	**33**	14	18	>	**17**	12	15	>	**14**	**25**
			V/C	0.71	0.65	>		0.27	0.58	0.10		0.11	0.27	>		0.47	0.22	>		**0.60**
			Q	50	61	>		17	47	15		10	35	>		42	26	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	20	-	>		38	-	95		30	-	>		8	-	>		
	2 - Guelph Line & St. Clair Avenue	TWSC	LOS					B		B	**B**		A	>	**A**	A	A		**A**	
			Delay					11		11	**11**		0	>	**0**	8	0		**1**	
			V/C					0.07		0.07			0.24	>		0.02	0.20			
			Q					2		2			0	>		1	0			
			Ex					-		-			-	>		20	-			
			Avail.					-		-			-	>		20	-			
PM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	D	C	>	**C**	C	D	C	**C**	B	C	>	**C**	B	C	>	**C**	**C**
			Delay	45	29	>	**34**	22	38	28	**35**	18	24	>	**23**	16	23	>	**21**	**30**
			V/C	0.83	0.36	>		0.26	0.80	0.17		0.14	0.31	>		0.33	0.33	>		**0.57**
			Q	57	46	>		23	106	18		14	46	>		33	45	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	13	-	>		32	-	92		26	-	>		17	-	>		
	2 - Guelph Line & St. Clair Avenue	TWSC	LOS					B		B	**B**		A	>	**A**	A	A		**A**	
			Delay					11		11	**11**		0	>	**0**	8	0		**0**	
			V/C					0.08		0.08			0.25	>		0.02	0.26			
			Q					2		2			0	>		0	0			
			Ex					-		-			-	>		20	-			
			Avail.					-		-			-	>		20	-			

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

<- Shared Left/Through Lane
>- Shared Right/Through Lane

3 Development Concept

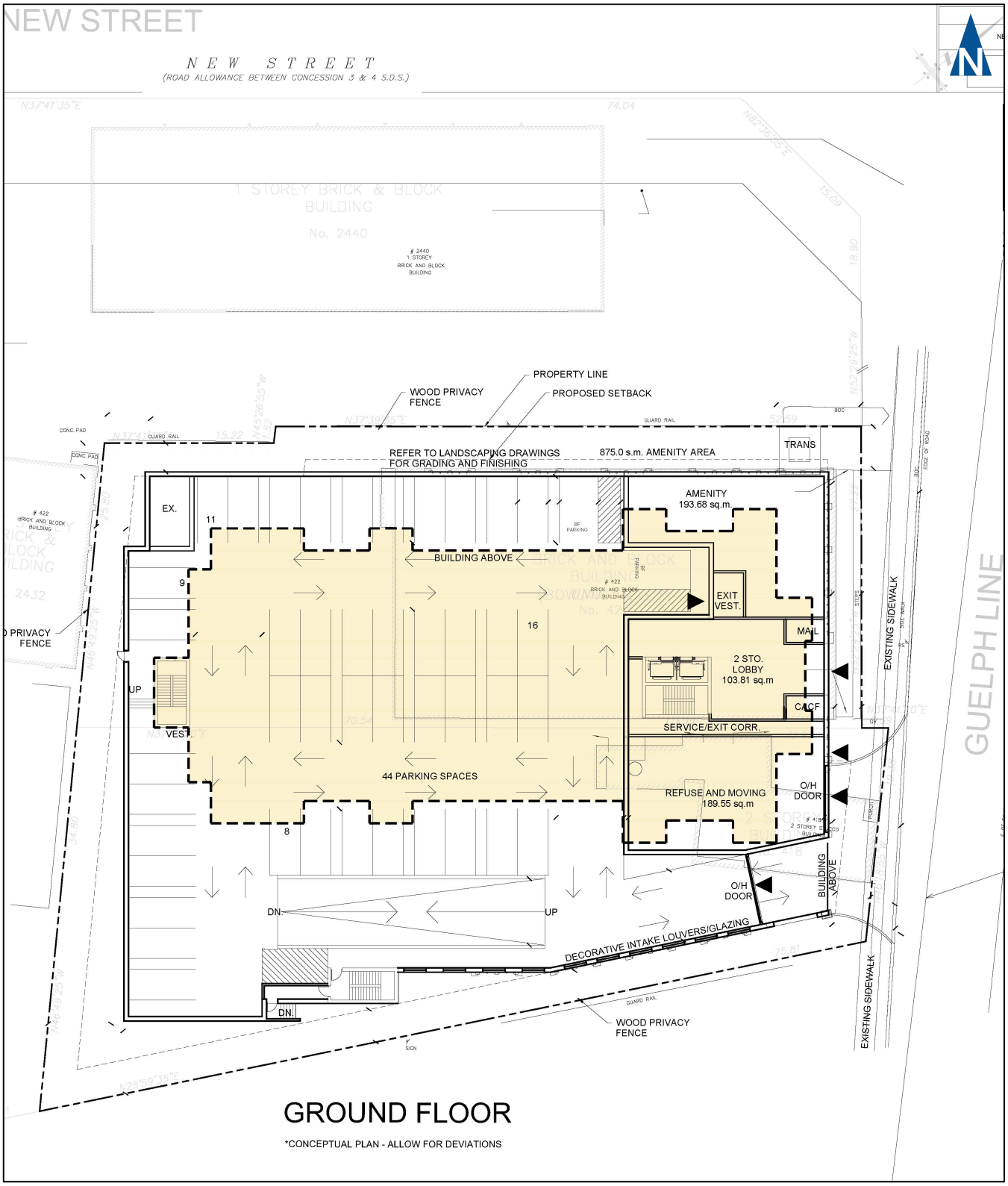
3.1 Development Description

The subject site is located on lands known municipally as 418 & 422 Guelph Line and is currently occupied by a former (closed) bowling alley and two-storey commercial/residential dwelling. Access to the site is currently provided via three all-moves driveway connections to Guelph Line. All existing buildings on the site and the associated driveway connections will be removed to facilitate redevelopment.

The redevelopment is proposed to comprise a 13-storey building with 170 residential units. Access is proposed via one all-moves driveway connection to Guelph Line.

A total of 219 parking spaces are proposed to service the site: within two underground parking levels and on floors one and two (above-grade). Internal lockers are proposed underground and on the second floor to accommodate bicycle storage. Short-term bike parking (bike rack) will be located adjacent to the main entrance.

The development is proposed to be constructed in one phase and be built out by 2024; however, this timing may change depending on market conditions. **Figure 3.1** illustrates the conceptual site plan.



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Site Plan

418 & 422 Guelph Line TIS & PS
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Figure 3.1

3.2 Development Trip Generation

3.2.1 Base Trip Generation

Trip generation information is used to forecast the new vehicular traffic to occur as result of the development of the site. The traffic estimated to be generated by the development has been completed using the Institute of Transportation Engineers (ITE) Trip Generation Manual[2] land use code (LUC) 222 Multifamily Housing – High Rise. The regression equations were used since all criteria for their use were met.

Table 3.1 summarizes the trip generation estimates and indicates the development is forecast to have a base trip generation of 60 new AM peak hour trips and 66 new PM peak hour trips.

TABLE 3.1: TRIP GENERATION ESTIMATES

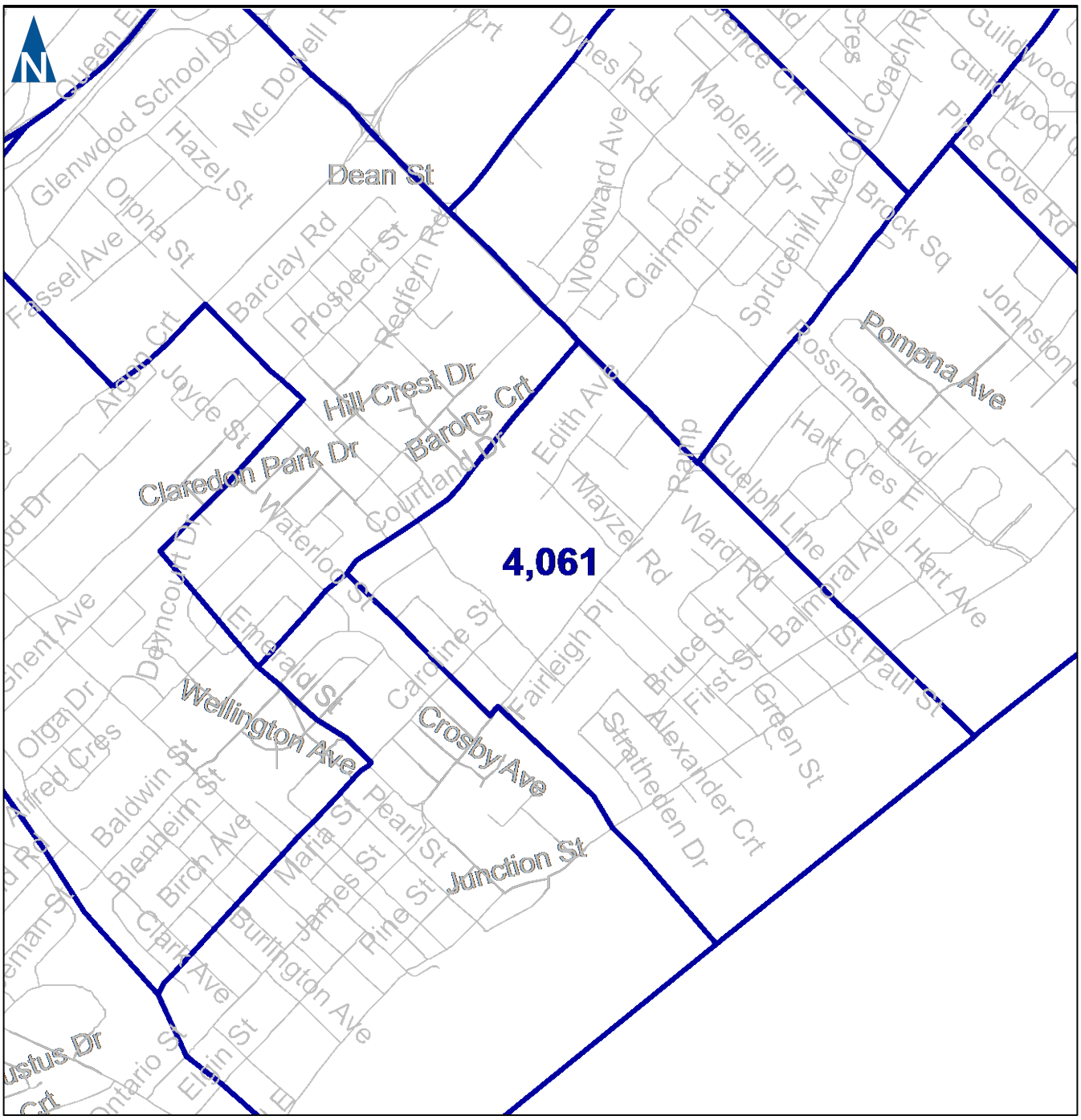
Land Use Code	Units	AM Peak Hour				PM Peak Hour			
			In	Out	Total		In	Out	Total
222 - Multifamily Housing (High-Rise)	170	FC[1]	14	46	**60**	FC[2]	40	26	**66**
Modal Split Reduction		20%	-3	-9	-12	20%	-8	-5	-13
TOTAL Adjusted Trip Generation			**11**	**37**	**48**		**32**	**21**	**53**
		FC[1]	T = 0.28(x) + 12.86			FC[2]	T = 0.34(x) + 8.56		

3.2.2 Modal Split

The subject site is located within walking distance of transit stops providing access to the broader Burlington Transit network and GO Transit regional services at Burlington GO Station (via Route 3/3A, 10, 50 & 52) and Appleby GO Station (Route 10). Further, the subject site is within a walkable and bike friendly community providing for a wide choice of transportation modes.

To recognize the potential for trips to and from the subject site by alternate modes, data on primary modes of travel for all trips during the AM and PM peak periods (6:00 AM to 9:00 AM) and (3:00 PM to 6:00 PM) were extracted from the 2016 Transportation Tomorrow Survey (TTS) at the traffic analysis zone (TAZ), City and ward levels **Figure 3.2** illustrates the subject site's location in traffic analysis zone (TAZ) 4061 and City of Burlington Ward 2.

[2] Institute of Transportation Engineers. 2017 *Trip Generation Manual (10th Edition)*. Washington D.C.



Subject Site TTS Zone

418 & 422 Guelph Line TIS & PS
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Figure 3.2

Table 3.2 summarizes the mode of travel within TAZ 4061, City of Burlington Ward 2 and the City of Burlington as a whole. The data illustrates that the automobile is the dominant mode choice, accounting for approximately 73% of AM and PM trips in Ward 2 and the City, and 60% of AM and PM trips in TAZ 4061. However, transit and active transportation modes are higher in TAZ 4061, representing an average of 17% transit and 14% cycling/walking.

On this basis a mode share factor of twenty percent (20%) has been applied to the trip generation estimates. This mode share is considered conservative as it accounts for the existing and future context of the subject site's location, which is likely not comparable to denser areas (e.g. downtown area of Ward 2) where destinations are within closer walking distance, and a larger number of transit services are available. Future development in the study area at the build-out horizon may likely include additional transit service and/or cycling facilities to improve accessibility.

Based on this analysis, 12 trips in the AM peak hour and 13 trips in the PM peak hour are estimated to be made by alternate modes of transportation upon build-out of the site (**Table 3.1**).

TABLE 3.2: MODE SHARE STATISTICS

Trip Mode	TAZ 4061		Ward 2		City of Burlington	
	AM	PM	AM	PM	AM	PM
Auto Driver	57%	63%	74%	73%	72%	73%
Auto Passenger	11%	8%	8%	10%	10%	12%
Local Transit	17%	13%	4%	3%	2%	2%
Go Rail	1%	1%	2%	2%	2%	2%
GO Rail/Local	1%	1%	2%	2%	1%	1%
Cycle	7%	6%	3%	4%	1%	1%
Walk	6%	9%	5%	5%	7%	6%
Other	0%	0%	2%	2%	5%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Auto	68%	71%	82%	83%	82%	85%
Transit	19%	14%	8%	6%	5%	5%
Walk/Cycle	13%	15%	8%	9%	8%	7%
Other	0%	0%	2%	2%	5%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

3.2.3 Adjusted Trip Generation Estimates

When adjusted to account for modal split, , the development is forecast to generate 48 new trips in the AM peak hour and 53 new trips in the weekday PM peak hour (**Table 3.1**).

3.3 Development Trip Distribution

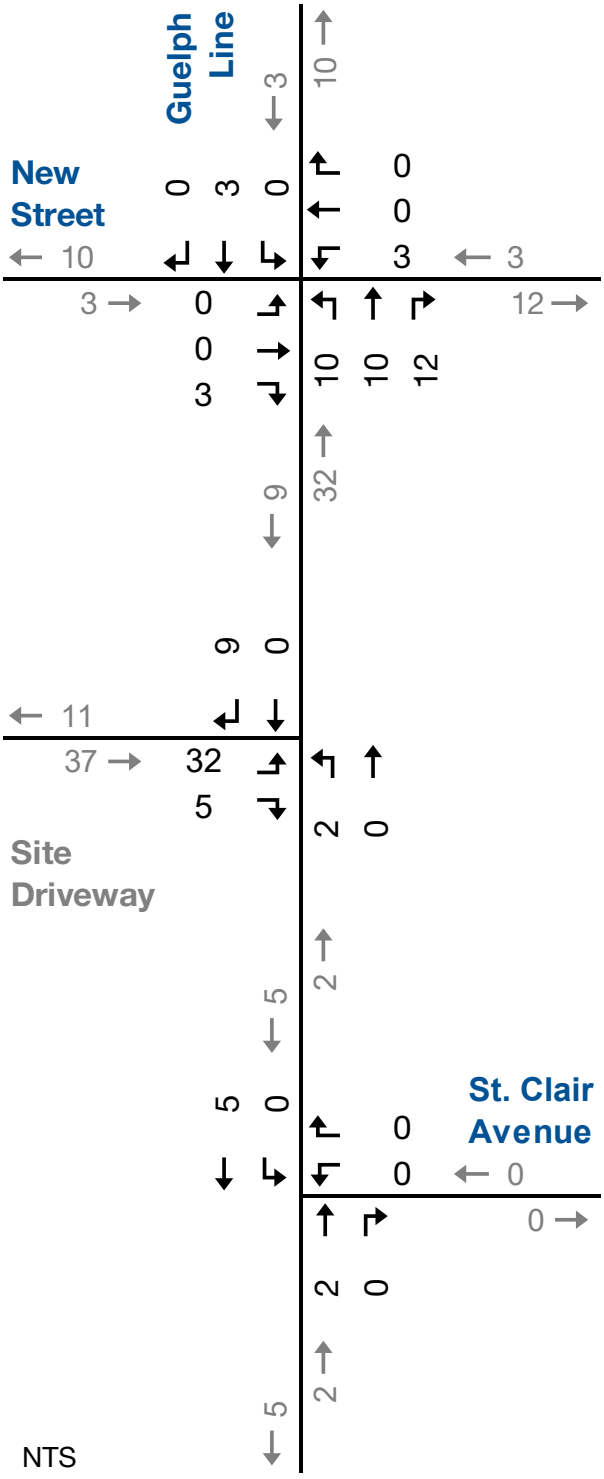
The trip distribution for the subject site was developed based on the existing travel patterns as documented in the existing turning movement counts. **Table 3.3** summarizes the trip distribution used for this study.

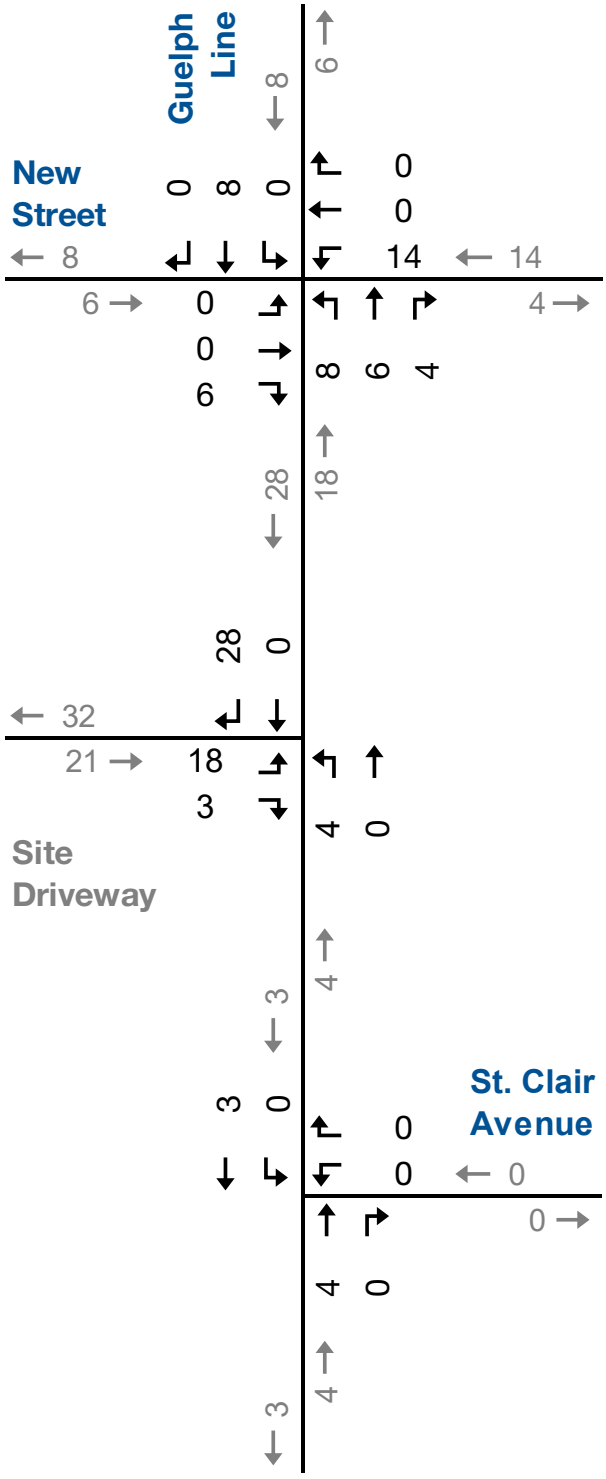
TABLE 3.3: DEVELOPMENT TRIP DISTRIBUTION

Origin/Destination	AM		PM	
	In	Out	In	Out
North via Guelph Line	30%	25%	25%	25%
East via New Street	25%	35%	40%	20%
South via Guelph Line	15%	15%	15%	15%
West via New Street	30%	25%	20%	40%
Total	**100%**	**100%**	**100%**	**100%**

3.4 Development Trip Assignment

The site generated traffic was assigned to study road network using the trip distribution outlined in **Table 3.3** and the most logical routes to and from the site. **Figure 3.3** illustrates the site-generated traffic assignments for the AM and PM peak hours, respectively.





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Site Generated Traffic Volumes

418 & 422 Guelph Line TIS & PS
190014

Figure 3.3

4 Future Traffic

The assessment of future conditions in this section include the following components necessary to assess the traffic implications on the adjacent road network:

- Future background traffic estimates;
- Level of service analysis for background traffic (pre-development);
- Future total traffic estimates; and
- Level of service analysis for total traffic (post-development).

4.1 Planned Infrastructure Improvements

During pre-study consultation, City Staff confirmed there were no future roadway or traffic control improvements in the study area to be reflected at the future horizon year.

4.2 Background Traffic Volumes

In accordance with the Region's traffic impact study guidelines and the terms of reference established for this study, a horizon year of five years from date of study has been used for traffic forecasting and analysis purposes. This is represented by year 2024.

4.2.1 General Background Growth

During pre-study consultation, City staff advised that a growth rate of one percent (1%) compounded per annum (total growth of 5.1%) be applied to the base year traffic volumes. This growth rate accounts for future increases in employment and population within and beyond the study area which will likely increase traffic volumes in the study area.

4.2.2 Other Area Developments

Through a review of the City's Development Activity Map[3] and pre-study consultation, City staff advised there was two additional development forecast to generate traffic above and beyond general background growth in the study area. These two developments are as follows:

- **2421 & 2431 New Street**: An eleven-storey residential development with 139 condominium units and 223 retirement

[3] City of Burlington, Planning and Development. *Current Development Applications – Ward 2*. Accessed 08 March 2019 from https://www.burlington.ca/en/services-for-you/ward-two.asp

living units. Access is proposed via one driveway connection to New Street; and

- **2360 & 2368 New Street**: Eleven townhouse units with shared access to New Street via a private street connection

Figure 4.1 illustrates the location of the background developments in relation to the subject site. The site generated traffic forecasts for 2421 & 2431 New Street were extracted from the Traffic Impact Study[4] for this development. The site generated traffic forecasts for 2360 & 2368 New Street were estimated using ITE Trip Generation LUC 220 and the trip distribution noted in **Table 3.3**. **Appendix D** contains the site generated traffic forecasts for the two developments.

Figure 4.2 illustrates the 2024 background traffic volumes. These forecasts include the general background traffic growth plus the other area development traffic volumes.

4.3 Background Traffic Operations

The background traffic volumes at the horizon year were analyzed using the same methodology and parameters as used for existing traffic conditions.

Table 4.2 details the background traffic level of service conditions and indicates the study area intersections are forecast to operate with acceptable levels of service and within capacity with the following critical movement:

- The eastbound left-turn movement on New Street at Guelph Line is forecast to operate at LOS F with a v/c ratio of 1.00 during the PM peak hour. The 95th percentile back of queue is forecast to exceed available storage by 11 metres

Appendix E contains the detailed Synchro reports.

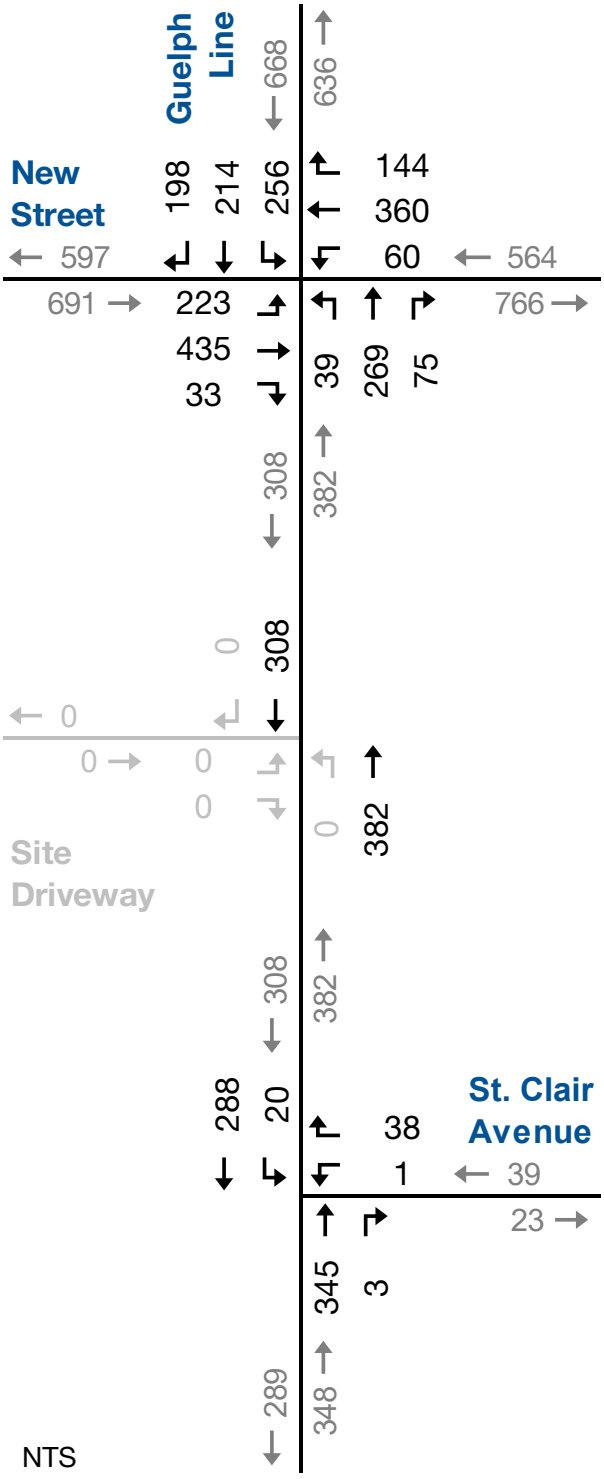
[4] Traffic Impact Study: 2421 & 2431 New Street. Prepared by C.F. Crozier & Associates. December 2017.

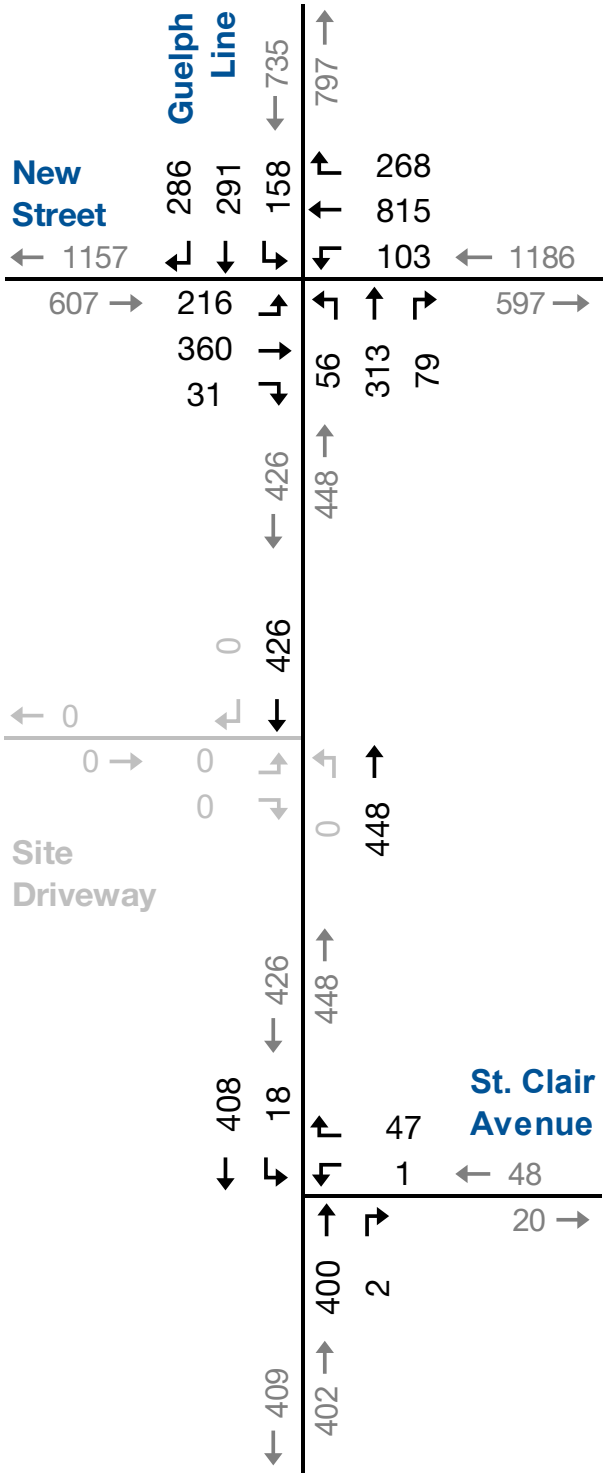


Location of Background Developments

418 & 422 Guelph Line TIS & PS
190014

Figure 4.1





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2024 Background Traffic Volumes

418 & 422 Guelph Line TIS & PS
190014

Figure 4.2

TABLE 4.1: 2024 BACKGROUND TRAFFIC OPERATIONS SUMMARY

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	C	C	>	C	C	D	C	C	B	B	>	B	B	B	>	B	C
			Delay	33	35	>	34	27	35	31	33	14	18	>	17	12	15	>	13	25
			V/C	0.72	0.65	>		0.26	0.59	0.10		0.09	0.25	>		0.46	0.22	>		0.59
			Q	50	61	>		16	47	15		9	33	>		42	26	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	20	-	>		39	-	95		32	-	>		8	-	>		
	2 - Guelph Line & St. Clair Avenue	TWSC	LOS					B		B	B		A	>	A	A			A	
			Delay					11		11	11		0	>	0	8			1	
			V/C					0.07		0.07			0.24	>		0.02	0.19			
			Q					2		2			0	>		1	0			
			Ex					-		-			-	>		20	-			
			Avail.					-		-			-	>		20	-			
PM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	F	C	>	D	C	D	C	D	B	C	>	C	B	C	>	C	C
			Delay	85	29	>	49	22	39	28	35	19	25	>	24	17	24	>	22	33
			V/C	1.00	0.38	>		0.28	0.82	0.19		0.17	0.33	>		0.36	0.37	>		0.68
			Q	81	50	>		24	113	18		15	48	>		35	50	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	-11	-	>		31	-	92		25	-	>		15	-	>		
	2 - Guelph Line & St. Clair Avenue	TWSC	LOS					B		B	B		A	>	A	A			A	
			Delay					12		12	12		0	>	0	8			0	
			V/C					0.09		0.09			0.27	>		0.02	0.27			
			Q					2		2			0	>		0	0			
			Ex					-		-			-	>		20	-			
			Avail.					-		-			-	>		20	-			

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

<- Shared Left/Through Lane
>- Shared Right/Through Lane

4.4 Total Traffic Volumes

The total traffic volumes are the addition of the site generated traffic volumes (**Figure 3.2**) to the background traffic volumes (**Figure 4.2**). **Figure 4.3** illustrates the 2024 total traffic volumes.

4.5 Total Traffic Operations

The total traffic volumes at the horizon year were analyzed using the same methodology and parameters used for existing and background conditions. One inbound lane, one outbound lane and stop sign control have been assumed on the site driveway.

Table 4.2 details the future total traffic level of service conditions and indicates the study area intersections are forecast to operate with acceptable levels of service and within capacity with the following critical movement:

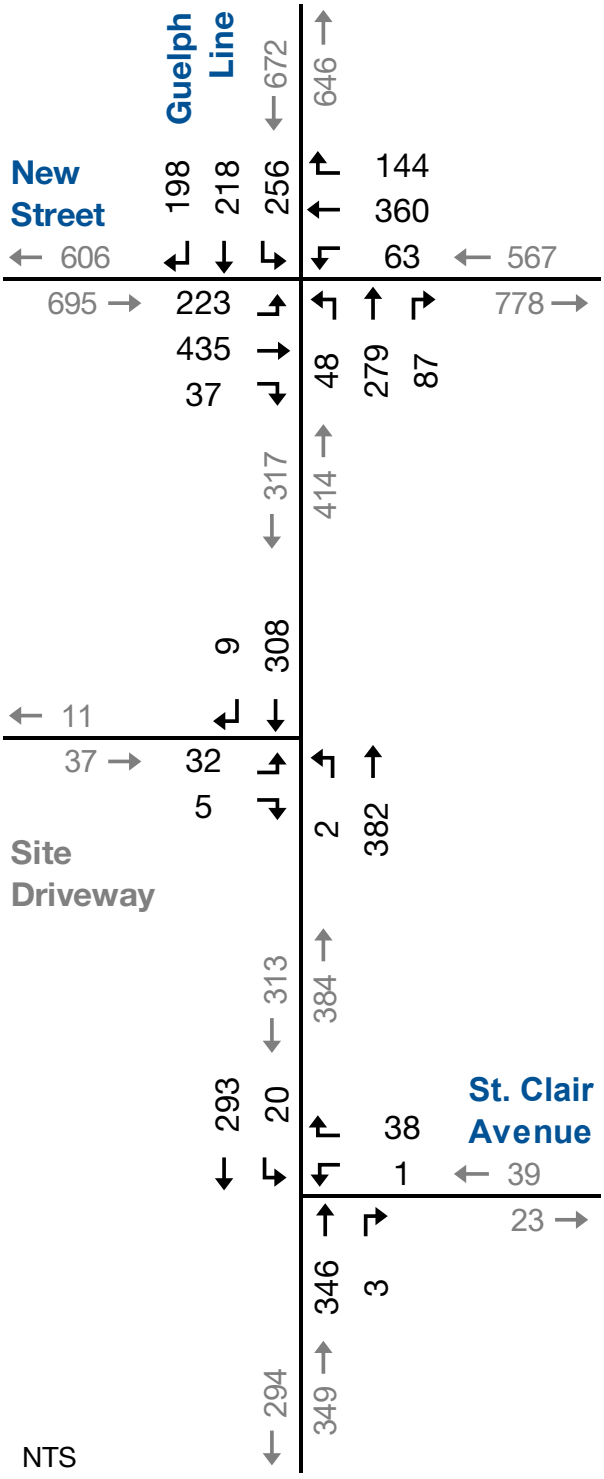
- The eastbound left-turn movement on New Street at Guelph Line is forecast to operate at LOS F with a v/c ratio of 1.00 during the PM peak hour. The 95th percentile back of queue is forecast to exceed available storage by 10 metres.

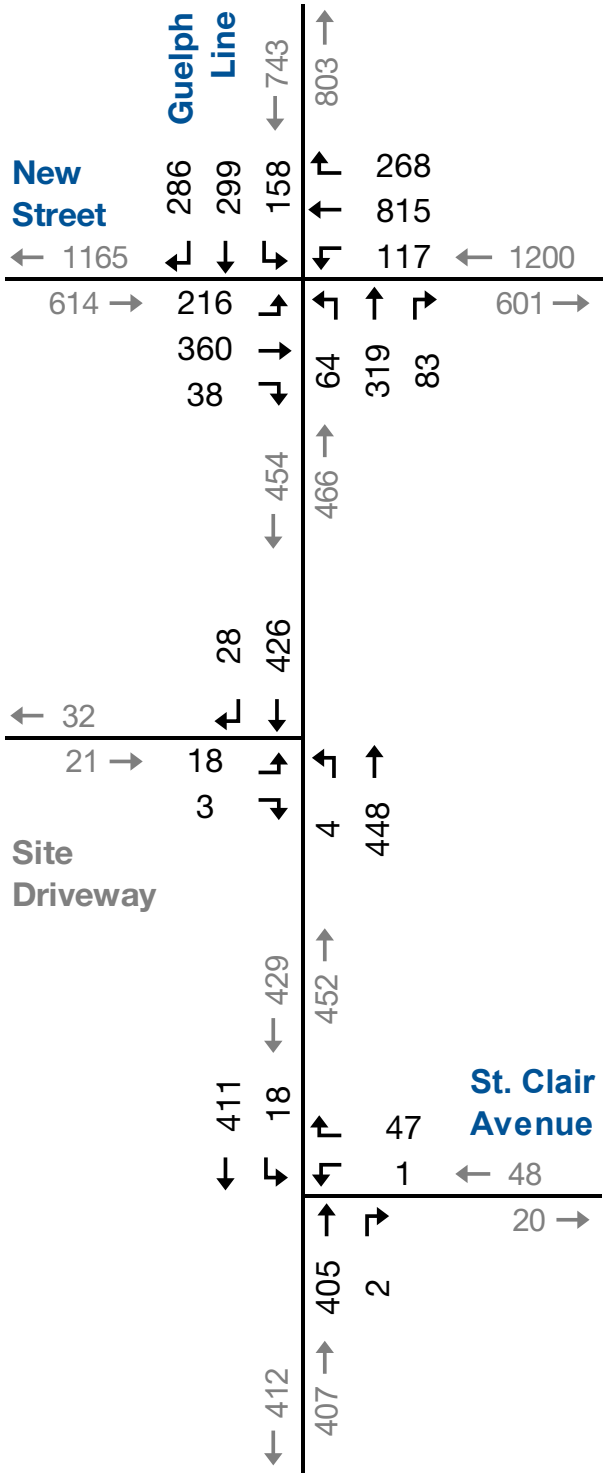
  Note that no site generated traffic has been assigned to the critical movement.

Inclusion of the site generated traffic does not increase delay at the study area intersections. However, a small increase in overall intersection v/c ratio (from 0.59 to 0.60) is forecast at the Guelph Line and New Street intersection.

Appendix F contains the detailed Synchro reports.







2024 Future Total Traffic Volumes

Figure 4.3

TABLE 4.2: 2024 TOTAL TRAFFIC OPERATIONS SUMMARY

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	C	C	>	C	C	D	C	C	B	B	>	B	B	B	>	B	C
			Delay	33	35	>	34	27	35	31	33	14	18	>	17	12	15	>	14	25
			V/C	0.72	0.65	>		0.28	0.58	0.10		0.11	0.27	>		0.47	0.22	>		0.60
			Q	50	61	>		17	47	15		10	35	>		42	26	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	20	-	>		38	-	95		30	-	>		8	-	>		
	2 - Guelph Line & St. Clair Avenue	TWSC	LOS					B		B	B		A	>	A	A			A	
			Delay					11		11	11		0	>	0	8			1	
			V/C					0.07		0.07			0.24	>		0.02				
			Q					2		2			0	>		1				
			Ex					-		-			-	>		20				
			Avail.					-		-			-	>		20				
	3 - Guelph Line & Site Driveway	TWSC	LOS	B		B	B					<	A		A		A	>	A	
			Delay	12		12	12					<	0		0		0	>	0	
			V/C	0.07		0.07						<	0.00				0.20	>		
			Q	2		2						<	0				0	>		
			Ex	-		-						<	-				-	>		
			Avail.	-		-						<	-				-	>		
PM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	F	C	>	D	C	D	C	C	B	C	>	C	B	C	>	C	C
			Delay	84	29	>	48	22	39	28	35	19	25	>	24	17	24	>	23	33
			V/C	1.00	0.39	>		0.32	0.81	0.19		0.20	0.34	>		0.36	0.38	>		0.68
			Q	80	50	>		27	113	18		16	49	>		35	52	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	-10	-	>		28	-	92		24	-	>		15	-	>		
	2 - Guelph Line & St. Clair Avenue	TWSC	LOS					B		B	B		A	>	A	A			A	
			Delay					12		12	12		0	>	0	8			0	
			V/C					0.09		0.09			0.27	>		0.02				
			Q					2		2			0	>		0				
			Ex					-		-			-	>		20				
			Avail.					-		-			-	>		20				
	3 - Guelph Line & Site Driveway	TWSC	LOS	B		B	B					<	A		A		A	>	A	
			Delay	12		12	12					<	0		0		0	>	0	
			V/C	0.04		0.04						<	0.00				0.29	>		
			Q	1		1						<	0				0	>		
			Ex	-		-						<	-				-	>		
			Avail.	-		-						<	-				-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
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Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

<- Shared Left/Through Lane
>- Shared Right/Through Lane

5 Remedial Measures

5.1 Intersection Optimization

The results of the analysis in **Section 4.3** and **Section 4.5** indicate the eastbound left-turn movement on New Street at Guelph Line is forecast to operate at LOS F with a v/c ratio of 1.00 in the PM peak hour at the background and total 2024 horizon. The 95th percentile queues on this movement are also forecast to exceed available lane storage by approximately 10 metres. These queuing conditions can be addressed through pavement marking modifications on New Street in lieu of signal timing adjustments.

To improve the PM peak hour level of service of this movement, the signal timing plan was optimized with a cycle length of 115 seconds.

Table 5.1 summarizes the level of service conditions for the 2024 background horizon and indicates these signal timing modifications mitigate the critical movement previously noted.

Table 5.2 summarizes the level of service conditions for the 2024 total traffic horizon and indicates the same timing plan as above can accommodate the development traffic in a satisfactory manner with a negligible impact on study area traffic operations .

Appendix G contains the detailed Synchro reports.

5.2 Auxiliary Turn Lanes

Auxiliary turn lanes are usually provided on roadways where traffic intending to complete a left-turn incurs significant delay due to opposing traffic volumes. The existing two-way left-turn lane provided on Guelph Line at the site driveway should adequately accommodate the forecast left-turn movements based on the following:

- The low volume of northbound left-turns on Guelph Line at the site driveway (approximately two to five per hour); and
- The adequacy of the northbound left-turn lane storage on Guelph Line at New Street, which is forecast retain approximately 25 to 30 metres of storage at the 2024 total traffic horizon.



TABLE 5.1: 2024 BACKGROUND TRAFFIC OPERATIONS SUMMARY – OPTIMIZED

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	C	C	>	C	C	D	C	C	B	B	>	B	B	B	>	B	C
			Delay	33	35	>	34	27	35	31	33	14	18	>	17	12	15	>	13	25
			V/C	0.72	0.65	>		0.26	0.59	0.10		0.09	0.25	>		0.46	0.22	>		0.59
			Q	50	61	>		16	47	15		9	33	>		42	26	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	20	-	>		39	-	95		32	-	>		8	-	>		
PM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	C	C	>	C	C	D	C	D	C	C	>	C	C	C	>	C	C
			Delay	32	25	>	28	26	43	29	38	21	27	>	26	21	27	>	26	31
			V/C	0.74	0.32	>		0.30	0.84	0.19		0.19	0.34	>		0.40	0.40	>		0.61
			Q	58	45	>		23	120	19		17	51	>		39	56	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	12	-	>		32	-	91		24	-	>		11	-	>		

MOE - Measure of Effectiveness
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TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
<- Shared Left/Through Lane
>- Shared Right/Through Lane

TABLE 5.2: 2024 TOTAL TRAFFIC OPERATIONS SUMMARY – OPTIMIZED

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	C	C	>	C	C	D	C	C	B	B	>	B	B	B	>	B	C
			Delay	33	35	>	34	27	35	31	33	14	18	>	17	12	15	>	14	25
			V/C	0.72	0.65	>		0.28	0.58	0.10		0.11	0.27	>		0.47	0.22	>		0.60
			Q	50	61	>		17	47	15		10	35	>		42	26	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	20	-	>		38	-	95		30	-	>		8	-	>		
PM Peak Hour	1 - Guelph Line & New Street	TCS	LOS	C	C	>	C	C	D	C	D	C	C	>	C	C	C	>	C	C
			Delay	32	25	>	28	26	43	29	38	21	27	>	26	21	27	>	26	31
			V/C	0.74	0.32	>		0.34	0.84	0.19		0.22	0.35	>		0.41	0.41	>		0.62
			Q	58	46	>		25	120	19		18	53	>		39	58	>		
			Ex	70	-	>		55	-	110		40	-	>		50	-	>		
			Avail.	12	-	>		30	-	91		22	-	>		11	-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
<- Shared Left/Through Lane
>- Shared Right/Through Lane

6 Parking Justification

As with any equilibrium system, there are a minimum of two components that are required to be in balance to reach the equilibrium point. With parking systems, this requires the balance in parking supply and demand. Providing an appropriate supply is equally important as applying strategies to control demands. The oversupply of cheap and accessible has long been identified as a major contributing factor to the growth in single-occupant vehicle (SOV) travel.

6.1 Zoning By-Law Parking Requirements

6.1.1 Zoning By-Law 2020

The City of Burlington's Zoning By-law (2020)[5] requires the following number of parking spaces:

- 1.25 resident spaces per one-bedroom unit,
- 1.50 resident spaces per two-bedroom unit;
- 1.75 resident spaces per three-bedroom unit; and
- 0.35 visitor spaces per unit

Under this By-law, a total of 284 parking spaces would be required to service the site. A total of 219 parking spaces are proposed which is a variance of 65 spaces, or 23%. **Table 6.1** summarizes the site's parking requirements under the City's Zoning By-law.

TABLE 6.1: ZONING BY-LAW PARKING REQUIREMENTS

Land Use	Units	Parking Standard	Required Parking
Apartment	131	1.25 resident spaces per one-bedroom unit	164
	35	1.50 resident spaces per two-bedroom unit	53
	4	1.75 resident spaces per three-bedroom unit	7
Visitor Parking	170	0.35 parking spaces per unit	60
Total By-law Parking Required			**284**
Total Parking Provided			**219**
Parking Variance			**-65**
Percent Parking Variance			**-23%**

[5] City of Burlington. *Zoning By-Law 2020, §2.25.4, Table 1.2.6: Off-Street Parking Standards.* December 2017.



6.1.2 City-Wide Parking Standards Update (By-Law 2020.XXX)

The City of Burlington recently approved the amendment of By-law 2020 to reflect the revised residential parking rates. Under the amended By-law (2020.XXX) requires the following number of parking spaces:

- 1.00 resident spaces per one-bedroom unit,
- 1.25 resident spaces per two-bedroom unit;
- 1.50 resident spaces per three-bedroom unit; and
- 0.25 visitor spaces per unit; and
- 1 space per 75 units for the use of maintenance vehicles servicing the site

Under this By-law, a total of 226 parking spaces would be required to service the site. A total of 219 parking spaces are proposed which is a variance of seven spaces, or 3%. **Table 6.2** summarizes the site's parking requirements under the amended City's Zoning By-law.

TABLE 6.2: AMENDED ZONING BY-LAW PARKING REQUIREMENTS

Land Use	Units	Parking Standard	Required Parking
Apartment	131	1.00 resident spaces per one-bedroom unit	131
	35	1.25 resident spaces per two-bedroom unit	44
	4	1.50 resident spaces per three-bedroom unit	6
Visitor Parking	170	0.35 parking spaces per unit	43
Maintenance Vehicle	170	1 space per 75 units	2
Total By-law Parking Required			**226**
Total Parking Provided			**219**
Parking Variance			**-7**
Percent Parking Variance			**-3%**

This By-law is not yet in-force; however, it is reasonable to assume that it will be upon completion of the redevelopment in 2024. Therefore, the amended By-law parking rates should apply to this development application.

6.2 ITE Parking Generation

The Institute of Transportation Engineers (ITE) Parking Generation Manual[6] provides data on parking surveys and peak demand conducted across the United States and Canada for different land use codes (LUCs). LUC 222 Multifamily Housing (High Rise) was referenced in estimating the parking requirements for the proposed development **Table 6.3** summarizes the estimated parking demand using the ITE Parking Generation Manual. Based on this, the subject site is estimated to require 167 parking spaces, inclusive of visitor parking requirements. The development is proposing 219 parking spaces which is a surplus of 52 parking spaces.

TABLE 6.3: ITE PARKING DEMAND ESTIMATES

Land Use	Units	Parking Requirement ITE Parking Generation (5th Edition)	Parking Required
LUC 222	170	0.98 parking spaces per dwelling unit	167
		Total Parking Provided	**219**
		Parking Surplus	**52**

6.3 TTS Auto Ownership

The 2016 Transportation Tomorrow Survey provides information on a wide variety of transportation related characteristics within the Greater Toronto and Hamilton Area (GTHA). These characteristics include, but are not limited to, vehicle ownership rates, primary mode of travel, trip origin, trip destination and time of trip. To better understand the household and trip characteristics in the study area, vehicle ownership rates among apartments were reviewed for TTS traffic analysis zones (TAZ) 4061 to 4065. The subject site is located in TAZ 4061; however, to provide a comprehensive assessment of vehicle ownership and assumed parking demand, data for the four surrounding TAZs were included. The data indicates:

- 24% of apartments do not own a vehicle;
- 76% of apartments own at least one vehicle;
- No household owns more than two vehicles; and
- The vehicle ownership and assumed parking demand is calculated to be 0.86 vehicles per household (exclusive of visitor parking demands)

[6] Institute of Transportation Engineers. February 2019. *Parking Generation Manual (5th Edition)*. Washington D.C.

Appendix H contains the TTS data.

The TTS data is summarized in **Table 6.4** and indicates that when the TTS vehicle ownership and assumed parking demand of 0.86 spaces per unit is applied to the 170 proposed units, it results in a parking demand of 146 spaces (not including visitor demand). This is a surplus of 73 spaces. When the visitor parking requirements of 60 spaces under the current in-force By-law and 43 spaces under the amended By-law are applied, it results in an overall parking surplus of 13 and 30 spaces respectively.

TABLE 6.4: TTS AUTO OWNERSHIP

Number of Vehicles per Unit	Number of Units	Total Vehicles
0	586	0
1	1,563	1,563
2	252	504
TOTAL	**2,401**	**2,067**
Units with at least one vehicle		76%
TTS vehicles per unit		0.86
Proposed number of units		170
Parking required for residents based on TTS auto ownership		**146**
Proposed resident parking supply		**219**
Surplus spaces		73
By-law visitor parking requirement		60 / 43
Overall site parking surplus		**13 / 30**

6.4 Summary of Parking Demand Estimates

Under the City's of Burlington's Zoning By-law 2020, a total of 284 parking spaces are required. The development is proposing a supply of 219 parking spaces (1.29 spaces per unit) to be shared among

residents and visitors. This equates to a variance of 65 spaces, or 23% of the By-law supply.

Under the City's of Burlington's amended Zoning By-law 2020.XXX, a total of 226 parking spaces are required. The proposed supply of 219 parking spaces equates to a variance of seven spaces, or 3% of the amended By-law supply.

When the ITE Parking Generation data is applied to the proposed number of units, a total of 167 spaces will be required to serve the resident and visitor demands of the site. The proposed parking supply of 219 spaces results in a surplus of 52 spaces.

When the TTS auto ownership and assume parking demand is applied to the proposed number of units, a total of 146 spaces will be required to serve the resident demands of the site. This is surplus of 73 spaces. When the visitor parking requirements of 60 spaces under the current in-force By-law and 43 spaces under the amended By-law are applied, it results in an overall parking surplus of 13 and 30 spaces respectively.

Overall, based on the ITE Parking Generation and TTS auto ownership and assumed parking demand, the proposed supply of 219 parking spaces should adequately accommodate the resident and visitor parking demands of the site.

6.5 Parking Management Initiatives

To ensure an adequate supply of onsite parking for both residents and visitors, the applicant can implement the following parking management initiatives:

- Unbundle parking spaces from the units. Unbundling parking means that a parking space and its associated costs are removed from the purchase price of a unit. Unbundling results in the purchase of parking spaces by only those requiring them. Any surplus spaces would be available for use by visitors and residents;
- The applicant can limit the number of spaces that each unit can purchase, up to 174 total spaces purchased, with 43 spaces reserved to accommodate the By-law visitor parking requirement and two spaces reserved for maintenance vehicles; and
- Under each scenario, the applicant could rent/lease the spare residential spaces (to residents) until such time as the space was purchased



7 Conclusions and Recommendations

7.1 Conclusions

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

Transportation Overview

- Under existing conditions, all intersections in the study area are operating at acceptable levels of service and well within capacity. No critical movements are noted;
- The development of the subject site is forecast to generate 48 trips in the AM peak hour and 53 trips in the PM peak hour after accounting for trips by transit and other alternate modes;
- Under 2024 background traffic conditions, in the PM peak hour, the eastbound left-turn movement on New Street at Guelph Line is forecast to operate at LOS F and with a v/c ratio of 1.00. The 95th percentile back of queue is forecast to exceed available lane storage by approximately 11 metres;
- Under 2024 total traffic conditions, in the PM peak hour, the eastbound left-turn movement on New Street at Guelph Line is forecast to operate the same as under background conditions;
- The proposed driveway connection to Guelph Line is forecast to operate with acceptable levels of service and within capacity during both peak hours;
- Overall, the development of the subject site is anticipated to have a minimal impact on traffic operations within the study area;
- With optimization of the signal timing and phasing plan at New Street and Guelph Line, the critical eastbound left-turn movement is forecast to operate with an acceptable LOS and v/c ratio; and
- Northbound left-turns from Guelph Line into the site can be accommodated within the existing two-way left-turn lane on Guelph Line north of St. Clair Avenue

Parking Overview

Under the existing By-law, a total of 284 spaces are required for the site. The development is proposing to provide 219 spaces. This is a variance of 65 spaces, or 23% of the By-law required supply.

Under the amended By-law, a total of 226 spaces are required for the site. The development is proposing to provide 219 spaces. This is a variance of seven spaces, or 3% of the By-law required supply.

The results of the methodologies utilized in the parking analysis provide a general understanding of parking behaviour. The analysis indicates that the proposed supply of 219 parking spaces will exceed the parking demand for the following reasons:

- The current By-law parking requirement of 284 spaces is conservative compared to actual needs. This is substantiated by the approved reduction in residential parking rates contained within the amended By-law 2020.XXX, the ITE data and the TTS data;
- Under the ITE Parking Generation Manual average rates, the subject site will require 0.98 parking spaces per dwelling unit (inclusive of visitors), or a total supply of 167 spaces. This results in a surplus of 52 spaces compared to the proposed parking supply of 219 spaces;
- Vehicle ownership rates and assume parking demand for apartments within the surrounding area are 0.86 autos per unit. On this basis, a total of 146 residential parking spaces will be required to service the residential parking demand of the site. This results in a surplus of 74 spaces. When the visitor parking requirements of 60 spaces under the current in-force By-law and 43 spaces under the amended By-law are applied, it results in an overall parking surplus of 13 and 30 spaces respectively;
- There is an established sidewalk network through the neighbourhood which provides good connectivity to surrounding streets and transit services on New Street and Guelph Line which may help to reduce auto ownership and assumed parking demand; and
- Implementation of the recommended parking management initiatives will help ensure an adequate supply of both residential and visitor parking is provided at the site.

7.2 Recommendations

Based on the findings of this study, it is recommended that:

- The City of Burlington monitor the signal timing plan at the intersection of Guelph Line and New Street;
- The City of Burlington support the proposed parking supply of 219 parking spaces, recognizing the development's target



market and the proximity to local and inter-regional transit services; and

- The applicant implement the parking management initiatives.

Appendix A

Pre-Study Consultation Correspondence

From:	Andrew Steinsky
To:	Lucas, Steve
Cc:	Edgcumbe, Kaylan; Jill Juhlke
Subject:	RE: 190014 - 418 & 422 Guelph Line TIS & PS Scope of Work
Date:	March 8, 2019 9:21:56 AM
Attachments:	image001.png

Hi Steve,

Thank you very much for providing those comments. We will ensure counts are completed mid-week (Tuesday to Thursday) and will add St. Clair Avenue & Guelph Line to the study.

With respect to the background traffic forecasts, we have reviewed the City's development activity map in Ward 2, and note a proposed residential development at 2421 & 2431 New Street. Can you confirm if it is acceptable to reference traffic forecasts from this TIS in our background traffic forecasts, in addition to a 1% growth rate applied to the base year traffic volumes. Please also let us know if there are any other approved on in-stream developments that should be included in the background traffic estimates.

Thanks,

Andrew Steinsky, B.Eng., EIT
Transportation Consultant

Paradigm Transportation Solutions Limited
p: 905.381.2229 x306

From: Lucas, Steve <Steve.Lucas@burlington.ca>
Sent: March 7, 2019 10:41 AM
To: Andrew Steinsky <asteinsky@ptsl.com>
Cc: Edgcumbe, Kaylan <Kaylan.Edgcumbe@burlington.ca>
Subject: RE: 190014 - 418 & 422 Guelph Line TIS & PS Scope of Work

Hello Andrew,

Our comments with regards to your scope of work are as follows:

Study Area

- Please include St. Clair Avenue as part of your study area.

Data Assembly

- If additional counts are required, please conduct them mid-week (Tuesday to Thursday) and during the Fall to Spring seasons (September to June).

Forecasting and Analysis

- Please use a growth rate of 1% as part of your analysis.

Thank you,

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

From: Andrew Steinsky <asteinsky@ptsl.com>
Sent: Tuesday, March 05, 2019 9:47 AM
To: Edgcumbe, Kaylan <Kaylan.Edgcumbe@burlington.ca>
Cc: Jill Juhlke <jjuhlke@ptsl.com>
Subject: 190014 - 418 & 422 Guelph Line TIS & PS Scope of Work

Hi Kaylan,

Paradigm Transportation Solutions Limited has been retained to complete a Transportation Impact Study (TIS) and Parking Study (PS) for a proposed mixed-use development in the City of Burlington. The attached letter details our understanding of the assignment and our proposed work plan. I have also attached the concept site plan for your reference. We would kindly ask City staff to review and provide any comments no later than **Tuesday 12 March 2019**. If you have any questions, please do not hesitate to contact me.

Thanks,

Andrew Steinsky, B.Eng., EIT
Transportation Consultant

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge, Ontario, N1R 8J8
p: 905.381.2229 x306
e: asteinsky@ptsl.com
w: www.ptsl.com

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Appendix B

Existing Turning Movement Count Data

Guelph Line @ New St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

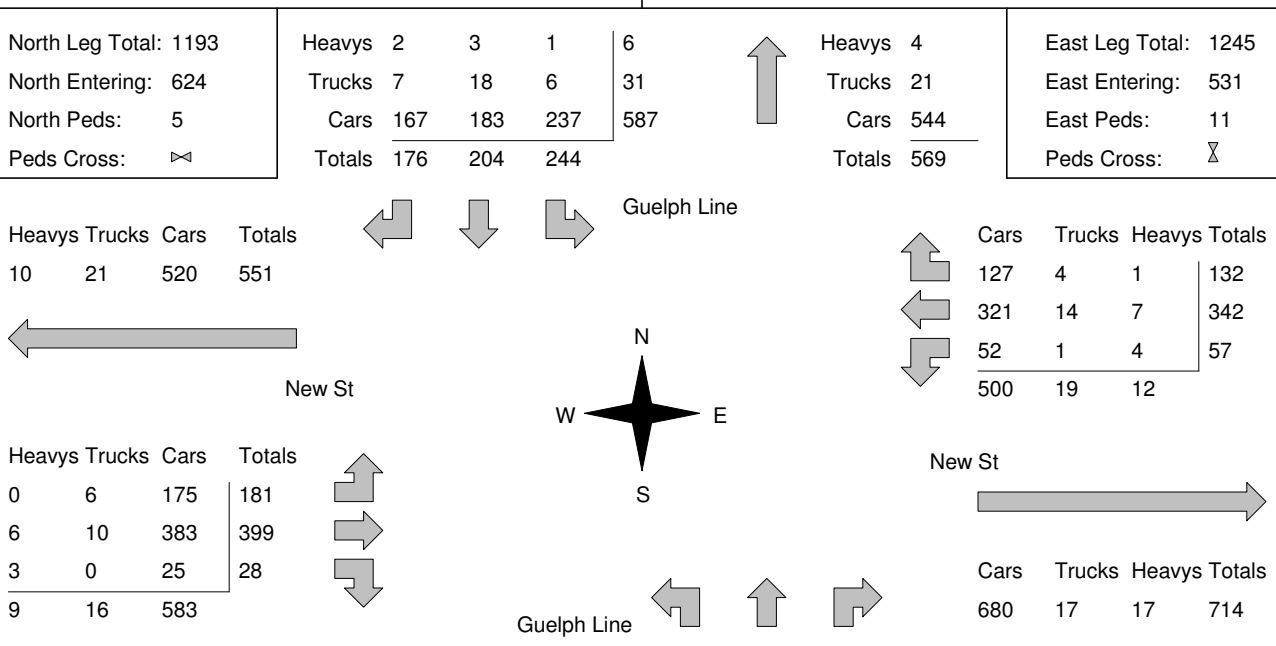
Municipality: Burlington
Site #: 0000000001
Intersection: New St & Guelph Line
TFR File #: 1
Count date: 19-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

**** Signalized Intersection ****

Major Road: New St runs W/E



Comments

Guelph Line @ New St

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

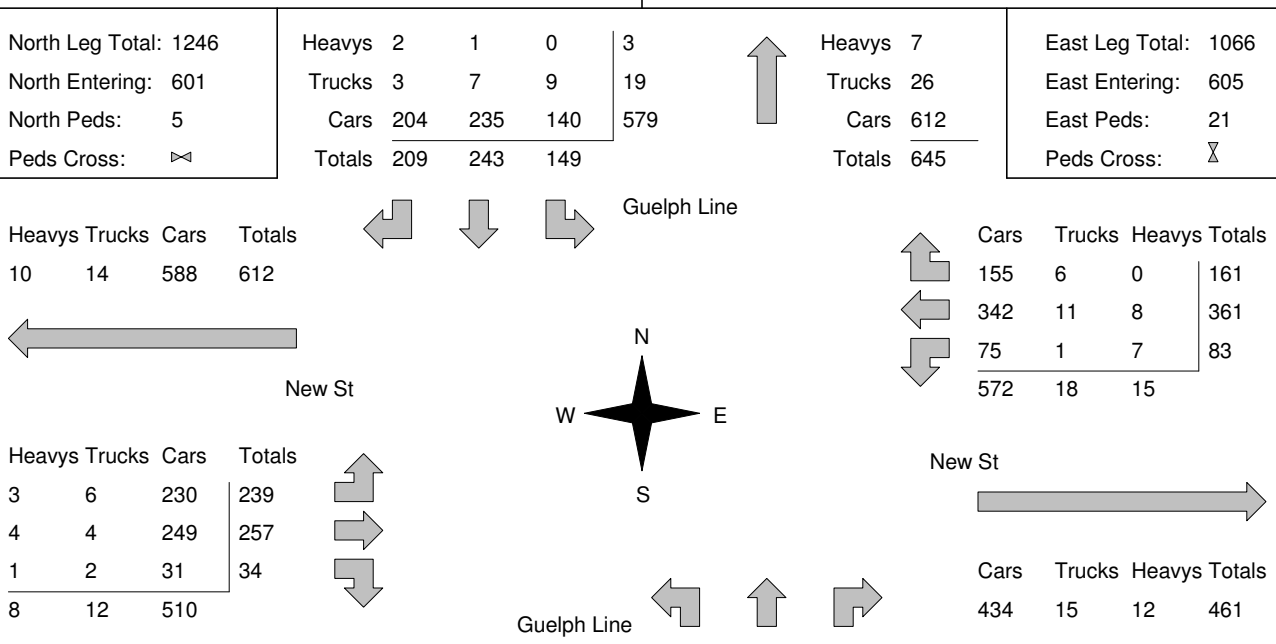
Municipality: Burlington
Site #: 0000000001
Intersection: New St & Guelph Line
TFR File #: 1
Count date: 19-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

**** Signalized Intersection ****

Major Road: New St runs W/E



Comments

Guelph Line @ New St

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 #: 0000000001
Intersection: New St & Guelph Line
TFR File #: 1
Count date: 19-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

**** Signalized Intersection ****

Major Road: New St runs W/E

North Leg Total:	1354			
North Entering:	671			
North Peds:	10			
Peds Cross:	⋈			
Heavys	0	4	1	5
Trucks	11	2	1	14
Cars	233	271	148	652
Totals	244	277	150	
Heavys	5			
Trucks	19			
Cars	659			
Totals	683			
East Leg Total:	1662			
East Entering:	1115			
East Peds:	14			
Peds Cross:	⧖			

Guelph Line

Heavys	Trucks	Cars	Totals
4	25	1033	1062

New St

Cars	Trucks	Heavys	Totals
234	7	2	243
757	13	4	774
94	4	0	98
1085	24	6	

N
W E
S

Heavys	Trucks	Cars	Totals
0	3	182	185
3	3	327	333
1	0	27	28
4	6	536	

New St

Cars	Trucks	Heavys	Totals
536	5	6	547

Guelph Line

Peds Cross:	⧖			
West Peds:	20			
West Entering:	546			
West Leg Total:	1608			
Cars	392			
Trucks	6			
Heavys	5			
Totals	403			
Cars	43	243	61	347
Trucks	1	9	1	11
Heavys	0	3	2	5
Totals	44	255	64	
Peds Cross:	⋈			
South Peds:	12			
South Entering:	363			
South Leg Total:	766			

Comments

Guelph Line @ New St

Total Count Diagram

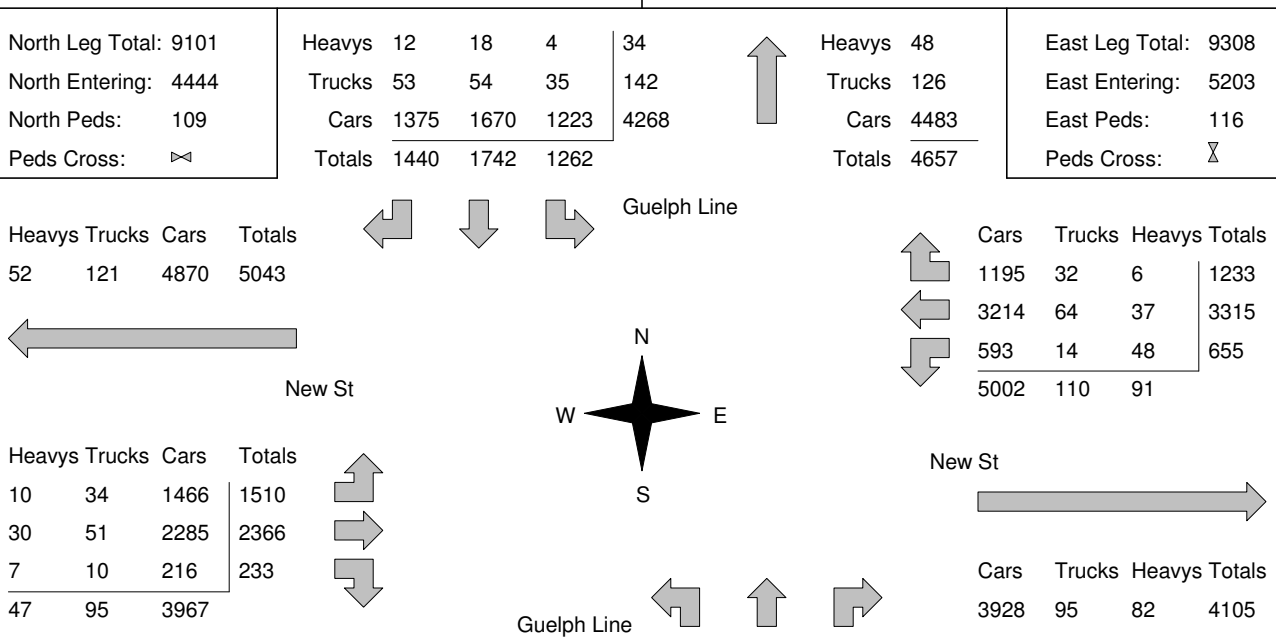
Municipality: Burlington
Site #: 0000000001
Intersection: New St & Guelph Line
TFR File #: 1
Count date: 19-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

**** Signalized Intersection ****

Major Road: New St runs W/E



Comments

Guelph Line @ St Clair Ave

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: Burlington
Site #: 0000000002
Intersection: Guelph Line & St Clair Ave
TFR File #: 2
Count date: 20-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

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

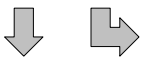
Major Road: Guelph Line runs N/S

North Leg Total: 634
North Entering: 287
North Peds: 0
Peds Cross: ⋈

Heavys	18	0	18
Trucks	13	1	14
Cars	237	18	255
Totals	268	19	

Heavys	17
Trucks	9
Cars	321
Totals	347

East Leg Total: 58
East Entering: 36
East Peds: 1
Peds Cross: ⋈

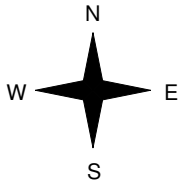




Cars	Trucks	Heavys	Totals
34	0	1	35



1	0	0	1
35	0	1	





Cars	Trucks	Heavys	Totals
21	1	0	22





Cars	238
Trucks	13
Heavys	18
Totals	269

Cars	287	3	290
Trucks	9	0	9
Heavys	16	0	16
Totals	312	3	

Peds Cross: ⋈
South Peds: 0
South Entering: 315
South Leg Total: 584

Comments

Guelph Line @ St Clair Ave

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Municipality: Burlington
Site #: 0000000002
Intersection: Guelph Line & St Clair Ave
TFR File #: 2
Count date: 20-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

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

Major Road: Guelph Line runs N/S

North Leg Total: 699
North Entering: 344
North Peds: 0
Peds Cross: ⋈

Heavys	13	0	13
Trucks	10	1	11
Cars	295	25	320
Totals	318	26	

Heavys	17
Trucks	17
Cars	321
Totals	355

East Leg Total: 68
East Entering: 37
East Peds: 1
Peds Cross: ⋈

Guelph Line

Cars	Trucks	Heavys	Totals
33	1	0	34
3	0	0	3
36	1	0	

N
W E
S

St Clair Ave

Cars	Trucks	Heavys	Totals
29	2	0	31

Guelph Line

Cars	298		
Trucks	10		
Heavys	13		
Totals	321		

Cars	288	4	292
Trucks	16	1	17
Heavys	17	0	17
Totals	321	5	

Peds Cross: ⋈
South Peds: 0
South Entering: 326
South Leg Total: 647

Comments

Guelph Line @ St Clair Ave

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

Municipality: Burlington
Site #: 0000000002
Intersection: Guelph Line & St Clair Ave
TFR File #: 2
Count date: 20-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

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

Major Road: Guelph Line runs N/S

North Leg Total: 828
North Entering: 404
North Peds: 3
Peds Cross: ⋈

Heavys	6	0	6
Trucks	5	0	5
Cars	376	17	393
Totals	387	17	

Heavys	8
Trucks	9
Cars	407
Totals	424

East Leg Total: 65
East Entering: 46
East Peds: 7
Peds Cross: ⋈

Guelph Line

	Cars	Trucks	Heavys	Totals
	45	0	0	45
	1	0	0	1
	46	0	0	

N
W E
S

St Clair Ave

Cars	Trucks	Heavys	Totals
19	0	0	19

Guelph Line

Cars	377
Trucks	5
Heavys	6
Totals	388

Cars	362	2	364
Trucks	9	0	9
Heavys	8	0	8
Totals	379	2	

Peds Cross: ⋈
South Peds: 0
South Entering: 381
South Leg Total: 769

Comments

Guelph Line @ St Clair Ave

Total Count Diagram

Municipality: Burlington
Site #: 0000000002
Intersection: Guelph Line & St Clair Ave
TFR File #: 2
Count date: 20-Mar-2019

Weather conditions:
Sunny/Dry

Person(s) who counted:
Teresa
Ela M

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

Major Road: Guelph Line runs N/S

North Leg Total: 5281
North Entering: 2495
North Peds: 5
Peds Cross: ⋈

Heavys	89	3	92
Trucks	55	4	59
Cars	2199	145	2344
Totals	2343	152	

Heavys	105
Trucks	64
Cars	2617
Totals	2786

East Leg Total: 451
East Entering: 273
East Peds: 37
Peds Cross: ⋈

Guelph Line

Cars	Trucks	Heavys	Totals
250	3	3	256
16	1	0	17
266	4	3	

N
W E
S

St Clair Ave

Cars	Trucks	Heavys	Totals
170	5	3	178

Guelph Line

Cars	2215		
Trucks	56		
Heavys	89		
Totals	2360		

Cars	2367	25	2392
Trucks	61	1	62
Heavys	102	0	102
Totals	2530	26	

Peds Cross: ⋈
South Peds: 0
South Entering: 2556
South Leg Total: 4916

Comments

Appendix C

Existing Traffic Operations Reports

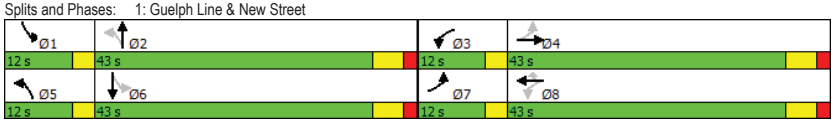


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	221	433	35	63	359	144	48	279	88	256	217	197
Future Volume (vph)	221	433	35	63	359	144	48	279	88	256	217	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	1.00	0.99		0.99	0.99	
Frt		0.989				0.850		0.964			0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3407	0	1656	3406	1553	1752	3216	0	1752	3094	0
Flt Permitted	0.377			0.384			0.501			0.478		
Satd. Flow (perm)	694	3407	0	665	3406	1527	923	3216	0	877	3094	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				150		41			205	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			146.9			265.0	
Travel Time (s)		20.3			16.0			10.6			19.1	
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Adj. Flow (vph)	230	451	36	66	374	150	50	291	92	267	226	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	230	487	0	66	374	150	50	383	0	267	431	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	29.9	19.8		27.3	16.6	16.6	46.9	37.1		51.2	43.0	
Actuated g/C Ratio	0.33	0.22		0.30	0.19	0.19	0.52	0.41		0.57	0.48	
v/c Ratio	0.68	0.64		0.23	0.59	0.37	0.09	0.28		0.45	0.27	
Control Delay	33.5	36.2		21.2	37.3	8.1	9.9	16.8		13.1	8.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.5	36.2		21.2	37.3	8.1	9.9	16.8		13.1	8.9	
LOS	C	D		C	D	A	A	B		B	A	
Approach Delay		35.3			28.1			16.0			10.5	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 89.6			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 23.0		Intersection LOS: C	
Intersection Capacity Utilization 86.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	230	487	66	374	150	50	383	267	431
v/c Ratio	0.68	0.64	0.23	0.59	0.37	0.09	0.28	0.45	0.27
Control Delay	33.5	36.2	21.2	37.3	8.1	9.9	16.8	13.1	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	36.2	21.2	37.3	8.1	9.9	16.8	13.1	8.9
Queue Length 50th (m)	30.6	43.0	8.0	32.9	0.0	3.6	20.8	22.1	12.5
Queue Length 95th (m)	49.7	60.6	16.7	47.2	15.3	9.8	35.3	42.3	26.1
Internal Link Dist (m)		258.3		242.4			122.9		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	338	1414	312	1409	719	589	1354	589	1590
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.34	0.21	0.27	0.21	0.08	0.28	0.45	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	221	433	35	63	359	144	48	279	88	256	217	197
Future Volume (vph)	221	433	35	63	359	144	48	279	88	256	217	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1751	3407		1652	3406	1528	1751	3217		1749	3094	
Flt Permitted	0.38	1.00		0.38	1.00	1.00	0.50	1.00		0.48	1.00	
Satd. Flow (perm)	695	3407		668	3406	1528	924	3217		880	3094	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	230	451	36	66	374	150	50	291	92	267	226	205
RTOR Reduction (vph)	0	6	0	0	0	122	0	24	0	0	109	0
Lane Group Flow (vph)	230	481	0	66	374	28	50	359	0	267	322	0
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	28.8	19.8		23.6	17.2	17.2	42.5	38.3		50.2	43.0	
Effective Green, g (s)	28.8	19.8		23.6	17.2	17.2	42.5	38.3		50.2	43.0	
Actuated g/C Ratio	0.32	0.22		0.26	0.19	0.19	0.46	0.42		0.55	0.47	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	738		241	640	287	467	1348		567	1455	
v/s Ratio Prot	c0.07	0.14		0.02	0.11		0.00	0.11		c0.05	0.10	
v/s Ratio Perm	c0.15			0.05		0.02	0.04			c0.21		
v/c Ratio	0.71	0.65		0.27	0.58	0.10	0.11	0.27		0.47	0.22	
Uniform Delay, d1	25.2	32.7		26.3	33.8	30.7	13.5	17.4		11.1	14.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.3	2.1		0.6	1.4	0.2	0.1	0.5		0.6	0.4	
Delay (s)	32.5	34.7		26.9	35.2	30.8	13.6	17.8		11.7	14.7	
Level of Service	C	C		C	D	C	B	B		B	B	
Approach Delay (s)		34.0			33.2			17.4			13.5	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	86.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	38	346	3	20	292
Future Volume (vph)	1	38	346	3	20	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1601	0	1758	0	1719	1696
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1601	0	1758	0	1719	1696
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			146.9
Travel Time (s)	21.9		14.7			10.6
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	3%	8%	0%	5%	12%
Adj. Flow (vph)	1	44	398	3	23	336
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	401	0	23	336
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	38	346	3	20	292
Future Volume (Veh/h)	1	38	346	3	20	292
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	44	398	3	23	336
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.94					
vC, conflicting volume	782	400			402	
vC1, stage 1 conf vol	400					
vC2, stage 2 conf vol	382					
vCu, unblocked vol	738	400			402	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			98	
cM capacity (veh/h)	562	647			1140	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	45	401	23	336
Volume Left	1	0	23	0
Volume Right	44	3	0	0
cSH	645	1700	1140	1700
Volume to Capacity	0.07	0.24	0.02	0.20
Queue Length 95th (m)	1.8	0.0	0.5	0.0
Control Delay (s)	11.0	0.0	8.2	0.0
Lane LOS	B		A	
Approach Delay (s)	11.0	0.0	0.5	
Approach LOS	B			

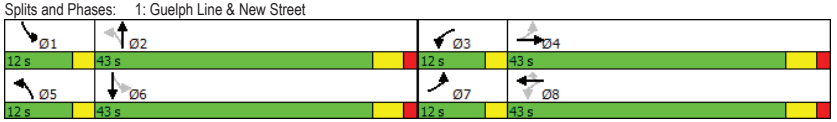
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	333	28	98	774	243	51	298	75	150	277	244
Future Volume (vph)	185	333	28	98	774	243	51	298	75	150	277	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	0.99	1.00		0.99	0.99	
Frt		0.989				0.850		0.970			0.930	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3485	0	1736	3539	1553	1770	3318	0	1787	3201	0
Flt Permitted	0.144			0.484			0.408			0.453		
Satd. Flow (perm)	270	3485	0	875	3539	1520	754	3318	0	846	3201	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				256		30			219	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			146.9			265.0	
Travel Time (s)		20.3			16.0			10.6			19.1	
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Adj. Flow (vph)	195	351	29	103	815	256	54	314	79	158	292	257
Shared Lane Traffic (%)												
Lane Group Flow (vph)	195	380	0	103	815	256	54	393	0	158	549	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	42.4	30.4		40.8	29.6	29.6	47.4	37.1		50.5	40.5	
Actuated g/C Ratio	0.41	0.30		0.40	0.29	0.29	0.46	0.36		0.49	0.40	
v/c Ratio	0.80	0.37		0.25	0.80	0.41	0.13	0.32		0.32	0.39	
Control Delay	43.6	28.8		18.6	40.0	5.5	15.4	23.5		16.8	15.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	43.6	28.8		18.6	40.0	5.5	15.4	23.5		16.8	15.1	
LOS	D	C		B	D	A	B	C		B	B	
Approach Delay		33.8			30.6			22.5			15.5	
Approach LOS		C			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 102.4			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 26.3		Intersection LOS: C	
Intersection Capacity Utilization 89.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	195	380	103	815	256	54	393	158	549
v/c Ratio	0.80	0.37	0.25	0.80	0.41	0.13	0.32	0.32	0.39
Control Delay	43.6	28.8	18.6	40.0	5.5	15.4	23.5	16.8	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	28.8	18.6	40.0	5.5	15.4	23.5	16.8	15.1
Queue Length 50th (m)	25.3	32.6	12.7	83.0	0.0	5.6	28.6	17.3	25.2
Queue Length 95th (m)	#56.9	45.7	23.1	105.5	17.7	13.7	45.5	33.3	45.3
Internal Link Dist (m)		258.3		242.4			122.9		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	245	1269	431	1283	714	451	1222	500	1397
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.30	0.24	0.64	0.36	0.12	0.32	0.32	0.39

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	333	28	98	774	243	51	298	75	150	277	244
Future Volume (vph)	185	333	28	98	774	243	51	298	75	150	277	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3484		1728	3539	1521	1765	3318		1782	3202	
Flt Permitted	0.14	1.00		0.48	1.00	1.00	0.41	1.00		0.45	1.00	
Satd. Flow (perm)	271	3484		881	3539	1521	758	3318		851	3202	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	195	351	29	103	815	256	54	314	79	158	292	257
RTOR Reduction (vph)	0	6	0	0	0	182	0	19	0	0	133	0
Lane Group Flow (vph)	195	374	0	103	815	74	54	374	0	158	416	0
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	39.4	30.4		38.0	29.7	29.7	43.7	37.8		49.1	40.5	
Effective Green, g (s)	39.4	30.4		38.0	29.7	29.7	43.7	37.8		49.1	40.5	
Actuated g/C Ratio	0.38	0.29		0.37	0.29	0.29	0.42	0.37		0.48	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	235	1027		392	1019	438	378	1216		482	1257	
v/s Ratio Prot	c0.07	0.11		0.02	0.23		0.01	0.11		c0.03	c0.13	
v/s Ratio Perm	c0.24			0.08		0.05	0.05			0.13		
v/c Ratio	0.83	0.36		0.26	0.80	0.17	0.14	0.31		0.33	0.33	
Uniform Delay, d1	24.3	28.7		21.9	33.9	27.5	17.7	23.3		15.7	21.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.9	0.2		0.4	4.5	0.2	0.2	0.7		0.4	0.7	
Delay (s)	45.1	28.9		22.2	38.4	27.6	17.9	24.0		16.1	22.6	
Level of Service	D	C		C	D	C	B	C		B	C	
Approach Delay (s)		34.4			34.7			23.2			21.1	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	103.1	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	89.1%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	45	379	2	17	386
Future Volume (vph)	1	45	379	2	17	386
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1648	0	1825	0	1805	1845
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1648	0	1825	0	1805	1845
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			146.9
Travel Time (s)	21.9		14.7			10.6
Confl. Peds. (#/hr)		3		7	7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	4%	0%	0%	3%
Adj. Flow (vph)	1	51	426	2	19	434
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	428	0	19	434
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		



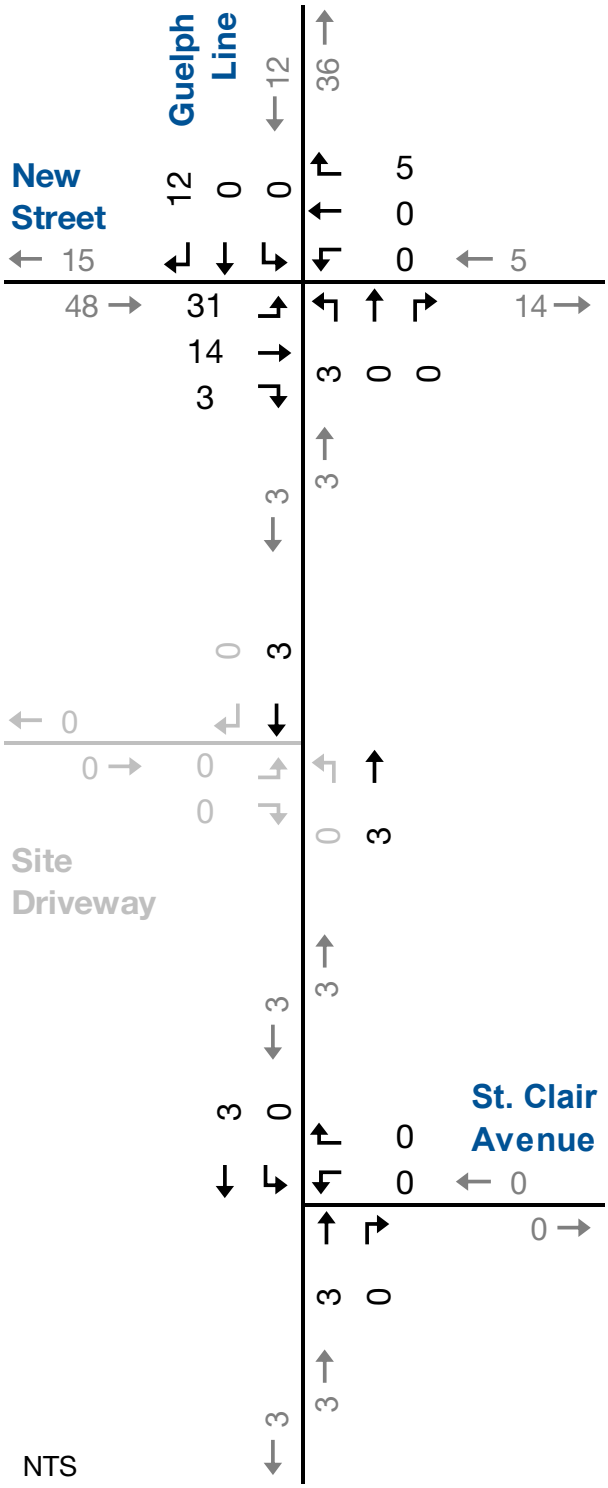
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	45	379	2	17	386
Future Volume (Veh/h)	1	45	379	2	17	386
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	51	426	2	19	434
Pedestrians	7					3
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.87					
vC, conflicting volume	906	437			435	
vC1, stage 1 conf vol	434					
vC2, stage 2 conf vol	472					
vCu, unblocked vol	813	437			435	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			98	
cM capacity (veh/h)	516	619			1129	

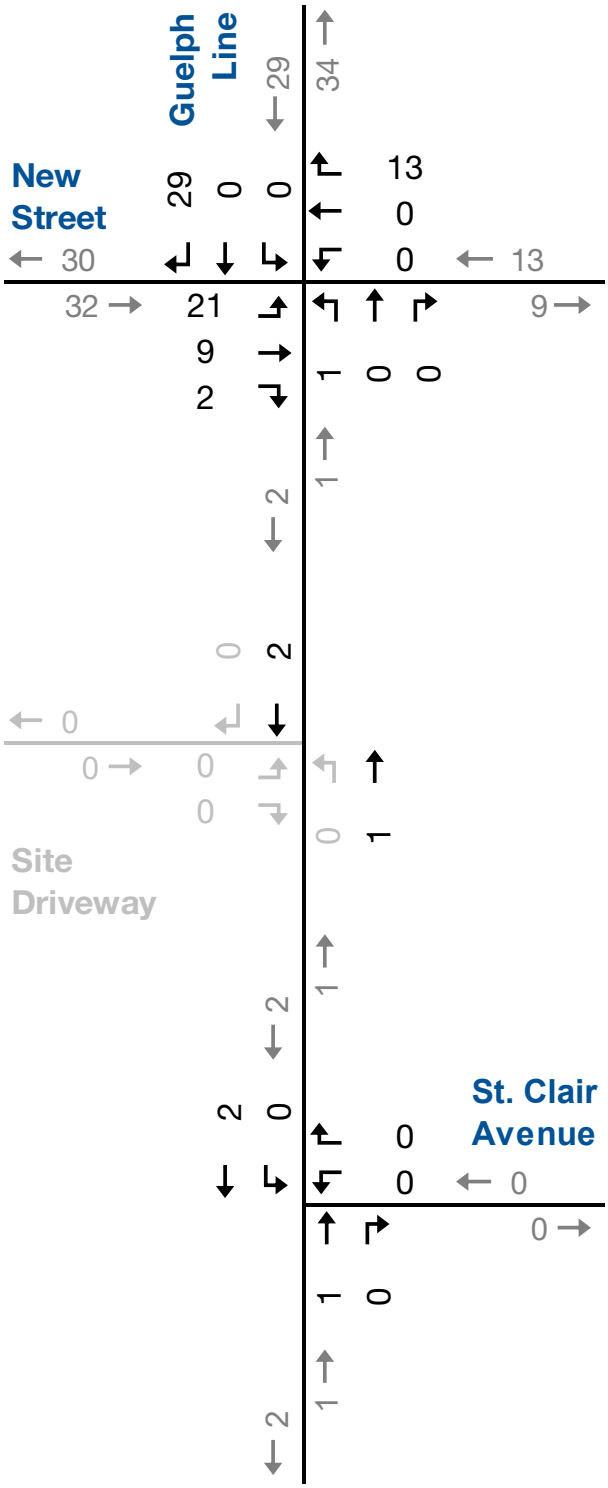
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	52	428	19	434
Volume Left	1	0	19	0
Volume Right	51	2	0	0
cSH	616	1700	1129	1700
Volume to Capacity	0.08	0.25	0.02	0.26
Queue Length 95th (m)	2.2	0.0	0.4	0.0
Control Delay (s)	11.4	0.0	8.2	0.0
Lane LOS	B		A	
Approach Delay (s)	11.4	0.0	0.3	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D

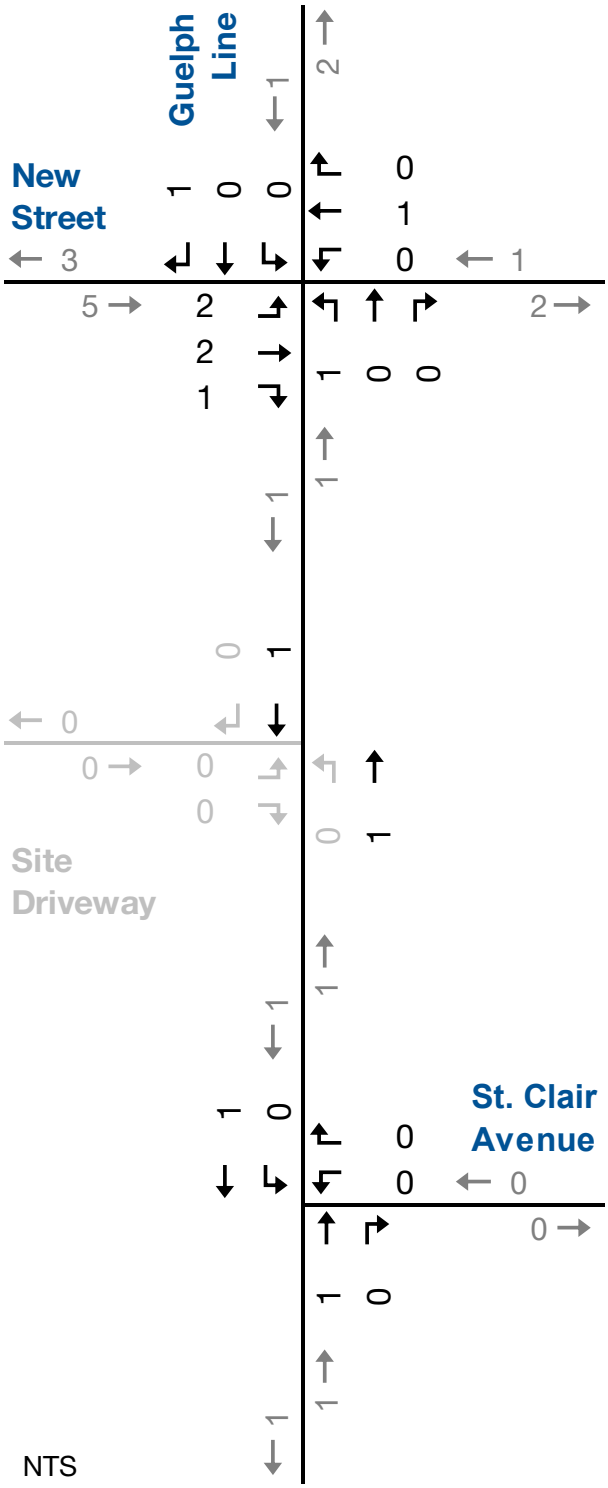
Other Area Developments Trip Assignment

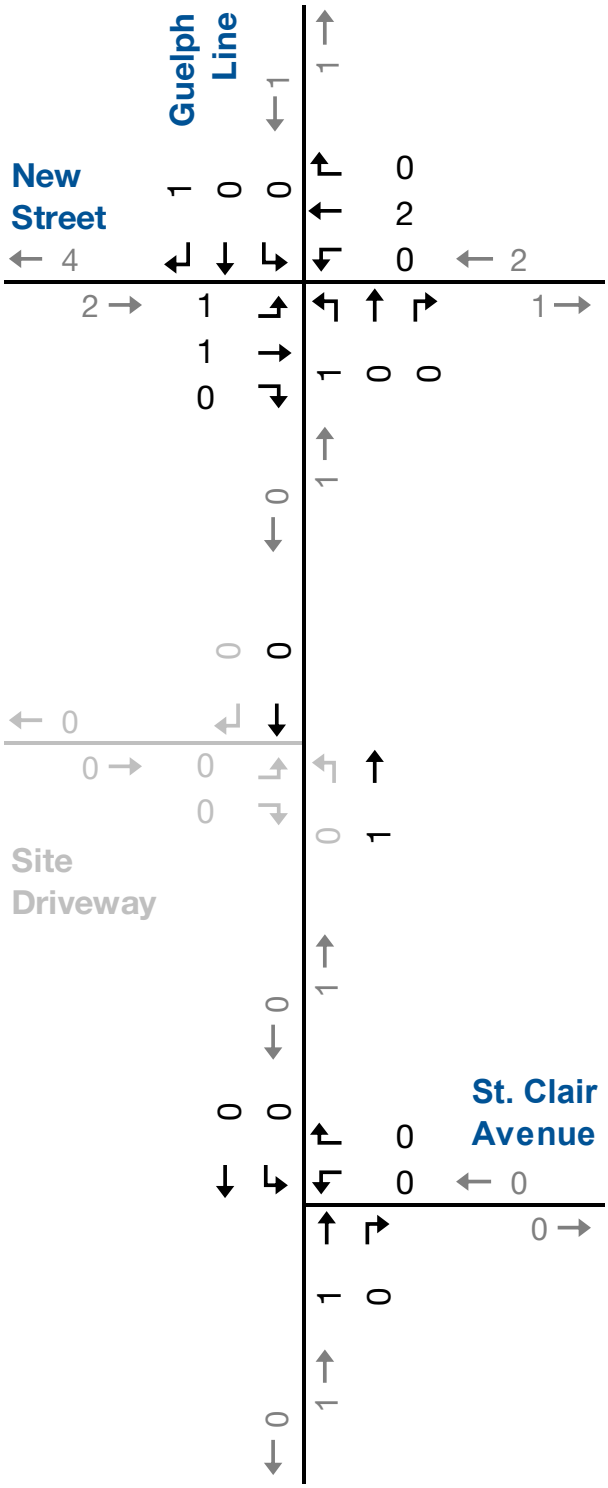




paradigm TRANSPORTATION SOLUTIONS LIMITED

2421 & 2431 New Street Traffic Volumes





paradigm TRANSPORTATION SOLUTIONS LIMITED

2360 & 2368 New Street Traffic Volumes

Appendix E

Background Traffic Operations Reports

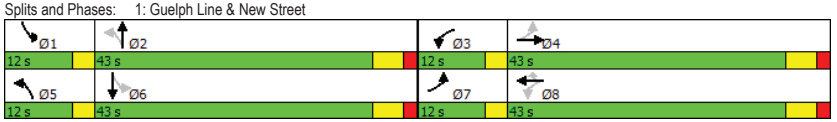


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Future Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	1.00	1.00		0.99	0.99	
Frt		0.990				0.850		0.967			0.928	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3412	0	1656	3406	1553	1752	3235	0	1752	3091	0
Flt Permitted	0.373			0.386			0.502			0.496		
Satd. Flow (perm)	686	3412	0	668	3406	1527	925	3235	0	910	3091	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				150		35			206	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			146.9			265.0	
Travel Time (s)		20.3			16.0			10.6			19.1	
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Adj. Flow (vph)	232	453	34	63	375	150	41	280	78	267	224	206
Shared Lane Traffic (%)												
Lane Group Flow (vph)	232	487	0	63	375	150	41	358	0	267	430	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	29.9	19.8		27.1	16.5	16.5	46.7	37.1		51.4	43.2	
Actuated g/C Ratio	0.33	0.22		0.30	0.18	0.18	0.52	0.41		0.57	0.48	
v/c Ratio	0.69	0.64		0.22	0.60	0.37	0.08	0.26		0.44	0.27	
Control Delay	34.1	36.1		21.1	37.5	8.1	9.8	16.8		12.8	8.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	34.1	36.1		21.1	37.5	8.1	9.8	16.8		12.8	8.7	
LOS	C	D		C	D	A	A	B		B	A	
Approach Delay		35.5			28.2			16.1			10.3	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 89.5			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 86.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street





Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	232	487	63	375	150	41	358	267	430
v/c Ratio	0.69	0.64	0.22	0.60	0.37	0.08	0.26	0.44	0.27
Control Delay	34.1	36.1	21.1	37.5	8.1	9.8	16.8	12.8	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	36.1	21.1	37.5	8.1	9.8	16.8	12.8	8.7
Queue Length 50th (m)	30.9	42.8	7.6	33.0	0.0	2.9	19.4	21.9	12.3
Queue Length 95th (m)	50.1	60.6	16.2	47.3	15.3	8.5	33.2	42.3	25.7
Internal Link Dist (m)		258.3		242.4			122.9		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	336	1418	312	1411	720	590	1360	607	1598
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.34	0.20	0.27	0.21	0.07	0.26	0.44	0.27

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Future Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1751	3411		1652	3406	1528	1751	3237		1748	3093	
Flt Permitted	0.37	1.00		0.39	1.00	1.00	0.50	1.00		0.50	1.00	
Satd. Flow (perm)	687	3411		672	3406	1528	925	3237		913	3093	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	232	453	34	62	375	150	41	280	78	267	224	206
RTOR Reduction (vph)	0	6	0	0	0	122	0	20	0	0	109	0
Lane Group Flow (vph)	232	481	0	63	375	28	41	338	0	267	321	0
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	28.8	19.8		23.4	17.1	17.1	42.5	38.4		50.3	43.2	
Effective Green, g (s)	28.8	19.8		23.4	17.1	17.1	42.5	38.4		50.3	43.2	
Actuated g/C Ratio	0.32	0.22		0.26	0.19	0.19	0.46	0.42		0.55	0.47	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	321	738		239	637	285	467	1359		583	1461	
v/s Ratio Prot	c0.07	0.14		0.02	0.11		0.00	0.10		c0.04	0.10	
v/s Ratio Perm	c0.16			0.05		0.02	0.04			c0.21		
v/c Ratio	0.72	0.65		0.26	0.59	0.10	0.09	0.25		0.46	0.22	
Uniform Delay, d1	25.3	32.7		26.4	33.9	30.8	13.4	17.2		11.0	14.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.8	2.1		0.6	1.4	0.2	0.1	0.4		0.6	0.3	
Delay (s)	33.1	34.7		27.0	35.3	30.9	13.5	17.6		11.6	14.5	
Level of Service	C	C		C	D	C	B	B		B	B	
Approach Delay (s)		34.2			33.3			17.2			13.4	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	86.2%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	38	345	3	20	288
Future Volume (vph)	1	38	345	3	20	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1601	0	1758	0	1719	1696
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1601	0	1758	0	1719	1696
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			146.9
Travel Time (s)	21.9		14.7			10.6
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	3%	8%	0%	5%	12%
Adj. Flow (vph)	1	44	397	3	23	331
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	400	0	23	331
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	38	345	3	20	288
Future Volume (Veh/h)	1	38	345	3	20	288
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	44	397	3	23	331
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.94					
vC, conflicting volume	776	400			401	
vC1, stage 1 conf vol	400					
vC2, stage 2 conf vol	377					
vCu, unblocked vol	733	400			401	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			98	
cM capacity (veh/h)	564	648			1141	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	45	400	23	331
Volume Left	1	0	23	0
Volume Right	44	3	0	0
cSH	646	1700	1141	1700
Volume to Capacity	0.07	0.24	0.02	0.19
Queue Length 95th (m)	1.8	0.0	0.5	0.0
Control Delay (s)	11.0	0.0	8.2	0.0
Lane LOS	B		A	
Approach Delay (s)	11.0	0.0	0.5	
Approach LOS	B			

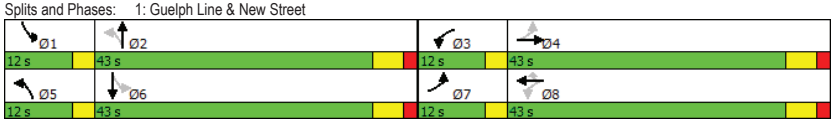
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Future Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	0.99	1.00		0.99	0.99	
Frt		0.988				0.850		0.970			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3481	0	1736	3539	1553	1770	3318	0	1787	3182	0
Flt Permitted	0.129			0.457			0.364			0.437		
Satd. Flow (perm)	242	3481	0	827	3539	1520	673	3318	0	816	3182	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				282		31			243	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			146.9			265.0	
Travel Time (s)		20.3			16.0			10.6			19.1	
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Adj. Flow (vph)	227	379	33	108	858	282	59	329	83	166	307	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	412	0	108	858	282	59	412	0	166	608	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	43.8	31.8		42.3	31.0	31.0	47.5	37.1		50.5	40.4	
Actuated g/C Ratio	0.42	0.31		0.41	0.30	0.30	0.46	0.36		0.49	0.39	
v/c Ratio	0.96	0.39		0.26	0.81	0.43	0.15	0.34		0.35	0.44	
Control Delay	74.0	28.8		18.7	40.5	5.4	16.0	24.3		17.7	15.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	74.0	28.8		18.7	40.5	5.4	16.0	24.3		17.7	15.9	
LOS	E	C		B	D	A	B	C		B	B	
Approach Delay		44.9			30.7			23.3			16.3	
Approach LOS		D			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 103.9			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 28.9		Intersection LOS: C	
Intersection Capacity Utilization 92.0%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	412	108	858	282	59	412	166	608
v/c Ratio	0.96	0.39	0.26	0.81	0.43	0.15	0.34	0.35	0.44
Control Delay	74.0	28.8	18.7	40.5	5.4	16.0	24.3	17.7	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.0	28.8	18.7	40.5	5.4	16.0	24.3	17.7	15.9
Queue Length 50th (m)	30.4	35.7	13.3	88.7	0.0	6.3	31.1	19.0	29.5
Queue Length 95th (m)	#80.6	49.5	23.9	112.5	18.4	14.6	47.6	34.9	50.4
Internal Link Dist (m)		258.3		242.4			122.9		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	236	1249	421	1264	724	413	1205	480	1385
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.33	0.26	0.68	0.39	0.14	0.34	0.35	0.44

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Future Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3481		1729	3539	1521	1766	3318		1783	3183	
Flt Permitted	0.13	1.00		0.46	1.00	1.00	0.36	1.00		0.44	1.00	
Satd. Flow (perm)	243	3481		831	3539	1521	677	3318		819	3183	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	379	33	108	858	282	59	329	83	166	307	301
RTOR Reduction (vph)	0	6	0	0	0	198	0	20	0	0	149	0
Lane Group Flow (vph)	227	406	0	108	858	84	59	392	0	166	459	0
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	40.7	31.7		39.3	31.0	31.0	43.7	37.7		49.1	40.4	
Effective Green, g (s)	40.7	31.7		39.3	31.0	31.0	43.7	37.7		49.1	40.4	
Actuated g/C Ratio	0.39	0.30		0.38	0.30	0.30	0.42	0.36		0.47	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	227	1056		384	1050	451	345	1198		465	1231	
v/s Ratio Prot	c0.09	0.12		0.02	0.24		0.01	0.12		c0.03	c0.14	
v/s Ratio Perm	c0.30			0.08		0.06	0.06			0.14		
v/c Ratio	1.00	0.38		0.28	0.82	0.19	0.17	0.33		0.36	0.37	
Uniform Delay, d1	25.6	28.7		21.7	34.1	27.3	18.4	24.2		16.3	22.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.7	0.2		0.4	5.0	0.2	0.2	0.7		0.5	0.9	
Delay (s)	85.4	28.9		22.1	39.1	27.5	18.6	24.9		16.8	23.8	
Level of Service	F	C		C	D	C	B	C		B	C	
Approach Delay (s)		48.9			35.0			24.1			22.3	
Approach LOS		D			D			C			C	

Intersection Summary					
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	104.4	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	92.0%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	47	401	2	18	408
Future Volume (vph)	1	47	401	2	18	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1646	0	1825	0	1805	1845
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1646	0	1825	0	1805	1845
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			146.9
Travel Time (s)	21.9		14.7			10.6
Confl. Peds. (#/hr)		3		7	7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	4%	0%	0%	3%
Adj. Flow (vph)	1	53	451	2	20	458
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	453	0	20	458
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	47	401	2	18	408
Future Volume (Veh/h)	1	47	401	2	18	408
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	53	451	2	20	458
Pedestrians	7					3
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.85					
vC, conflicting volume	957	462			460	
vC1, stage 1 conf vol	459					
vC2, stage 2 conf vol	498					
vCu, unblocked vol	860	462			460	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			98	
cM capacity (veh/h)	497	599			1105	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	54	453	20	458
Volume Left	1	0	20	0
Volume Right	53	2	0	0
cSH	597	1700	1105	1700
Volume to Capacity	0.09	0.27	0.02	0.27
Queue Length 95th (m)	2.4	0.0	0.4	0.0
Control Delay (s)	11.6	0.0	8.3	0.0
Lane LOS	B		A	
Approach Delay (s)	11.6	0.0	0.3	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F

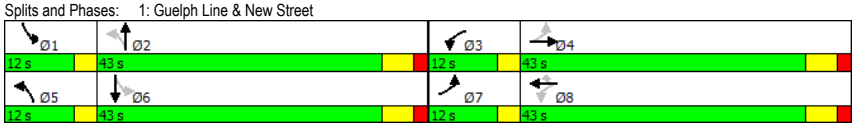
Total Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	37	63	360	144	48	279	87	256	218	198
Future Volume (vph)	223	435	37	63	360	144	48	279	87	256	218	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	1.00	0.99		0.99	0.99	
Frt		0.988				0.850		0.964			0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3402	0	1656	3406	1553	1752	3217	0	1752	3094	0
Flt Permitted	0.377			0.379			0.500			0.478		
Satd. Flow (perm)	694	3402	0	656	3406	1527	921	3217	0	877	3094	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				150		41			206	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			81.3			265.0	
Travel Time (s)		20.3			16.0			5.9			19.1	
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Adj. Flow (vph)	232	453	39	66	375	150	50	291	91	267	227	206
Shared Lane Traffic (%)												
Lane Group Flow (vph)	232	492	0	66	375	150	50	382	0	267	433	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	30.1	20.0		27.4	16.7	16.7	46.9	37.1		51.3	43.0	
Actuated g/C Ratio	0.34	0.22		0.31	0.19	0.19	0.52	0.41		0.57	0.48	
v/c Ratio	0.69	0.64		0.23	0.59	0.37	0.09	0.28		0.45	0.27	
Control Delay	33.7	36.2		21.2	37.2	8.0	9.9	16.9		13.2	9.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.7	36.2		21.2	37.2	8.0	9.9	16.9		13.2	9.0	
LOS	C	D		C	D	A	A	B		B	A	
Approach Delay		35.4			28.0			16.1			10.6	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 89.8			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 23.1		Intersection LOS: C	
Intersection Capacity Utilization 86.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	232	492	66	375	150	50	382	267	433
v/c Ratio	0.69	0.64	0.23	0.59	0.37	0.09	0.28	0.45	0.27
Control Delay	33.7	36.2	21.2	37.2	8.0	9.9	16.9	13.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	36.2	21.2	37.2	8.0	9.9	16.9	13.2	9.0
Queue Length 50th (m)	30.9	43.4	8.0	33.0	0.0	3.6	20.8	22.2	12.6
Queue Length 95th (m)	50.1	61.3	16.7	47.3	15.3	9.9	35.3	42.4	26.2
Internal Link Dist (m)		258.3		242.4			57.3		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	338	1411	310	1407	718	587	1353	588	1589
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.35	0.21	0.27	0.21	0.09	0.28	0.45	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	37	63	360	144	48	279	87	256	218	198
Future Volume (vph)	223	435	37	63	360	144	48	279	87	256	218	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1751	3403		1652	3406	1528	1751	3219		1749	3094	
Flt Permitted	0.38	1.00		0.38	1.00	1.00	0.50	1.00		0.48	1.00	
Satd. Flow (perm)	695	3403		660	3406	1528	922	3219		881	3094	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	232	453	39	66	375	150	50	291	91	267	227	206
RTOR Reduction (vph)	0	7	0	0	0	122	0	24	0	0	109	0
Lane Group Flow (vph)	232	485	0	66	375	28	50	358	0	267	324	0
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	29.0	20.0		23.8	17.4	17.4	42.5	38.3		50.2	43.0	
Effective Green, g (s)	29.0	20.0		23.8	17.4	17.4	42.5	38.3		50.2	43.0	
Actuated g/C Ratio	0.32	0.22		0.26	0.19	0.19	0.46	0.42		0.55	0.47	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	743		240	646	290	465	1345		567	1452	
v/s Ratio Prot	c0.07	0.14		0.02	0.11		0.00	0.11		c0.05	0.10	
v/s Ratio Perm	c0.16			0.05		0.02	0.04			c0.21		
v/c Ratio	0.72	0.65		0.28	0.58	0.10	0.11	0.27		0.47	0.22	
Uniform Delay, d1	25.2	32.6		26.2	33.8	30.6	13.5	17.4		11.1	14.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.4	2.1		0.6	1.3	0.1	0.1	0.5		0.6	0.4	
Delay (s)	32.6	34.7		26.8	35.1	30.8	13.6	17.9		11.8	14.8	
Level of Service	C	C		C	D	C	B	B		B	B	
Approach Delay (s)		34.0			33.1			17.4			13.6	
Approach LOS		C			C			B			B	

Intersection Summary					
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.60				
Actuated Cycle Length (s)	91.6	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	86.2%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	38	346	3	20	293
Future Volume (vph)	1	38	346	3	20	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1601	0	1758	0	1719	1696
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1601	0	1758	0	1719	1696
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			65.6
Travel Time (s)	21.9		14.7			4.7
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	3%	8%	0%	5%	12%
Adj. Flow (vph)	1	44	398	3	23	337
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	401	0	23	337
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	38	346	3	20	293
Future Volume (Veh/h)	1	38	346	3	20	293
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	44	398	3	23	337
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.94					
vC, conflicting volume	784	400			402	
vC1, stage 1 conf vol	400					
vC2, stage 2 conf vol	383					
vCu, unblocked vol	741	400			402	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			98	
cM capacity (veh/h)	561	647			1140	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	45	401	23	337
Volume Left	1	0	23	0
Volume Right	44	3	0	0
cSH	645	1700	1140	1700
Volume to Capacity	0.07	0.24	0.02	0.20
Queue Length 95th (m)	1.8	0.0	0.5	0.0
Control Delay (s)	11.0	0.0	8.2	0.0
Lane LOS	B		A	
Approach Delay (s)	11.0	0.0	0.5	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	32	5	2	382	308	9
Future Volume (vph)	32	5	2	382	308	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.983				0.996	
Flt Protected	0.958					
Satd. Flow (prot)	1789	0	0	1713	1772	0
Flt Permitted	0.958					
Satd. Flow (perm)	1789	0	0	1713	1772	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	75.0			65.6	81.3	
Travel Time (s)	5.4			4.7	5.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	11%	7%	0%
Adj. Flow (vph)	35	5	2	415	335	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	417	345	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	5	2	382	308	9
Future Volume (Veh/h)	32	5	2	382	308	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	5	2	415	335	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					81	
pX, platoon unblocked	0.91	0.91	0.91			
vC, conflicting volume	759	340	345			
vC1, stage 1 conf vol	340					
vC2, stage 2 conf vol	419					
vCu, unblocked vol	681	219	224			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	100			
cM capacity (veh/h)	578	748	1228			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	417	345
Volume Left	35	2	0
Volume Right	5	0	10
cSH	595	1228	1700
Volume to Capacity	0.07	0.00	0.20
Queue Length 95th (m)	1.7	0.0	0.0
Control Delay (s)	11.5	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.5	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

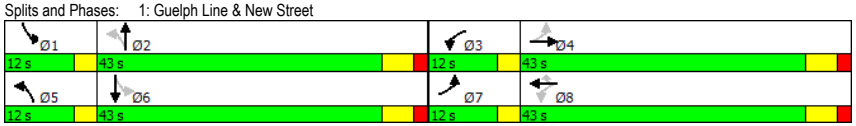
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	38	117	815	268	64	319	83	158	299	286
Future Volume (vph)	216	360	38	117	815	268	64	319	83	158	299	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	0.99	0.99		0.99	0.99	
Frt		0.986				0.850		0.969			0.927	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3471	0	1736	3539	1553	1770	3315	0	1787	3187	0
Flt Permitted	0.131			0.447			0.356			0.431		
Satd. Flow (perm)	246	3471	0	809	3539	1520	659	3315	0	805	3187	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				282		32			236	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			80.6			265.0	
Travel Time (s)		20.3			16.0			5.8			19.1	
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Adj. Flow (vph)	227	379	40	123	858	282	67	336	87	166	315	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	419	0	123	858	282	67	423	0	166	616	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	43.6	31.6		42.5	31.0	31.0	47.7	37.1		50.3	40.2	
Actuated g/C Ratio	0.42	0.30		0.41	0.30	0.30	0.46	0.36		0.48	0.39	
v/c Ratio	0.96	0.39		0.30	0.81	0.43	0.18	0.35		0.35	0.45	
Control Delay	72.7	28.9		19.2	40.5	5.4	16.2	24.4		17.8	16.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	72.7	28.9		19.2	40.5	5.4	16.2	24.4		17.8	16.5	
LOS	E	C		B	D	A	B	C		B	B	
Approach Delay		44.3			30.6			23.3			16.8	
Approach LOS		D			C			C			B	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 103.9
Natural Cycle: 105
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 28.8 — Intersection LOS: C
Intersection Capacity Utilization 92.0% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	419	123	858	282	67	423	166	616
v/c Ratio	0.96	0.39	0.30	0.81	0.43	0.18	0.35	0.35	0.45
Control Delay	72.7	28.9	19.2	40.5	5.4	16.2	24.4	17.8	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.7	28.9	19.2	40.5	5.4	16.2	24.4	17.8	16.5
Queue Length 50th (m)	30.1	36.3	15.3	88.7	0.0	7.2	32.0	19.0	31.1
Queue Length 95th (m)	#79.9	50.2	26.7	112.5	18.4	16.2	49.0	34.9	52.3
Internal Link Dist (m)		258.3		242.4			56.6		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	237	1247	415	1264	724	408	1205	475	1379
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.34	0.30	0.68	0.39	0.16	0.35	0.35	0.45

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	38	117	815	268	64	319	83	158	299	286
Future Volume (vph)	216	360	38	117	815	268	64	319	83	158	299	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3470		1729	3539	1521	1766	3316		1783	3187	
Flt Permitted	0.13	1.00		0.45	1.00	1.00	0.36	1.00		0.43	1.00	
Satd. Flow (perm)	246	3470		814	3539	1521	662	3316		808	3187	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	379	40	123	858	282	67	336	87	166	315	301
RTOR Reduction (vph)	0	8	0	0	0	198	0	20	0	0	145	0
Lane Group Flow (vph)	227	411	0	123	858	84	67	403	0	166	471	0
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	40.6	31.6		39.6	31.1	31.1	43.9	37.7		48.9	40.2	
Effective Green, g (s)	40.6	31.6		39.6	31.1	31.1	43.9	37.7		48.9	40.2	
Actuated g/C Ratio	0.39	0.30		0.38	0.30	0.30	0.42	0.36		0.47	0.38	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	228	1049		382	1053	452	343	1196		459	1226	
v/s Ratio Prot	c0.09	0.12		0.03	0.24		0.01	0.12		c0.03	c0.15	
v/s Ratio Perm	c0.30			0.10		0.06	0.07			0.14		
v/c Ratio	1.00	0.39		0.32	0.81	0.19	0.20	0.34		0.36	0.38	
Uniform Delay, d1	25.7	28.8		21.8	34.0	27.3	18.4	24.3		16.5	23.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	58.0	0.2		0.5	4.9	0.2	0.3	0.8		0.5	0.9	
Delay (s)	83.7	29.1		22.3	39.0	27.5	18.7	25.1		17.0	24.1	
Level of Service	F	C		C	D	C	B	C		B	C	
Approach Delay (s)		48.3			34.8			24.2			22.6	
Approach LOS		D			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.68				
Actuated Cycle Length (s)	104.5	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	92.0%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	47	405	2	18	411
Future Volume (vph)	1	47	405	2	18	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1646	0	1825	0	1805	1845
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1646	0	1825	0	1805	1845
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			66.3
Travel Time (s)	21.9		14.7			4.8
Confl. Peds. (#/hr)		3		7	7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	4%	0%	0%	3%
Adj. Flow (vph)	1	53	455	2	20	462
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	457	0	20	462
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

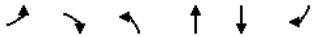
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	47	405	2	18	411
Future Volume (Veh/h)	1	47	405	2	18	411
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	53	455	2	20	462
Pedestrians	7					3
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.85					
vC, conflicting volume	965	466			464	
vC1, stage 1 conf vol	463					
vC2, stage 2 conf vol	502					
vCu, unblocked vol	868	466			464	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			98	
cM capacity (veh/h)	494	596			1101	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	54	457	20	462
Volume Left	1	0	20	0
Volume Right	53	2	0	0
cSH	593	1700	1101	1700
Volume to Capacity	0.09	0.27	0.02	0.27
Queue Length 95th (m)	2.4	0.0	0.4	0.0
Control Delay (s)	11.7	0.0	8.3	0.0
Lane LOS	B		A	
Approach Delay (s)	11.7	0.0	0.3	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	3	4	448	426	28
Future Volume (vph)	18	3	4	448	426	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.982				0.992	
Flt Protected	0.958					
Satd. Flow (prot)	1787	0	0	1827	1833	0
Flt Permitted	0.958					
Satd. Flow (perm)	1787	0	0	1827	1833	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	68.9			66.3	80.6	
Travel Time (s)	5.0			4.8	5.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	3%	0%
Adj. Flow (vph)	20	3	4	487	463	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	0	0	491	493	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	3	4	448	426	28
Future Volume (Veh/h)	18	3	4	448	426	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	3	4	487	463	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					80	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	973	478	493			
vC1, stage 1 conf vol	478					
vC2, stage 2 conf vol	495					
vCu, unblocked vol	851	241	259			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	100	100			
cM capacity (veh/h)	499	652	1069			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	491	493
Volume Left	20	4	0
Volume Right	3	0	30
cSH	515	1069	1700
Volume to Capacity	0.04	0.00	0.29
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	12.3	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.3	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix G

Traffic Operations Reports – Optimized

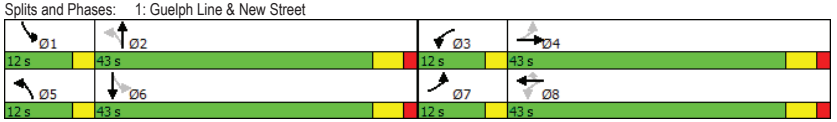
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Future Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	1.00	1.00		0.99	0.99	
Frt		0.990				0.850		0.967			0.928	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3412	0	1656	3406	1553	1752	3235	0	1752	3091	0
Flt Permitted	0.373			0.386			0.502			0.496		
Satd. Flow (perm)	686	3412	0	668	3406	1527	925	3235	0	910	3091	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				150		35			206	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			146.9			265.0	
Travel Time (s)		20.3			16.0			10.6			19.1	
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Adj. Flow (vph)	232	453	34	63	375	150	41	280	78	267	224	206
Shared Lane Traffic (%)												
Lane Group Flow (vph)	232	487	0	63	375	150	41	358	0	267	430	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	29.9	19.8		27.1	16.5	16.5	46.7	37.1		51.4	43.2	
Actuated g/C Ratio	0.33	0.22		0.30	0.18	0.18	0.52	0.41		0.57	0.48	
v/c Ratio	0.69	0.64		0.22	0.60	0.37	0.08	0.26		0.44	0.27	
Control Delay	34.1	36.1		21.1	37.5	8.1	9.8	16.8		12.8	8.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	34.1	36.1		21.1	37.5	8.1	9.8	16.8		12.8	8.7	
LOS	C	D		C	D	A	A	B		B	A	
Approach Delay		35.5			28.2			16.1			10.3	
Approach LOS		D			C			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 89.5
Natural Cycle: 105
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 23.2 — Intersection LOS: C
Intersection Capacity Utilization 86.2% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	232	487	63	375	150	41	358	267	430
v/c Ratio	0.69	0.64	0.22	0.60	0.37	0.08	0.26	0.44	0.27
Control Delay	34.1	36.1	21.1	37.5	8.1	9.8	16.8	12.8	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	36.1	21.1	37.5	8.1	9.8	16.8	12.8	8.7
Queue Length 50th (m)	30.9	42.8	7.6	33.0	0.0	2.9	19.4	21.9	12.3
Queue Length 95th (m)	50.1	60.6	16.2	47.3	15.3	8.5	33.2	42.3	25.7
Internal Link Dist (m)		258.3		242.4			122.9		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	336	1418	312	1411	720	590	1360	607	1598
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.34	0.20	0.27	0.21	0.07	0.26	0.44	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Future Volume (vph)	223	435	33	60	360	144	39	269	75	256	215	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1751	3411		1652	3406	1528	1751	3237		1748	3093	
Flt Permitted	0.37	1.00		0.39	1.00	1.00	0.50	1.00		0.50	1.00	
Satd. Flow (perm)	687	3411		672	3406	1528	925	3237		913	3093	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	232	453	34	62	375	150	41	280	78	267	224	206
RTOR Reduction (vph)	0	6	0	0	0	122	0	20	0	0	109	0
Lane Group Flow (vph)	232	481	0	63	375	28	41	338	0	267	321	0
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	28.8	19.8		23.4	17.1	17.1	42.5	38.4		50.3	43.2	
Effective Green, g (s)	28.8	19.8		23.4	17.1	17.1	42.5	38.4		50.3	43.2	
Actuated g/C Ratio	0.32	0.22		0.26	0.19	0.19	0.46	0.42		0.55	0.47	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	321	738		239	637	285	467	1359		583	1461	
v/s Ratio Prot	c0.07	0.14		0.02	0.11		0.00	0.10		c0.04	0.10	
v/s Ratio Perm	c0.16			0.05		0.02	0.04			c0.21		
v/c Ratio	0.72	0.65		0.26	0.59	0.10	0.09	0.25		0.46	0.22	
Uniform Delay, d1	25.3	32.7		26.4	33.9	30.8	13.4	17.2		11.0	14.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.8	2.1		0.6	1.4	0.2	0.1	0.4		0.6	0.3	
Delay (s)	33.1	34.7		27.0	35.3	30.9	13.5	17.6		11.6	14.5	
Level of Service	C	C		C	D	C	B	B		B	B	
Approach Delay (s)		34.2			33.3			17.2			13.4	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	86.2%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	38	345	3	20	288
Future Volume (vph)	1	38	345	3	20	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1601	0	1758	0	1719	1696
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1601	0	1758	0	1719	1696
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			146.9
Travel Time (s)	21.9		14.7			10.6
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	3%	8%	0%	5%	12%
Adj. Flow (vph)	1	44	397	3	23	331
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	400	0	23	331
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	38	345	3	20	288
Future Volume (Veh/h)	1	38	345	3	20	288
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	44	397	3	23	331
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.94					
vC, conflicting volume	776	400			401	
vC1, stage 1 conf vol	400					
vC2, stage 2 conf vol	377					
vCu, unblocked vol	733	400			401	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			98	
cM capacity (veh/h)	564	648			1141	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	45	400	23	331
Volume Left	1	0	23	0
Volume Right	44	3	0	0
cSH	646	1700	1141	1700
Volume to Capacity	0.07	0.24	0.02	0.19
Queue Length 95th (m)	1.8	0.0	0.5	0.0
Control Delay (s)	11.0	0.0	8.2	0.0
Lane LOS	B		A	
Approach Delay (s)	11.0	0.0	0.5	
Approach LOS	B			

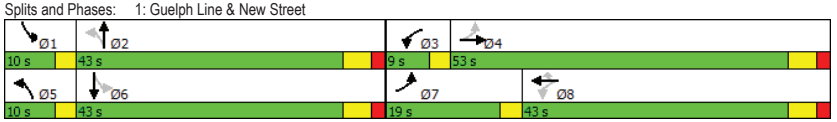
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Future Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	0.99	0.99		0.99	0.98	
Frt		0.988				0.850		0.970			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3480	0	1736	3539	1553	1770	3318	0	1787	3181	0
Flt Permitted	0.116			0.510			0.340			0.442		
Satd. Flow (perm)	218	3480	0	922	3539	1520	629	3318	0	826	3181	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				282		29			228	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			146.9			265.0	
Travel Time (s)		20.3			16.0			10.6			19.1	
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Adj. Flow (vph)	227	379	33	108	858	282	59	329	83	166	307	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	412	0	108	858	282	59	412	0	166	608	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	19.0	53.0		9.0	43.0	43.0	10.0	43.0		10.0	43.0	
Total Split (%)	16.5%	46.1%		7.8%	37.4%	37.4%	8.7%	37.4%		8.7%	37.4%	
Maximum Green (s)	16.0	47.0		6.0	37.0	37.0	7.0	37.0		7.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	51.9	39.9		40.4	31.4	31.4	46.9	37.2		48.0	39.5	
Actuated g/C Ratio	0.48	0.37		0.37	0.29	0.29	0.43	0.34		0.44	0.37	
v/c Ratio	0.72	0.32		0.28	0.84	0.44	0.17	0.36		0.39	0.47	
Control Delay	35.3	24.1		18.1	44.1	5.7	19.5	26.7		22.2	18.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	35.3	24.1		18.1	44.1	5.7	19.5	26.7		22.2	18.7	
LOS	D	C		B	D	A	B	C		C	B	
Approach Delay		28.1			33.2			25.8			19.4	
Approach LOS		C			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 108.2			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 27.6		Intersection LOS: C	
Intersection Capacity Utilization 92.0%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	412	108	858	282	59	412	166	608
v/c Ratio	0.72	0.32	0.28	0.84	0.44	0.17	0.36	0.39	0.47
Control Delay	35.3	24.1	18.1	44.1	5.7	19.5	26.7	22.2	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	24.1	18.1	44.1	5.7	19.5	26.7	22.2	18.7
Queue Length 50th (m)	29.8	33.1	12.8	95.3	0.0	7.4	34.2	22.1	35.1
Queue Length 95th (m)	57.9	45.4	22.9	119.8	19.2	16.5	51.1	39.4	55.7
Internal Link Dist (m)		258.3		242.4			122.9		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	337	1523	389	1215	707	348	1158	428	1306
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.27	0.28	0.71	0.40	0.17	0.36	0.39	0.47

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Future Volume (vph)	216	360	31	103	815	268	56	313	79	158	292	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3481		1727	3539	1520	1766	3318		1782	3182	
Flt Permitted	0.12	1.00		0.51	1.00	1.00	0.34	1.00		0.44	1.00	
Satd. Flow (perm)	219	3481		928	3539	1520	631	3318		829	3182	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	379	33	108	858	282	59	329	83	166	307	301
RTOR Reduction (vph)	0	6	0	0	0	201	0	19	0	0	145	0
Lane Group Flow (vph)	227	406	0	108	858	81	59	393	0	166	463	0
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	48.9	39.9		37.4	31.4	31.4	43.3	37.9		46.5	39.5	
Effective Green, g (s)	48.9	39.9		37.4	31.4	31.4	43.3	37.9		46.5	39.5	
Actuated g/C Ratio	0.45	0.37		0.34	0.29	0.29	0.40	0.35		0.43	0.36	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1276		363	1021	438	307	1155		415	1155	
v/s Ratio Prot	c0.10	0.12		0.02	c0.24		0.01	0.12		c0.03	c0.15	
v/s Ratio Perm	0.23			0.09		0.05	0.07			0.15		
v/c Ratio	0.74	0.32		0.30	0.84	0.19	0.19	0.34		0.40	0.40	
Uniform Delay, d1	23.4	24.7		25.0	36.3	29.1	20.7	26.2		19.8	25.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.0	0.1		0.5	6.3	0.2	0.3	0.8		0.6	1.0	
Delay (s)	32.4	24.8		25.5	42.7	29.3	21.0	27.0		20.5	26.9	
Level of Service	C	C		C	D	C	C	C		C	C	
Approach Delay (s)		27.5			38.2			26.3			25.5	
Approach LOS		C			D			C			C	

Intersection Summary					
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	108.8	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	92.0%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	47	401	2	18	408
Future Volume (vph)	1	47	401	2	18	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1646	0	1825	0	1805	1845
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1646	0	1825	0	1805	1845
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			146.9
Travel Time (s)	21.9		14.7			10.6
Confl. Peds. (#/hr)		3		7	7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	4%	0%	0%	3%
Adj. Flow (vph)	1	53	451	2	20	458
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	453	0	20	458
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	47	401	2	18	408
Future Volume (Veh/h)	1	47	401	2	18	408
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	53	451	2	20	458
Pedestrians	7					3
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.84					
vC, conflicting volume	957	462			460	
vC1, stage 1 conf vol	459					
vC2, stage 2 conf vol	498					
vCu, unblocked vol	853	462			460	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			98	
cM capacity (veh/h)	497	599			1105	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	54	453	20	458
Volume Left	1	0	20	0
Volume Right	53	2	0	0
cSH	597	1700	1105	1700
Volume to Capacity	0.09	0.27	0.02	0.27
Queue Length 95th (m)	2.4	0.0	0.4	0.0
Control Delay (s)	11.6	0.0	8.3	0.0
Lane LOS	B		A	
Approach Delay (s)	11.6	0.0	0.3	
Approach LOS	B			

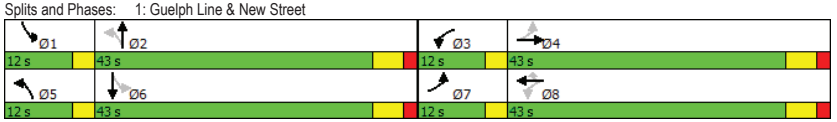
Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	37	63	360	144	49	279	88	256	219	198
Future Volume (vph)	223	435	37	63	360	144	49	279	88	256	219	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	1.00	0.99		0.99	0.99	
Frt		0.988				0.850		0.964			0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3402	0	1656	3406	1553	1752	3216	0	1752	3094	0
Flt Permitted	0.377			0.379			0.500			0.478		
Satd. Flow (perm)	694	3402	0	656	3406	1527	921	3216	0	877	3094	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				150		41			206	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			81.3			265.0	
Travel Time (s)		20.3			16.0			5.9			19.1	
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Adj. Flow (vph)	232	453	39	66	375	150	51	291	92	267	228	206
Shared Lane Traffic (%)												
Lane Group Flow (vph)	232	492	0	66	375	150	51	383	0	267	434	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	12.0	43.0		12.0	43.0	43.0	12.0	43.0		12.0	43.0	
Total Split (%)	10.9%	39.1%		10.9%	39.1%	39.1%	10.9%	39.1%		10.9%	39.1%	
Maximum Green (s)	9.0	37.0		9.0	37.0	37.0	9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	30.1	20.0		27.4	16.7	16.7	46.9	37.1		51.3	43.0	
Actuated g/C Ratio	0.34	0.22		0.31	0.19	0.19	0.52	0.41		0.57	0.48	
v/c Ratio	0.69	0.64		0.23	0.59	0.37	0.09	0.28		0.45	0.27	
Control Delay	33.7	36.2		21.2	37.2	8.0	9.9	16.9		13.2	9.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.7	36.2		21.2	37.2	8.0	9.9	16.9		13.2	9.0	
LOS	C	D		C	D	A	A	B		B	A	
Approach Delay		35.4			28.0			16.1			10.6	
Approach LOS		D			C			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 89.8			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 23.1		Intersection LOS: C	
Intersection Capacity Utilization 86.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	232	492	66	375	150	51	383	267	434
v/c Ratio	0.69	0.64	0.23	0.59	0.37	0.09	0.28	0.45	0.27
Control Delay	33.7	36.2	21.2	37.2	8.0	9.9	16.9	13.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	36.2	21.2	37.2	8.0	9.9	16.9	13.2	9.0
Queue Length 50th (m)	30.9	43.4	8.0	33.0	0.0	3.7	20.8	22.2	12.7
Queue Length 95th (m)	50.1	61.3	16.7	47.3	15.3	10.1	35.4	42.4	26.4
Internal Link Dist (m)		258.3		242.4			57.3		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	338	1411	310	1407	718	587	1352	588	1589
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.35	0.21	0.27	0.21	0.09	0.28	0.45	0.27

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	435	37	63	360	144	49	279	88	256	219	198
Future Volume (vph)	223	435	37	63	360	144	49	279	88	256	219	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1751	3403		1652	3406	1528	1751	3217		1749	3094	
Flt Permitted	0.38	1.00		0.38	1.00	1.00	0.50	1.00		0.48	1.00	
Satd. Flow (perm)	695	3403		660	3406	1528	921	3217		879	3094	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	232	453	39	66	375	150	51	291	92	267	228	206
RTOR Reduction (vph)	0	7	0	0	0	122	0	24	0	0	109	0
Lane Group Flow (vph)	232	485	0	66	375	28	51	359	0	267	325	0
Confl. Peds. (#/hr)	5		10	10		5	3		11	11		3
Heavy Vehicles (%)	3%	4%	11%	9%	6%	4%	3%	5%	16%	3%	10%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	29.0	20.0		23.8	17.4	17.4	42.5	38.3		50.2	43.0	
Effective Green, g (s)	29.0	20.0		23.8	17.4	17.4	42.5	38.3		50.2	43.0	
Actuated g/C Ratio	0.32	0.22		0.26	0.19	0.19	0.46	0.42		0.55	0.47	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	743		240	646	290	465	1345		566	1452	
v/s Ratio Prot	c0.07	0.14		0.02	0.11		0.01	0.11		c0.05	0.10	
v/s Ratio Perm	c0.16			0.05		0.02	0.05			c0.21		
v/c Ratio	0.72	0.65		0.28	0.58	0.10	0.11	0.27		0.47	0.22	
Uniform Delay, d1	25.2	32.6		26.2	33.8	30.6	13.6	17.5		11.1	14.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.4	2.1		0.6	1.3	0.1	0.1	0.5		0.6	0.4	
Delay (s)	32.6	34.7		26.8	35.1	30.8	13.7	17.9		11.8	14.8	
Level of Service	C	C		C	D	C	B	B		B	B	
Approach Delay (s)		34.0			33.1			17.4			13.6	
Approach LOS		C			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	86.2%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	38	347	3	20	294
Future Volume (vph)	1	38	347	3	20	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.868		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1601	0	1758	0	1719	1696
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1601	0	1758	0	1719	1696
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			65.6
Travel Time (s)	21.9		14.7			4.7
Confl. Peds. (#/hr)				1	1	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	3%	8%	0%	5%	12%
Adj. Flow (vph)	1	44	399	3	23	338
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	0	402	0	23	338
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

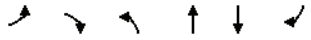
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	38	347	3	20	294
Future Volume (Veh/h)	1	38	347	3	20	294
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	44	399	3	23	338
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.94					
vC, conflicting volume	786	402			403	
vC1, stage 1 conf vol	402					
vC2, stage 2 conf vol	384					
vCu, unblocked vol	743	402			403	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			98	
cM capacity (veh/h)	560	646			1139	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	45	402	23	338
Volume Left	1	0	23	0
Volume Right	44	3	0	0
cSH	644	1700	1139	1700
Volume to Capacity	0.07	0.24	0.02	0.20
Queue Length 95th (m)	1.8	0.0	0.5	0.0
Control Delay (s)	11.0	0.0	8.2	0.0
Lane LOS	B		A	
Approach Delay (s)	11.0	0.0	0.5	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	6	2	383	308	11
Future Volume (vph)	33	6	2	383	308	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.978				0.995	
Flt Protected	0.960					
Satd. Flow (prot)	1784	0	0	1713	1771	0
Flt Permitted	0.960					
Satd. Flow (perm)	1784	0	0	1713	1771	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	75.0			65.6	81.3	
Travel Time (s)	5.4			4.7	5.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	11%	7%	0%
Adj. Flow (vph)	36	7	2	416	335	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	0	418	347	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	33	6	2	383	308	11
Future Volume (Veh/h)	33	6	2	383	308	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	7	2	416	335	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					81	
pX, platoon unblocked	0.90	0.90	0.90			
vC, conflicting volume	761	341	347			
vC1, stage 1 conf vol	341					
vC2, stage 2 conf vol	420					
vCu, unblocked vol	683	219	226			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	100			
cM capacity (veh/h)	578	747	1226			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	418	347
Volume Left	36	2	0
Volume Right	7	0	12
cSH	600	1226	1700
Volume to Capacity	0.07	0.00	0.20
Queue Length 95th (m)	1.8	0.0	0.0
Control Delay (s)	11.5	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.5	0.1	0.0
Approach LOS	B		

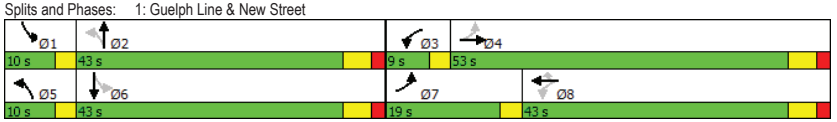
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	38	116	815	268	64	319	84	158	300	286
Future Volume (vph)	216	360	38	116	815	268	64	319	84	158	300	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	55.0		110.0	40.0		140.0	50.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99		0.98	0.99	0.99		0.99	0.98	
Frt		0.986				0.850		0.969			0.927	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3470	0	1736	3539	1553	1770	3314	0	1787	3186	0
Flt Permitted	0.116			0.507			0.334			0.433		
Satd. Flow (perm)	218	3470	0	916	3539	1520	618	3314	0	809	3186	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				282		30			221	
Link Speed (k/h)		50			60			50			50	
Link Distance (m)		282.3			266.4			80.6			265.0	
Travel Time (s)		20.3			16.0			5.8			19.1	
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Adj. Flow (vph)	227	379	40	122	858	282	67	336	88	166	316	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	419	0	122	858	282	67	424	0	166	617	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes						Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0	8.0	6.0	8.0		6.0	8.0	
Minimum Split (s)	9.0	43.0		9.0	43.0	43.0	9.0	43.0		9.0	43.0	
Total Split (s)	19.0	53.0		9.0	43.0	43.0	10.0	43.0		10.0	43.0	
Total Split (%)	16.5%	46.1%		7.8%	37.4%	37.4%	8.7%	37.4%		8.7%	37.4%	
Maximum Green (s)	16.0	47.0		6.0	37.0	37.0	7.0	37.0		7.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		17.0			17.0	17.0		17.0			17.0	
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	
Pedestrian Calls (#/hr)		0			0	0		0			0	
Act Effct Green (s)	51.9	39.9		40.4	31.4	31.4	46.9	37.2		47.9	39.5	
Actuated g/C Ratio	0.48	0.37		0.37	0.29	0.29	0.43	0.34		0.44	0.37	
v/c Ratio	0.72	0.33		0.31	0.84	0.44	0.20	0.37		0.39	0.47	
Control Delay	35.3	24.0		18.9	44.1	5.7	19.8	26.9		22.3	19.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	35.3	24.0		18.9	44.1	5.7	19.8	26.9		22.3	19.3	
LOS	D	C		B	D	A	B	C		C	B	
Approach Delay		28.0			33.1			25.9			19.9	
Approach LOS		C			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 108.2			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 27.7		Intersection LOS: C	
Intersection Capacity Utilization 92.0%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Guelph Line & New Street



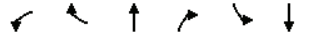
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	419	122	858	282	67	424	166	617
v/c Ratio	0.72	0.33	0.31	0.84	0.44	0.20	0.37	0.39	0.47
Control Delay	35.3	24.0	18.9	44.1	5.7	19.8	26.9	22.3	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	24.0	18.9	44.1	5.7	19.8	26.9	22.3	19.3
Queue Length 50th (m)	29.8	33.4	14.6	95.3	0.0	8.4	35.3	22.1	36.8
Queue Length 95th (m)	57.9	45.8	25.4	119.8	19.2	18.1	52.5	39.4	57.7
Internal Link Dist (m)		258.3		242.4			56.6		241.0
Turn Bay Length (m)	70.0		55.0		110.0	40.0		50.0	
Base Capacity (vph)	337	1521	388	1215	707	344	1158	422	1302
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.28	0.31	0.71	0.40	0.19	0.37	0.39	0.47

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	360	38	116	815	268	64	319	84	158	300	286
Future Volume (vph)	216	360	38	116	815	268	64	319	84	158	300	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3469		1727	3539	1520	1766	3314		1782	3187	
Flt Permitted	0.12	1.00		0.51	1.00	1.00	0.33	1.00		0.43	1.00	
Satd. Flow (perm)	219	3469		922	3539	1520	620	3314		812	3187	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	227	379	40	122	858	282	67	336	88	166	316	301
RTOR Reduction (vph)	0	8	0	0	0	201	0	20	0	0	141	0
Lane Group Flow (vph)	227	411	0	122	858	81	67	404	0	166	476	0
Confl. Peds. (#/hr)	10		12	12		10	20		14	14		20
Heavy Vehicles (%)	1%	2%	4%	4%	2%	4%	2%	5%	5%	1%	2%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	48.9	39.9		37.4	31.4	31.4	43.3	37.9		46.5	39.5	
Effective Green, g (s)	48.9	39.9		37.4	31.4	31.4	43.3	37.9		46.5	39.5	
Actuated g/C Ratio	0.45	0.37		0.34	0.29	0.29	0.40	0.35		0.43	0.36	
Clearance Time (s)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1272		361	1021	438	303	1154		409	1157	
v/s Ratio Prot	c0.10	0.12		0.02	c0.24		0.01	0.12		c0.03	c0.15	
v/s Ratio Perm	0.23			0.10		0.05	0.08			0.15		
v/c Ratio	0.74	0.32		0.34	0.84	0.19	0.22	0.35		0.41	0.41	
Uniform Delay, d1	23.4	24.8		25.2	36.3	29.1	20.8	26.3		19.8	25.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.0	0.1		0.6	6.3	0.2	0.4	0.8		0.7	1.1	
Delay (s)	32.4	24.9		25.8	42.7	29.3	21.2	27.2		20.5	27.0	
Level of Service	C	C		C	D	C	C	C		C	C	
Approach Delay (s)		27.5			38.1			26.3			25.6	
Approach LOS		C			D			C			C	

Intersection Summary					
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.62				
Actuated Cycle Length (s)	108.8	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	92.0%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	47	406	2	18	411
Future Volume (vph)	1	47	406	2	18	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.867		0.999			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1646	0	1825	0	1805	1845
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1646	0	1825	0	1805	1845
Link Speed (k/h)	50		50			50
Link Distance (m)	304.5		204.0			66.3
Travel Time (s)	21.9		14.7			4.8
Confl. Peds. (#/hr)		3		7	7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	4%	0%	0%	3%
Adj. Flow (vph)	1	53	456	2	20	462
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	0	458	0	20	462
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	47	406	2	18	411
Future Volume (Veh/h)	1	47	406	2	18	411
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	53	456	2	20	462
Pedestrians	7					3
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			TWLTL
Median storage veh)						2
Upstream signal (m)						147
pX, platoon unblocked	0.84					
vC, conflicting volume	966	467			465	
vC1, stage 1 conf vol	464					
vC2, stage 2 conf vol	502					
vCu, unblocked vol	864	467			465	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			98	
cM capacity (veh/h)	494	595			1100	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	54	458	20	462
Volume Left	1	0	20	0
Volume Right	53	2	0	0
cSH	593	1700	1100	1700
Volume to Capacity	0.09	0.27	0.02	0.27
Queue Length 95th (m)	2.4	0.0	0.4	0.0
Control Delay (s)	11.7	0.0	8.3	0.0
Lane LOS	B		A	
Approach Delay (s)	11.7	0.0	0.3	
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	19	4	5	448	425	29
Future Volume (vph)	19	4	5	448	425	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.978				0.991	
Flt Protected	0.960			0.999		
Satd. Flow (prot)	1784	0	0	1826	1832	0
Flt Permitted	0.960			0.999		
Satd. Flow (perm)	1784	0	0	1826	1832	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	68.9			66.3	80.6	
Travel Time (s)	5.0			4.8	5.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	3%	0%
Adj. Flow (vph)	21	4	5	487	462	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	492	494	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane				Yes	Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	4	5	448	425	29
Future Volume (Veh/h)	19	4	5	448	425	29
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	4	5	487	462	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (m)					80	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	975	478	494			
vC1, stage 1 conf vol	478					
vC2, stage 2 conf vol	497					
vCu, unblocked vol	848	231	251			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	498	655	1068			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	492	494
Volume Left	21	5	0
Volume Right	4	0	32
cSH	518	1068	1700
Volume to Capacity	0.05	0.00	0.29
Queue Length 95th (m)	1.2	0.1	0.0
Control Delay (s)	12.3	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.3	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix H

TTS Auto Ownership Data

Tue Oct 15 2019 12:24:32 GMT-0400 (Eastern Daylight Time) - Run Time: 476ms

Cross Tabulation Query Form - Household - 2016 v1.1

Row: 2006 GTA zone of household - gta06_hhld
Column: No. of vehicles in household - n_vehicle
Table: Type of dwelling unit - dwell_type

RowG:(4061-4065)
ColG:
TblG:(2)

Filters:
2006 GTA zone of household - gta06_hhld In **4061-4065**
and
Type of dwelling unit - dwell_type In 2

Household 2016
Table: 1

0	1	2		
586	1563	252	2401	Households
0	1563	504	2067	Autos
			0.86	Autos/Household