Appendix ‘J’ – Transportation Study

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Three Grand River Crossings Municipal Class EA Transportation Study

Paradigm Transportation Solutions Limited

August 2021
190487

ptsl.com

Project Summary

Project Number
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Three Grand River Crossings Municipal Class EA Transportation Study

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Executive Summary

Content

GM BluePlan Engineering Limited retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Study as part of the Schedule B Municipal Class Environmental Assessment for three crossings over the Grand River: Lorne Bridge, Brant's Crossing Bridge and the TH&B Crossing Bridge.

The EA is being carried out in two parts:

- Part One entails determining the preferred solution for the rehabilitation of the Lorne Bridge, including confirming structural components requiring rehabilitation, preparing staging/detour options during rehabilitation, and reviewing active transportation considerations; pending recommendations from the TH&B Crossing Bridge and Brant's Crossing Bridge Review (Part Two, as discussed below).
- Part Two entails an assessment on two pedestrian crossings: the TH&B Crossing Bridge and Brant's Crossing Bridge. The two pedestrian crossings must be studied for their need, connection to the trail system/parks, and rehabilitation/replacement/removal options.

Conclusions

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

- Under existing conditions, the study intersections operate with acceptable levels of service and within capacity during the weekday AM and PM peak hours;
- During the rehabilitation of the Lorne Bridge, minor modifications to signal timing phasing will be required to support diverted traffic volumes;
- The existing operating characteristics and traffic volumes crossing the Lorne Bridge signify the need for separated cycling facilities, rather than a shared roadway facility;

Recommendations

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

- The southbound channelization at Colborne Street West/Brant Avenue/Icomm Drive during rehabilitation be removed to reduce

conflicts between vehicles and pedestrians at Colborne Street West/Brant Avenue/Icomm Drive;

- The City of Brantford retain at least one of the existing active transportation crossings of the Grand River (i.e. Brant's Crossing Bridge or TH&B Crossing Bridge), based on the following:
  - To maintain the current lane arrangement and capacity along Colborne Street West, separated facilities do not appear feasible given the limited platform width across the Lorne Bridge.
  - Separated cycling facilities on the Lorne Bridge may introduce a gap in the cycling network as few of the study area roadways are identified as permitted bicycle routes; and
  - Brant's Crossing Bridge and the TH&B Crossing Bridge provide strong connectivity across the Grand River, without introducing conflict points with motor vehicle traffic.
- The City of Brantford consider signal timing modifications contained herein to support diverted traffic volumes during the Lorne Bridge rehabilitation. These measures are noted as follows, and deemed necessary only in the PM peak hour:
  - Veteran's Memorial Parkway & Mt. Pleasant Street: Implement a westbound protected-permissive left-turn phase within the existing intersection cycle length.

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1 Introduction

1.1 Overview

GM BluePlan Engineering Limited retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Study as part of the Schedule B Municipal Class Environmental Assessment for three crossings over the Grand River: Lorne Bridge, Brant's Crossing Bridge and the TH&B Crossing Bridge.

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- Part One entails determining the preferred solution for the rehabilitation of the Lorne Bridge, including confirming structural components requiring rehabilitation, preparing staging/detour options during rehabilitation, and reviewing active transportation considerations; pending recommendations from the TH&B Crossing Bridge and Brant's Crossing Bridge Review (Part Two, as discussed below).
- Part Two entails an assessment on two pedestrian crossings: the TH&B Crossing Bridge and Brant's Crossing Bridge. The two pedestrian crossings must be studied for their need, connection to the trail system/parks, and rehabilitation/replacement/removal options.

Figure 1.1 illustrates the location of the subject site, study area, and three bridge crossings.

1.2 Purpose and Scope

The scope of this study comprises the following:

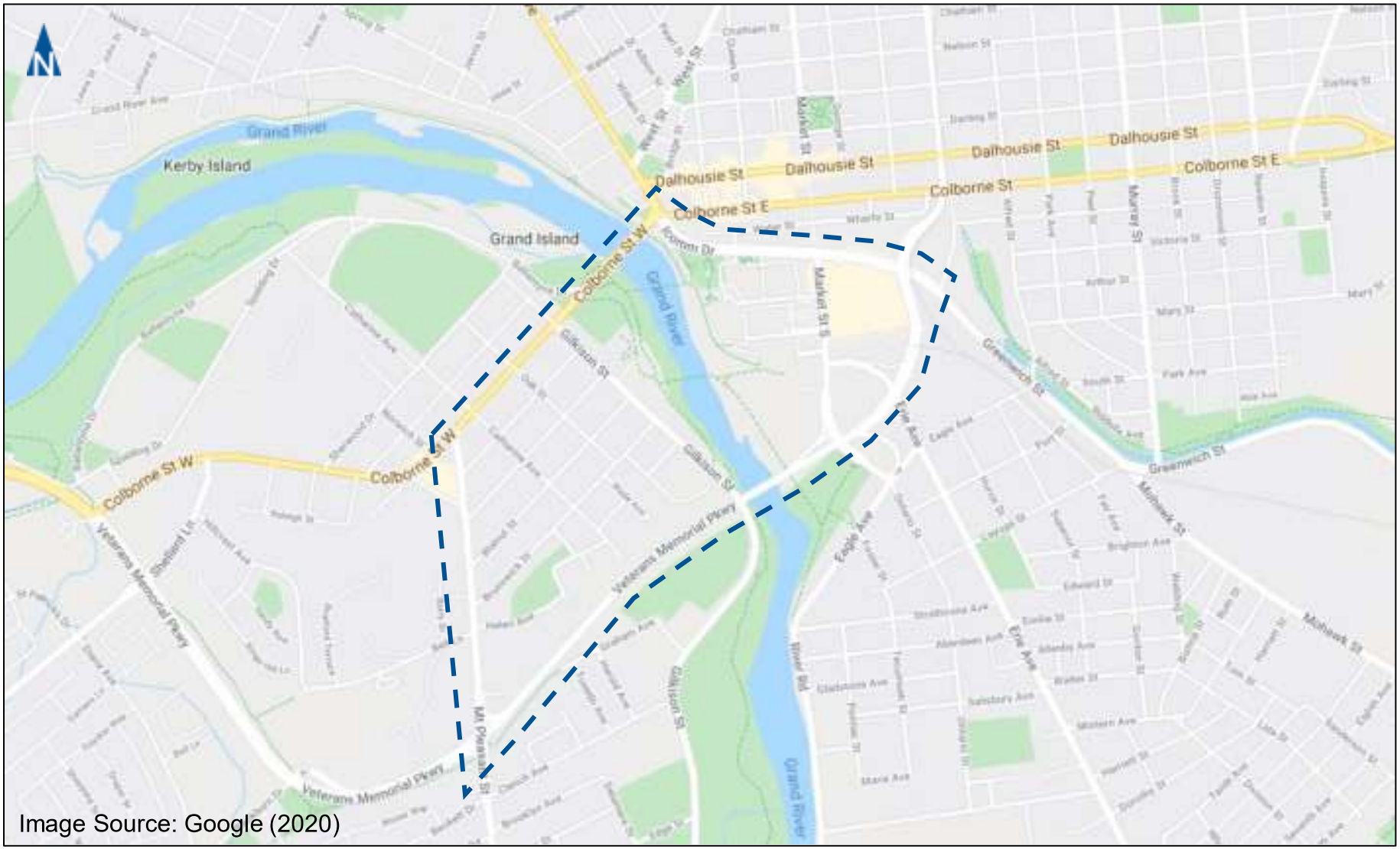
- Analyze base year conditions and deficiencies based on existing traffic volumes and impacts of the preferred solution with respect to staging and capacity. This includes analysis of existing capacity and level of service at intersections, screen line analyses, and link volume analyses;
- Identify impacts and benefits to all modes of transportation (transit, walking, cycling);
- Assess road safety performance and mitigation measures based on collision history, field investigation and predicative safety techniques;
- Assess active transportation facilities including the intersections of Brant Avenue/Icomm Drive/Colborne Street for cycling and

pedestrian crossing and safety connections to the waterfront trail system.

1.3 Study Area

The intersections analyzed as part of this study comprise the following:

- Mt. Pleasant Street and Veteran's Memorial Parkway;
- Mt. Pleasant Street and Colborne Street West;
- Colborne Street West and Gilkison Street;
- Colborne Street West and Brant Avenue/Icomm Drive;
- Icomm Drive and Market Street South;
- Icomm Drive/Greenwich Street and Clarence Street South; and
- Veteran's Memorial Parkway and Erie Avenue.



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Study Area

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Figure 1.1

2 Existing Conditions

2.1 Existing Road Network

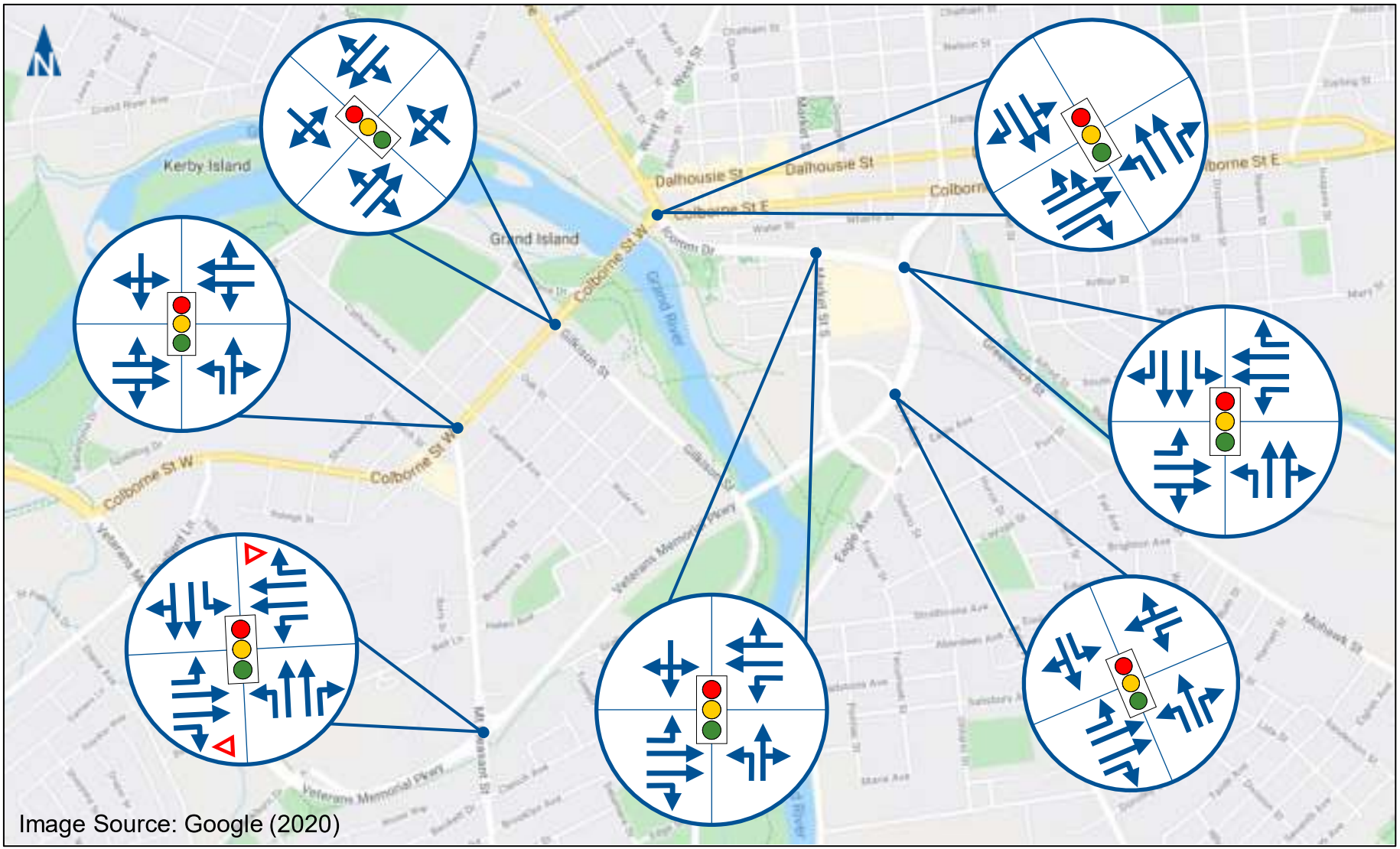
The existing roadways in the study area include Veteran's Memorial Parkway, Mt. Pleasant Street, Colborne Street West, Gilkison Street, Brant Avenue, Icomm Drive, Market Street South, Clarence Street South and Greenwich Street. All these roadways operate under the jurisdiction of the City of Brantford and are described as follows:

- **Veteran's Memorial Parkway** (from Mt. Pleasant Street to Clarence Street South) is an east-west, two-lane to four-lane, major arterial[1] roadway with a semi-urban cross-section. The maximum posted speed limit is 70 km/h. Parking is prohibited on both sides of the road. West of Mt. Pleasant Street the road operates with a four-lane, divided cross-section, comprising two-lanes per direction. East of Mt. Pleasant Street, the road operates with a two-lane, undivided cross-section, comprising one travel lane per direction. The road is identified as a truck route, and represents one of two vehicular crossings of the Grand River.
- **Mt. Pleasant Street** (from Colborne Street West to Veteran's Memorial Parkway) is a north-south, four-lane, minor arterial with an urban cross-section. The maximum posted speed limit is 50 km/h. The road is identified as a truck route between Colborne Street West and Veteran's Memorial Parkway. The roadway comprises a four-lane, undivided cross-section, and parking is prohibited on both sides.
- **Colborne Street West** (from Mt. Pleasant Street to Brant Avenue) is an east-west, four-lane, minor arterial roadway with an urban cross-section. The maximum posted speed limit is 50 km/h. Parking is prohibited on both sides of the road. This road is identified as a truck route, and is one of two vehicular crossings of the Grand River. Across the Lorne Bridge, Colborne Street West operates with five-lanes: two westbound, and three eastbound.
- **Brant Avenue** is a north-south, four-lane, minor arterial roadway with an urban cross-section. The maximum posted speed limit is 50 km/h. South of Colborne Street West, Brant Avenue operates south with a four-lane, undivided cross-section, with two travel lanes per direction. Parking is not permitted on either side of the road.

[1] Official Plan of the City of Brantford. Office Consolidation. February 28, 2020. *Schedule 5-1 Transportation: Transportation Plan.*

- **Icomm Drive** is an east-west, four-lane, minor arterial roadway that connects Colborne Street and Clarence Street South. The road comprises an urban cross-section, with two travel lanes per direction, separated by a centre median. The maximum posted speed limit is 50 km/h. Parking is not permitted on either side of the road.
- **Greenwich Street** is an easterly extension of Icomm Drive at Clarence Street South and is identified as a major collector in the City's Official Plan. The road comprises a two-lane, urban cross-section with one travel lane per direction. At Clarence Street South, the roadway widens to a four-lane cross-section to match Icomm Drive. The posted maximum speed limit is 50 km/h. Parking is prohibited on both sides of the road.
- **Market Street South** is a north-south, minor arterial that connects Icomm Drive and Veterans' Memorial Parkway. The road operates with a four-lane, undivided, urban cross-section with two travel lanes per direction. The posted maximum speed limit is 50 km/h. Parking is prohibited on both sides of the road in the study area.
- **Gilkison Street** is a north-south, minor collector that connects Colborne Street West and Mt. Pleasant Street. The road operates with a two-lane, urban cross-section, comprising one travel lane per direction. North of Colborne Street West, parking is permitted on both sides, unless otherwise indicated by signage. South of Colborne Street West, parking is permitted on the west side of the road, unless otherwise indicated by signage.
- **Erie Avenue** is a north-south, minor arterial that connects Mt. Pleasant Street to Eagle Avenue via Veteran's Memorial Parkway. The road operates with a two-lane, urban cross-section comprising one travel lane per direction. Parking is not permitted on either side of the road north of Veteran's Memorial Parkway. The posted maximum speed limit is 50 kilometres per hour. The road is identified as a Bike Route, and signs are installed alongside the road.

Figure 2.1 illustrates the existing lane configurations and traffic control.



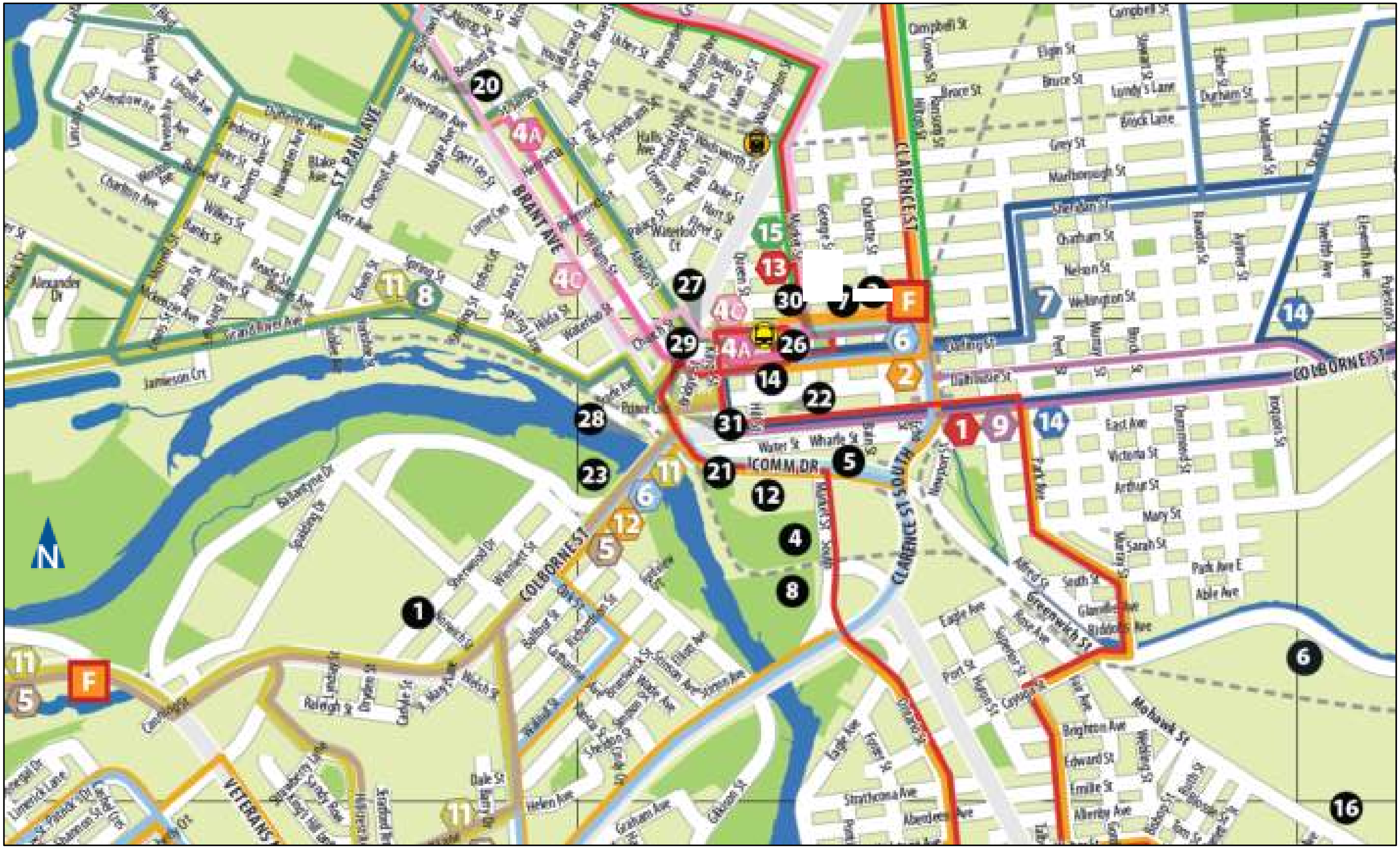
Existing Lane Configurations and Traffic Control

2.2 Transit Services

Brantford Transit (BT) is the public transit operator in the City of Brantford, and operates the following routes in the study area:

- **Route 1 (Eagle Place)** travels from the Transit Terminal to the Eagle Place Neighbourhood using Icomm Drive, Market Street and a variety of local neighbourhood roads. Service is provided Monday to Saturday from 6:00 AM to 8:30 PM, with 30-minute headways. Sunday service is provided from 8:00 AM to 7:00 PM with 60-minute headways.
- **Route 5 (West Brant Oakhill)** travels from the Transit Terminal to the West Brant/Oakhill area via Colborne Street West. A portion of the return trip uses Mt. Pleasant Street. Service is provided Monday to Saturday from 6:00 AM to 8:30 PM, with 30-minute headways. Sunday service is provided from 8:00 AM to 7:00 PM with 60-minute headways.
- **Route 6 (West Brant Shellard)** travels from the Transit Terminal to the West Brant Shellard area using Veteran's Memorial Parkway, Mt. Pleasant Street, Colborne Street and Icomm Drive. Service is provided Monday to Saturday from 6:00 AM to 8:30 PM, with 30-minute headways. Sunday service is provided from 8:00 AM to 7:00 PM with 60-minute headways.
- **Route 11 (West Brant Oakhill – NWIA Holmedale)** travels from the Transit Terminal, up Colborne Street West and loops through the West Brant Oakhill, Northwest Industrial Area and Holmedale areas using several roads including Dufferin Avenue, Morrell Street, and Grand River Avenue. Service is provided Monday to Saturday from 9:00 PM to 12:00 AM, with 60-minute headways.
- **Route 12 (Eagle Place Shellard)** travels from the Transit Terminal and loops through the Eagle Place and Shellard areas using Colborne Street West, Veteran's Memorial Parkway, Mt. Pleasant Street, and a variety of local roadway in each neighbourhood. Service is provided Monday to Saturday from 9:00 PM to 12:00 AM, with 60-minute headways.

Figure 2.2 illustrates the existing transit routes within the City of Brantford.



![paradigm Transportation Solutions Limited logo]

Existing Transit Services

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Figure 2.2

2.3 Active Transportation

2.3.1 Pedestrian Facilities

Sidewalks are provided on both sides of all study roads, except Veteran's Memorial Parkway. A multi-use trail is provided on the south side of Veteran's Memorial Parkway, west and east of Mt. Pleasant Street. This trail facility connects to the LE & N Rail Trail along the former Lake Erie and Northern Electric Railway route.

Sidewalks on Colborne Street West include a landscaped buffer, or physical barrier (along the Lorne Bridge). These elements enhance the attractiveness of the pedestrian environment by decreasing potential conflict with vehicle traffic. Sidewalks on Icomm Drive also include a landscaped buffer.

During the site visit, Paradigm performed spot measurements along each sidewalk corridor. Average sidewalk widths varied between 1.3 metres (on Mt. Pleasant Street) and 2.0 metres (on Colborne Street East). The Accessibility for Ontarians with Disabilities Act (AODA) requires exterior paths to provide a minimum clear width of 1.5 metres, but this clear width can be reduced to 1.2 metres under select circumstances. Although portions of the sidewalk on Mt. Pleasant Street are less than 1.5 metres, a lack of obstructions on either side of the sidewalk provide a cleat width more than 1.5 metres.

All seven study intersections include pedestrian push buttons, pedestrian signal heads, and delineated crosswalks. However, the channelized southbound right-turn movement on Brant Avenue at Colborne Street West includes an uncontrolled pedestrian crossing.

2.3.2 Trails

The Veteran's Memorial Parkway (VMP) Trail operates adjacent to Veteran's Memorial Parkway. The VMP is a multi-use trail, accommodating pedestrians, cyclists, and other trail users. The VMP intersects with Graham Avenue, east of Veteran's Memorial Parkway.

The Dike Trail runs along the east bank of the Grand River connecting to Market Street and Eagle Avenue. The SC Johnson Trail runs along the north and east bank of the Grand River. This trail runs 14 kilometres between Paris and Brantford. In Paris, the trail connects to the Cambridge to Paris Rail Trail. In Brantford, the trail connects to the Dike Trail, and the Hamilton and Brantford Rail Trail.

Additional multi-use trails within the study area include Fordview Trail and SC Johnson Trail, portions of which form part of the Trans Canada

Trail. These trails circumvent the Grand River and at present, cross the Grand River over two dedicated structures between Colborne Street (Lorne Bridge) and Veteran's Memorial Parkway:

- Brant's Crossing Bridge: former railway bridge, readapted for pedestrian and cyclist use. The bridge was closed following a flooding and ice jam event in 2018. Based on structural investigations, the bridge was recommended to remain closed until repairs can take place to ensure its safe use by the public.; and
- TH&B Crossing Bridge: former railway bridge readapted for pedestrian and cyclists use. Currently in use.

Figure 2.3 illustrates the existing active transportation network in the City with respect to trails and cycling routes/facilities.

2.3.3 Cycling Facilities

Cycling facilities throughout the City comprise dedicated bike lanes, shared use lanes, or designated bike routes. These facilities are generally located on lower-tier roads and enhance connectivity to the City's trail network. Erie Avenue and Ballantyne Drive are identified as Bike Routes on the City's Trails Map. None of the other study area roads are designated cycling routes or include dedicated on-road cycling facilities.

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Existing Active Transportation Network

2.4 Traffic Volumes

Turning movement counts (TMC) quantify the volume, and type of vehicles travelling through an intersection. The TMC data is typically collected during peak travel periods to capture peak traffic volumes and patterns.

In March 2020, the Provincial and Federal governments enacted measures to reduce the spread of COVID-19. Provincial measures included the closure of non-essential businesses and schools. Federal measures included the closure of the International Border to the United States of America, except for essential travel, the City of Brantford provided historical turning movement counts at all six study intersections. **Table 2.1** summarizes the date of each turning movement count.

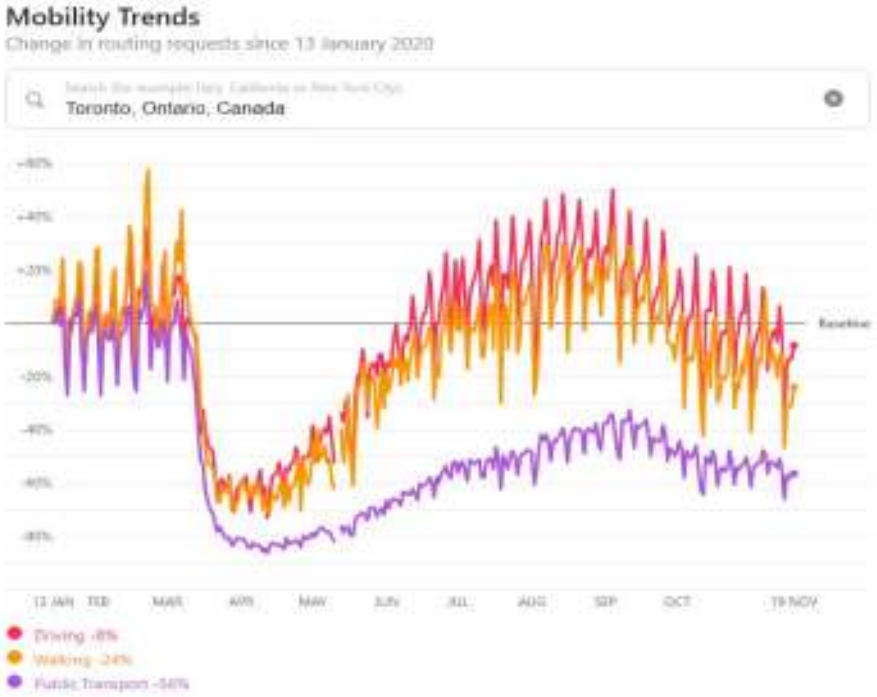
TABLE 2.1: TURNING MOVEMENT COUNT SUMMARY

Intersection	Date of Count
Veteran's Memorial Parkway and Mt. Pleasant Street	August 29, 2012
Colborne Street West and Mt. Pleasant Street	March 3, 2015
Colborne Street West and Gilkison Street	August 21, 2013
Colborne Street West and Brant Avenue/Icomm Drive	July 8, 2014
Icomm Drive and Market Street South	October 11, 2012
Icomm Drive/Greenwich Street and Clarence Street South	July 7, 2015
Veteran's Memorial Parkway and Erie Avenue	May 21, 2014

A comparison of these counts with 2017 traffic count data Paradigm had on file at a number of the study area intersections indicated significant changes to the traffic patterns has occurred between the respective years. The manipulation and growth of this data was considered to be unreliable given the various changes in patterns observed. As COVID-19 restrictions were relaxed and businesses were granted the ability to open for business a review of mobility trends for the City of Toronto was reviewed as no data for the City of Brantford or adjacent municipalities is available. The data is available through Apple[2] and indicates vehicle travel patterns have closely normalized to the baseline volumes prior to the pandemic outbreak.

[2] Apple Inc. *COVID-19 Mobility Trends Reports.* Accessed 19 November 2020 from https://covid19.apple.com/mobility

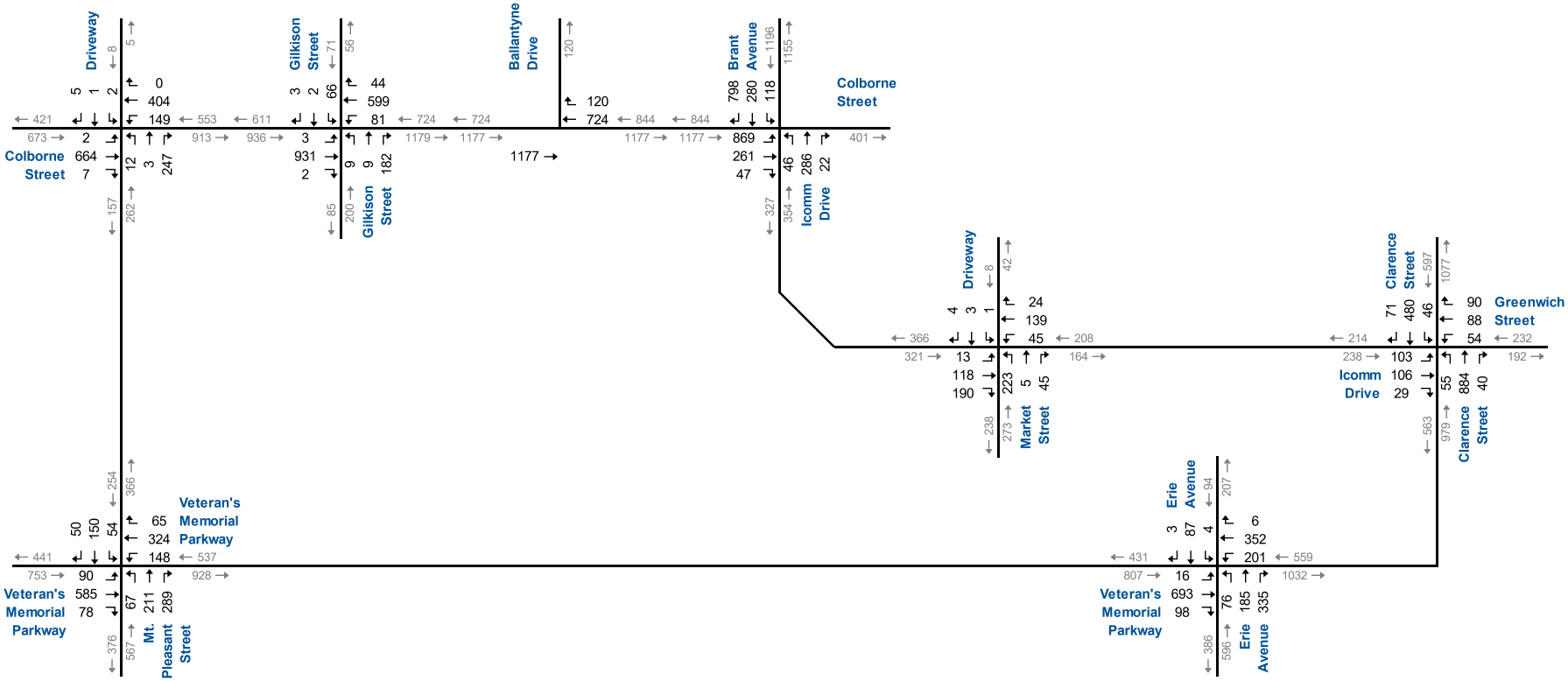
Mobility Trends, Toronto, Ontario



New traffic counts were completed for the study area intersections on November 4, 2020. All traffic movements, including pedestrian crossings were counted in 15-minute intervals and vehicles were classified by type. A review of the mobility trends indicates passenger vehicle traffic is 20% lower than the average volume observed prior to March 1, 2020. To account for this, the volumes have been adjusted to reflect typical average volumes.

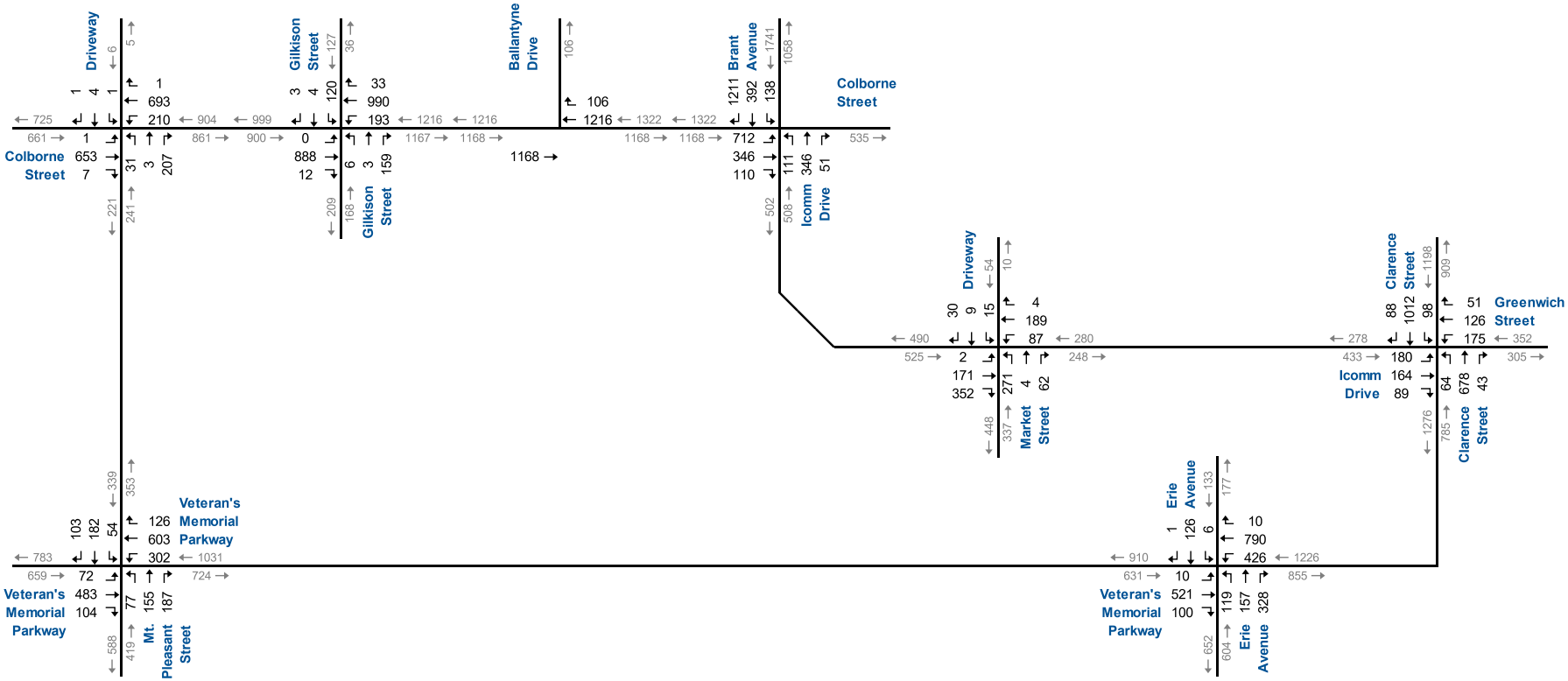
It is recognized the public transportation is expected to be underrepresented within these volumes, however given the majority of trips during the peak hours are represented by passenger vehicles, the reduced volume will not have a significant impact on the operational assessment.

Appendix A contains the detailed turning movement count reports. **Figure 2.4** and **Figure 2.5** illustrate the base year traffic volumes. **Figure 2.6** and **Figure 2.7** illustrate the pedestrian volumes at each study intersection.



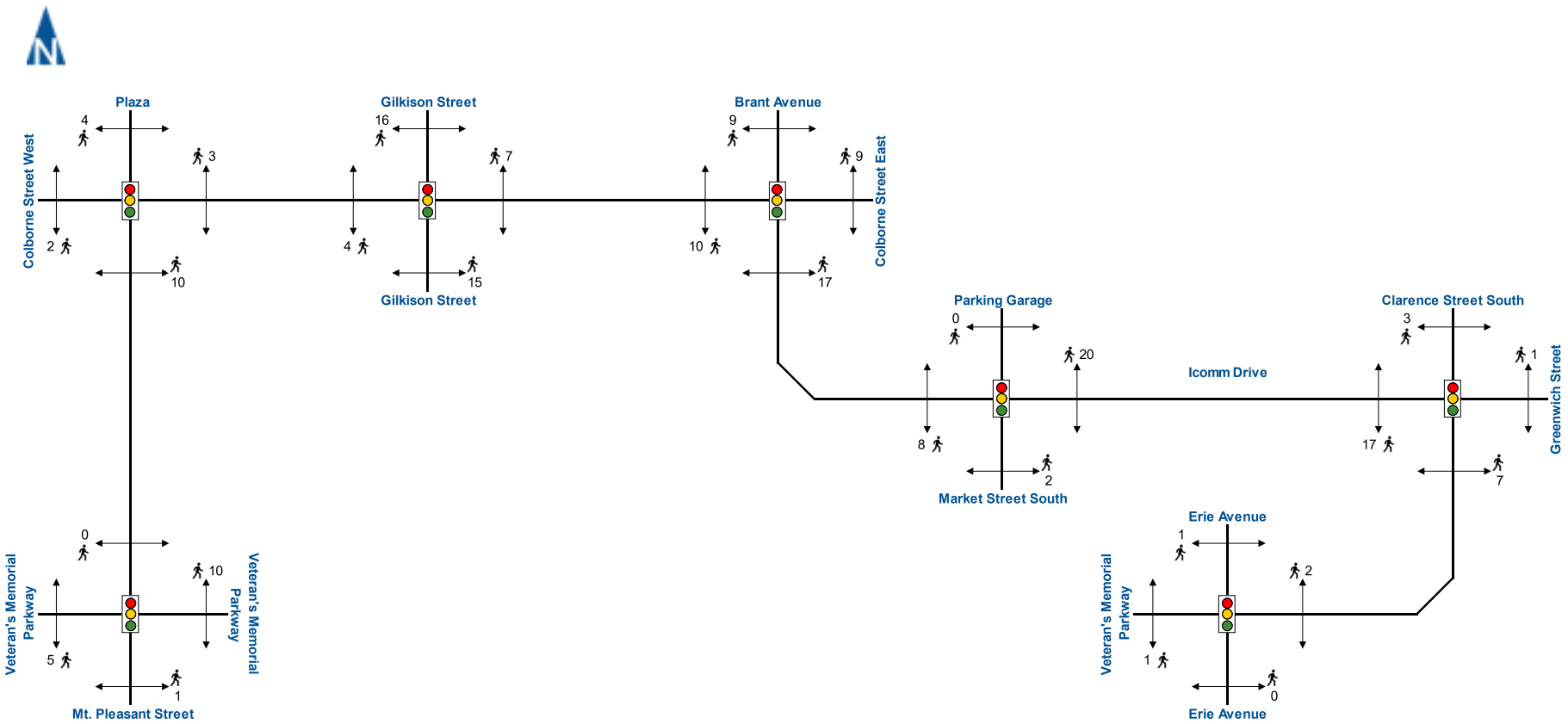
Not to Scale

Base Year Traffic Volumes
AM Peak Hour



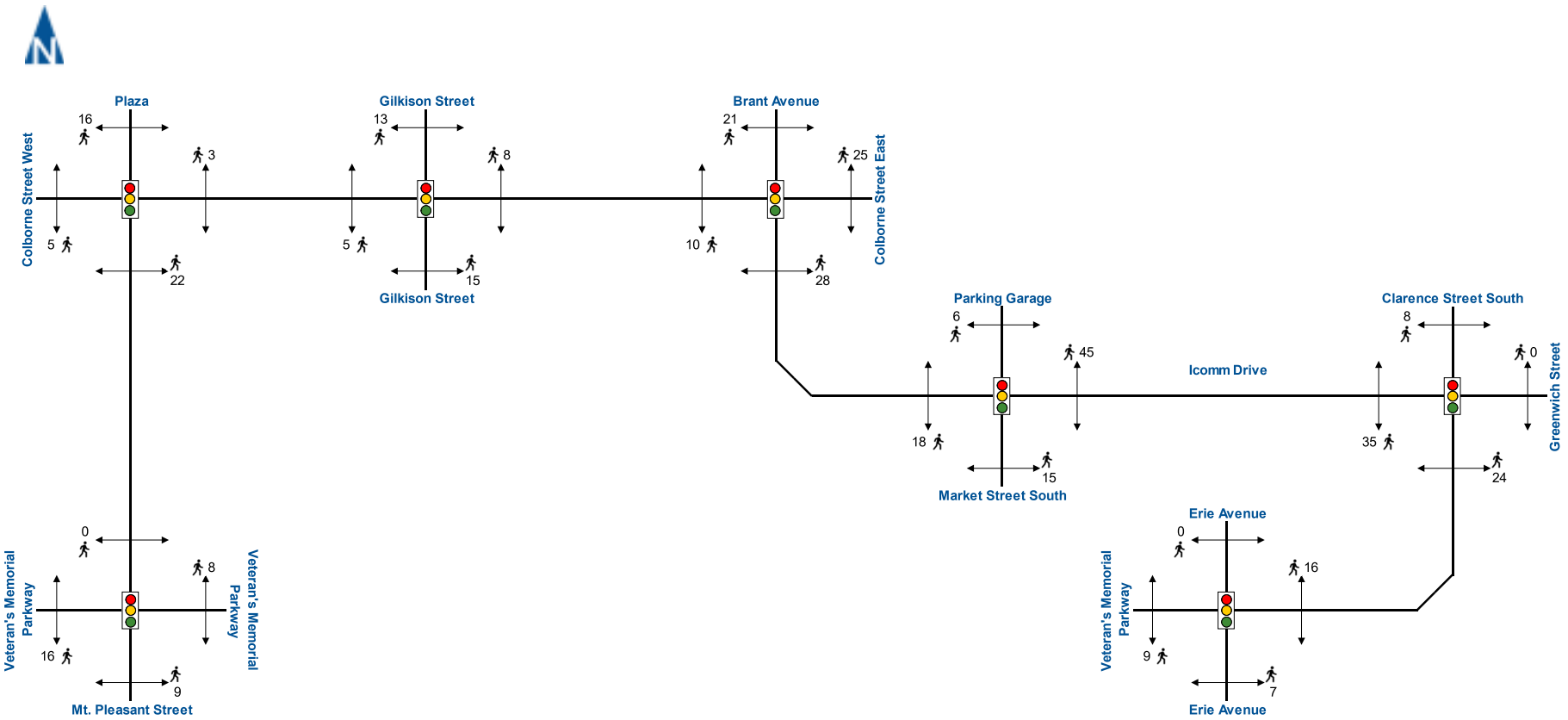
Not to Scale

Base Year Traffic Volumes
PM Peak Hour



Not to Scale

Pedestrian Volumes
AM Peak Hour



Not to Scale

Pedestrian Volumes
PM Peak Hour

2.5 Active Transportation Volumes

2.5.1 Pedestrian Volumes at Bridges

The City of Brantford provided pedestrian crossing counts of two bridges crossing the Grand River between Colborne Street and Veterans' Memorial Parkway; Brant's Crossing Bridge and TH&B Crossing Bridge.

Pedestrian crossing activity at the Brant's Crossing Bridge (Fordview) was collected between November 28, 2017, and January 5, 2018. During this time frame, the counter recorded:

- Average: 113 pedestrians per day (ppd)
- Maximum: 241 ppd on December 3, 2017
- Minimum: 31 ppd on January 1, 2018

Additional data was provided at this location between January 22, 2018, and March 21, 2018. This counter captured pedestrian crossing across this bridge during the flood event, in which the bridge was closed on February 21, 2018. Data collected on this date has also been disregarded as the volumes showed anomaly in volumes. During this time frame, the counter recorded:

- Average: 98 ppd
- Maximum: 448 ppd on January 28, 2018
- Minimum: 11 ppd on January 22, 2018

Pedestrian crossing activity at TH&B Crossing Bridge was collected between March 2018 and December 2018. During this period, the counter recorded:

- Average: 35 ppd
- Maximum: 219 ppd on March 16, 2018
- Minimum: 4 ppd on January 22, 2018

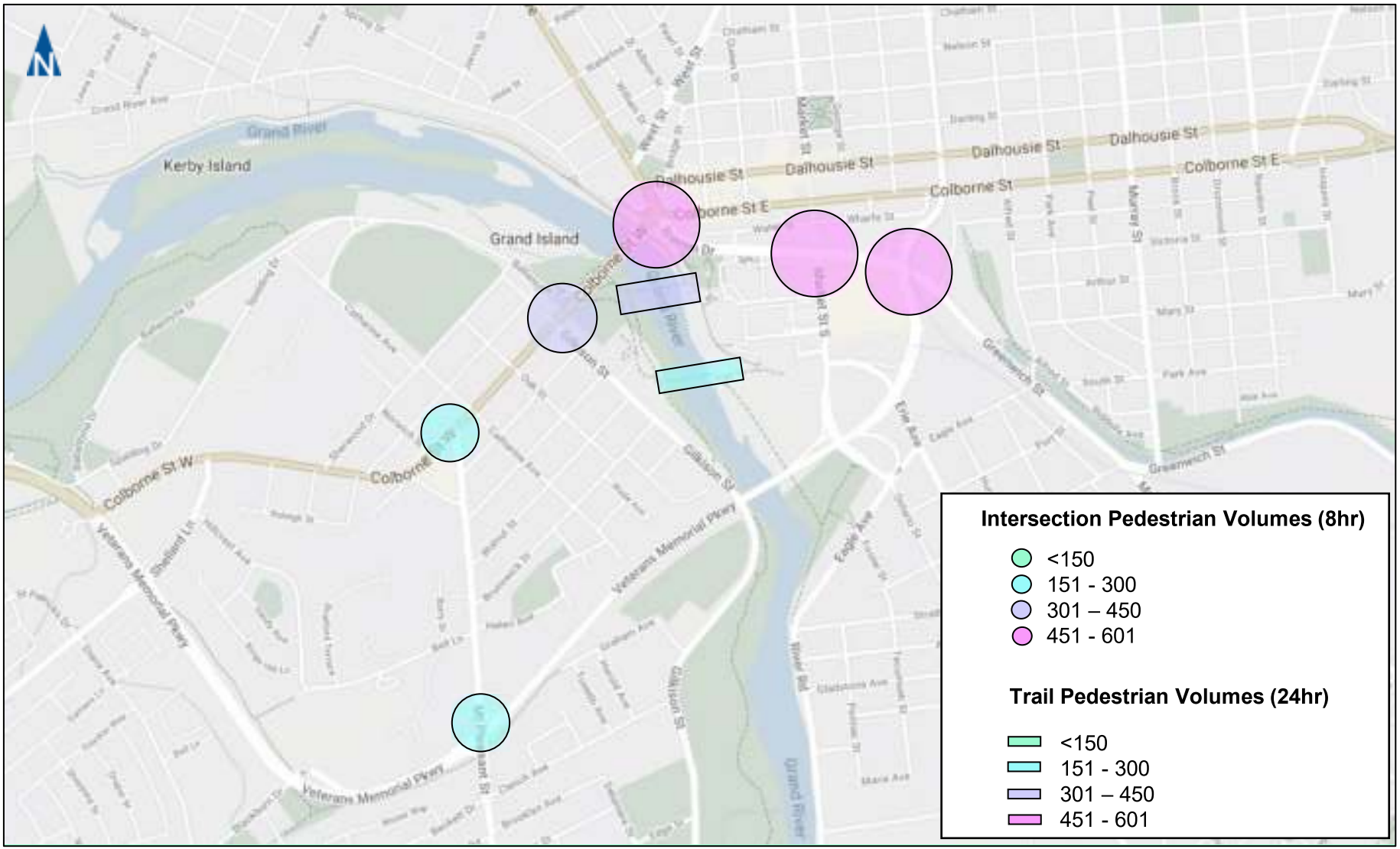
2.5.2 Pedestrian Volumes at Intersections

The traffic counts in November 2020 included pedestrian data for the study area intersections. A review of the mobility trends indicates pedestrian traffic is 21% lower than the average volume observed prior to March 1, 2020. To compensate for this, the pedestrian volumes have been adjusted to reflect typical average trend.

Based on a review of the traffic data supplied by the City of Brantford with adjustments made, the following is noted with regard to pedestrian activity at intersections:

- The intersection of Icomm Drive at Market Street South exhibited the highest pedestrian activity at 580 pedestrians. The intersections of Colborne Street at Brant Avenue and Icomm Drive at Clarence Street South exhibit similar volumes of 510 and 520 pedestrians across the eight-hour count period.
- The intersection of Veteran's Memorial Parkway and Mt. Pleasant Street exhibited the lowest pedestrian activity at 160 pedestrians.
- The intersections of Colborne Street at Mt. Pleasant Street and Colborne Street at Gilkison Street exhibited moderate pedestrian activity of 240 and 405 pedestrians.

Figure 2.8 illustrates the magnitude of pedestrian crossing activity within the study area.



Pedestrian Magnitude

Figure 2.8

2.5.3 Cycling Volumes at Intersections

The traffic counts undertaken in November 2020 and the counts provided by the City of Brantford did not include cycling data for the study area intersections. Given limited data, estimates of cycling demand were developed based on the Transportation Tomorrow Survey (TTS). The TTS survey randomly selects households in the Greater Golden Horseshoe (GGH) and is an important data source for transportation planning and is supported by the City of Brantford.

Unlike other data sources, such as regular traffic counts, which measure the change in magnitude of travel demand, the TTS provides information on the characteristics of these changes. As a transportation time series database, the TTS enables analysis on how factors such as flexible work hour programs, relocation of manufacturing employment, and aging population influence how people travel, how often, and the purpose of their trips. TTS data from year 2016[3] (most recent survey) was available for Brantford and included in the *2020 Transportation Master Plan Update*.[4] This data is comprised of modes of transportation originating in Brantford to destinations within and external to Brantford.

Daily cycling trips were reviewed for the entire City to produce a reasonable estimate of the cycling demand. Data from TTS is outlined in **Table 2.2**.

TABLE 2.2: 2016 TTS DATA (TRIP MODE)

City of Brantford – Mode Split (All Trips) 2016	
Mode	**%**
Auto Driver	73.2%
Auto Passenger	10.8%
Walk	6.4%
Other	6.3%
Transit	2.7%
Bicycle	0.6%
Total	**100.0%**

[3] Transportation Tomorrow Survey (TTS). 2016. Data Management Group, University of Toronto.

[4] City of Brantford. *2020 Brantford Transportation Master Plan Update*. March 2021.

Utilizing the TTS data, an estimate of the number of cyclists that could occur along the study area roadways can be developed based on the annual average daily traffic (AADT) volumes. The projected number of daily cyclists along the study area roadways is outlined in **Table 2.3**.

Based on the data, Colborne Street between Brant Avenue and Gilkison Street could see approximately 145 cyclists per day.

TABLE 2.3: 2020 ESTIMATED CYCLING DEMAND

Roadway	Segment		2020 Estimates	
			AADT	Daily Cyclists
Colborne Street	Brant Avenue	Ballantyne Drive	24,000	144
	Ballantyne Drive	Gilkison Street	24,000	144
	Gilkison Street	Mt. Pleasant Street	16,500	99
Icomm Drive	Colborne Street	Market Street	9,500	57
	Market Street	Clarence Street	6,500	39
Mt. Pleasant Street	Veteran's Memorial Parkway	Colborne Street	6,500	39

2.6 Traffic Operations

The quality of intersection operations at signalized and unsignalized intersections is evaluated in terms of level of service (LOS) and volume to capacity (v/c) as defined by the Highway Capacity Manual (HCM). LOS is evaluated based on the average control delay per vehicle and includes deceleration delay, queue move-up delay, stopped delay and final acceleration delay.

For signalized intersections, LOS ranges from LOS A (<10 seconds of average delay) to LOS F (>80 seconds of average delay). For unsignalized intersections, the LOS ranges from LOS A (<10 seconds of average delay) to LOS F (>50 seconds of average delay). Capacity is evaluated in terms of the ratio of demand flow to capacity with an at-capacity condition represented by a v/c ratio of 1.00 (i.e. volume demand equals capacity).

Under City of Brantford TIS Guidelines[5], movements are considered critical:

- When v/c ratios for overall intersection operations, through movements, or shared through/turning movements exceeds 0.85;
- When v/c ratios for dedicated turning movements exceeds 0.95, or queue lengths for individual movements exceeds available lane storage; and/or
- When as unsignalized intersection operates with a movement or approach at LOS E, or worse.

The traffic operations in the study area have been evaluated using Synchro 10 with the following parameters:

- Existing lane configurations;
- Signal timing as provided by the City (and included in **Appendix A** for reference);
- Heavy vehicles percentages and pedestrian volumes as extracted from the turning movement counts; and
- Synchro default values for all other inputs.

Synchro implements the methodology of the Highway Capacity Manual (HCM). The intersection analysis considers three separate measures of performance:

- The level of service (LOS), based on the average delay for each turning movement, measured in seconds (s);
- The volume-to-capacity (v/c) ratio for each movement; and
- The 95th percentile queue length, in metres (m).

Table 2.4 and **Table 2.5** summarize the level of service conditions and indicate the study intersections are operating within capacity and with acceptable levels of service. **Appendix B** contains the detailed Synchro reports.

[5] City of Brantford. *Transportation Impact Study Guidelines.* July 2014.

TABLE 2.4: EXISTING TRAFFIC OPERATIONS – AM PEAK HOUR

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 - Veteran's Memorial Parkway & Mt. Pleasant Street	TCS	LOS	A	A	A	**A**	B	B	B	**B**	C	D	D	**D**	C	D	>	**C**	**C**
			Delay	7	8	7	**8**	18	12	11	**14**	31	37	36	**36**	31	36	>	**35**	**20**
			V/C	0.16	0.29	0.06		0.44	0.20	0.04		0.30	0.49	0.34		0.23	0.39	>		**0.43**
			Q	15	44	7		46	34	1		19	29	29		16	24	>		
			Ex	140	-	25		40	-	45		45	-	40		35	-	>		
			Avail.	125	-	19		-6	-	44		26	-	11		19	-	>		
	2 - Mt. Pleasant Street & Colborne Street West	TCS	LOS	<	A	>	**A**	<	A	>	**A**	C	C	>	**C**	<	C	>	**C**	**A**
			Delay	<	4	>	**4**	<	2	>	**2**	32	33	>	**33**	<	32	>	**32**	**8**
			V/C	<	0.30	>		<	0.37	>		0.09	0.20	>		<	0.04	>		**0.37**
			Q	<	31	>		<	1	>		7	21	>		<	4	>		
			Ex	<	-	>		<	-	>		-	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		-	-	>		<	-	>		
	3 - Colborne Street West & Gilkison Street	TCS	LOS	<	C	>	**C**	<	A	>	**A**	<	C	>	**C**	<	D	>	**D**	**B**
			Delay	<	21	>	**21**	<	6	>	**6**	<	30	>	**30**	<	54	>	**54**	**17**
			V/C	<	0.62	>		<	0.44	>		<	0.24	>		<	0.72	>		**0.61**
			Q	<	91	>		<	36	>		<	21	>		<	27	>		
			Ex	<	-	>		<	-	>		<	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		<	-	>		<	-	>		
	4 - Colborne Street West & Ballantyne Drive	TWSC	LOS		UM		**UM**		UM	>	**UM**									
			Delay							>										
			V/C							>										
			Q							>										
			Ex							>										
			Avail.							>										
	5 - Colborne Street West & Brant Avenue/Icomm Drive	TCS	LOS	C	C	E	**C**					B	B	B	**B**	<	C	A	**A**	**B**
			Delay	28	22	69	**26**					11	13	13	**12**	<	22	2	**8**	**17**
			V/C	0.73	0.57	0.04						0.14	0.21	0.02		<	0.52	0.56		**0.74**
			Q	85	62	2						10	25	1		<	46	0		
			Ex	200	-	5						115	-	215		<	-	-		
			Avail.	115	-	3						105	-	214		<	-	-		
	6 - Icomm Drive & Market Street South	TCS	LOS	A	A	C	**C**	A	A	>	**A**	D	C	>	**C**	<	C	>	**C**	**C**
			Delay	7	8	33	**23**	6	5	>	**5**	35	23	>	**33**	<	23	>	**23**	**22**
			V/C	0.02	0.07	0.14		0.06	0.08	>		0.72	0.05	>		<	0.00	>		**0.31**
			Q	4	18	44		8	10	>		53	8	>		<	0	>		
			Ex	65	-	60		125	-	>		-	-	>		<	-	>		
			Avail.	61	-	16		117	-	>		-	-	>		<	-	>		
	7 - Icomm Drive/Greenwich Street & Clarence Street South	TCS	LOS	C	B	>	**B**	C	C	C	**C**	A	A	>	**A**	A	A	A	**A**	**A**
			Delay	22	14	>	**18**	31	30	29	**30**	4	6	>	**6**	5	5	4	**5**	**10**
			V/C	0.57	0.24	>		0.34	0.18	0.06		0.11	0.41	>		0.15	0.21	0.05		**0.44**
			Q	16	8	>		18	13	12		8	52	>		8	24	5		
			Ex	75	-	>		35	-	3		75	-	>		105	-	70		
			Avail.	59	-	>		17	-	-9		67	-	>		97	-	>		
	8 - Veteran's Memorial Parkway & Erie Avenue	TCS	LOS	A	B	A	**B**	A	A	>	**A**	C	D	D	**D**	C	C	>	**C**	**B**
			Delay	9	12	10	**12**	6	5	>	**6**	34	38	36	**36**	31	33	>	**33**	**18**
			V/C	0.03	0.38	0.07		0.45	0.17	>		0.39	0.61	0.53		0.02	0.30	>		**0.5**
			Q	5	61	8		26	22	>		25	50	42		3	27	>		
			Ex	50	-	50		85	-	>		30	-	30		30	-	>		
			Avail.	45	-	42		59	-	>		5	-	-12		27	-	>		

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
UM - Unopposed Movement

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

TABLE 2.5: EXISTING TRAFFIC OPERATIONS – PM PEAK HOUR

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	
PM Peak Hour	1 - Veteran's Memorial Parkway & Mt. Pleasant Street	TCS	LOS	A	A	A	**A**	C	B	B	**B**	C	D	D	**D**	D	D	>	**D**	**C**
			Delay	7	7	6	**7**	26	13	11	**16**	33	37	36	**36**	42	54	>	**52**	**22**
			V/C	0.16	0.23	0.07		0.73	0.35	0.09		0.40	0.40	0.13		0.23	0.53	>		**0.63**
			Q	11	32	7		106	56	10		22	24	19		18	33	>		
			Ex	140	-	25		40	-	45		45	-	40		35	-	>		
			Avail.	129	-	18		-66	-	35		23	-	21		17	-	>		
	2 - Mt. Pleasant Street & Colborne Street West	TCS	LOS	<	A	>	**A**	<	A	>	**A**	D	F	>	**F**	<	D	>	**D**	**B**
			Delay	<	3	>	**3**	<	1	>	**1**	37	89	>	**82**	<	37	>	**37**	**13**
			V/C	<	0.28	>		<	0.56	>		0.25	0.17	>		<	0.05	>		**0.56**
			Q	<	28	>		<	2	>		16	34	>		<	4	>		
			Ex	<	-	>		<	-	>		-	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		-	-	>		<	-	>		
	3 - Colborne Street West & Gilkison Street	TCS	LOS	<	B	>	**B**	<	B	>	**B**	<	C	>	**C**	<	E	>	**E**	**B**
			Delay	<	19	>	**19**	<	13	>	**13**	<	31	>	**31**	<	67	>	**67**	**20**
			V/C	<	0.58	>		<	0.84	>		<	0.16	>		<	0.85	>		**0.88**
			Q	<	98	>		<	102	>		<	18	>		<	51	>		
			Ex	<	-	>		<	-	>		<	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		<	-	>		<	-	>		
	4 - Colborne Street West & Ballantyne Drive	TWSC	LOS		UM		**UM**		UM	>	**UM**									
			Delay							>										
			V/C							>										
			Q							>										
			Ex							>										
			Avail.							>										
	5 - Colborne Street West & Brant Avenue/Icomm Drive	TCS	LOS	B	B	A	**B**					C	C	E	**C**	<	C	A	**B**	**B**
			Delay	16	14	5	**14**					23	22	65	**27**	<	28	5	**12**	**15**
			V/C	0.60	0.57	0.11						0.34	0.24	0.04		<	0.66	0.84		**1.02**
			Q	107	76	3						26	44	6		<	66	0		
			Ex	200	-	5						115	-	215		<	-	-		
			Avail.	93	-	2						89	-	209		<	-	-		
	6 - Icomm Drive & Market Street South	TCS	LOS	A	A	D	**C**	A	A	>	**A**	D	C	>	**D**	<	C	>	**C**	**C**
			Delay	7	7	36	**27**	8	8	>	**8**	39	23	>	**36**	<	23	>	**23**	**25**
			V/C	0.00	0.12	0.25		0.14	0.10	>		0.78	0.05	>		<	0.04	>		**0.43**
			Q	1	22	66		15	15	>		68	9	>		<	5	>		
			Ex	65	-	60		125	-	>		-	-	>		<	-	>		
			Avail.	65	-	-6		110	-	>		-	-	>		<	-	>		
	7 - Icomm Drive/Greenwich Street & Clarence Street South	TCS	LOS	C	C	>	**C**	E	C	C	**D**	C	C	>	**C**	B	B	B	**B**	**C**
			Delay	24	22	>	**23**	61	30	29	**45**	25	21	>	**22**	15	16	10	**15**	**22**
			V/C	0.48	0.21	>		0.86	0.19	0.04		0.39	0.42	>		0.35	0.58	0.06		**0.64**
			Q	47	31	>		68	19	5		25	80	>		25	91	7		
			Ex	75	-	>		35	-	3		75	-	>		105	-	70		
			Avail.	28	-	>		-33	-	-2		50	-	>		80	-	>		
	8 - Veteran's Memorial Parkway & Erie Avenue	TCS	LOS	B	B	B	**B**	B	A	>	**A**	D	D	C	**D**	C	C	>	**C**	**B**
			Delay	12	14	12	**14**	13	2	>	**6**	41	36	33	**35**	31	34	>	**34**	**16**
			V/C	0.04	0.32	0.07		0.72	0.35	>		0.63	0.55	0.23		0.04	0.43	>		**0.73**
			Q	4	49	9		52	19	>		37	44	22		5	36	>		
			Ex	50	-	50		85	-	>		30	-	30		30	-	>		
			Avail.	46	-	41		33	-	>		-7	-	9		26	-	>		

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
UM - Unopposed Movement

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

3 Safety Performance Report

3.1 Collision Data

The City of Brantford provided collision information for the period of January 1, 2015, to December 31, 2019 (inclusive) at the following intersections:

- Mt. Pleasant Street and Veteran's Memorial Parkway;
- Mt. Pleasant Street and Colborne Street West;
- Colborne Street West and Gilkison Street;
- Colborne Street West and Brant Avenue/Icomm Drive;
- Icomm Drive and Market Street South; and
- Icomm Drive/Greenwich Street and Clarence Street South.

The data was provided in tabulated form, and included the following information: date and time, weather, impact type, presence of injuries, and road surface condition. Additional information for each driver was provided as follows: direction of travel, vehicle maneuver, vehicle type, and driver action. **Appendix C** contains the raw collision reports.

The collision reports have been reviewed as is. No modifications or adjustments have been made to correct any duplicate entries, or entries for which the collision record appears incorrect (i.e. rear end collision between a northbound and westbound driver).

3.1.1 All Collisions

Figure 3.1 illustrates a locational summary of the collisions within the study area. A total of 312 collisions were reported during the analysis period. Nearly half of all collisions (46%) occurred at either Colborne Street and Brant Avenue/Icomm Drive (72 collisions (23%)) or Icomm Drive/Greenwich Street and Clarence Street South (72 collisions (23%)).

Figure 3.2 illustrates a broad summary of key collisions statistics. The data indicates environmental conditions were likely not a contributing factor since approximately 80% of collisions occurred under clear conditions. Seventeen percent of collisions occurred under rain (9%) or snow (8%) with the remaining 3% occurring under drifting snow, fog, mist, dust, or smoke.

The most common impact types were rear end collisions (34%) and turning movement (24%). Most collisions (77%) were uncategorized, considered non-reportable, or resulted in personal damages only.

However, there was one fatal injury at Colborne Street/Gilkison Street, and 61 non-fatal collisions across all intersections.

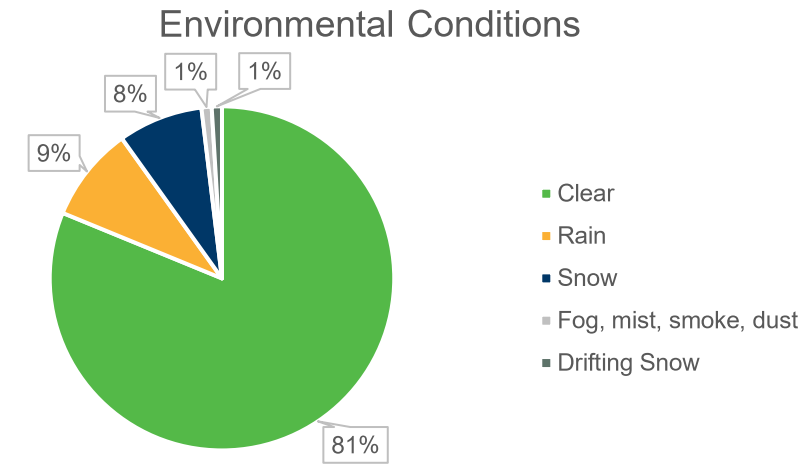
Out of all 312 collisions, six collisions involved a cyclist, all of which were deemed the fault of the cyclist. Seven other collisions involved a pedestrian. **Table 3.1** summarizes the total number of collisions involving vulnerable road users at each intersection.

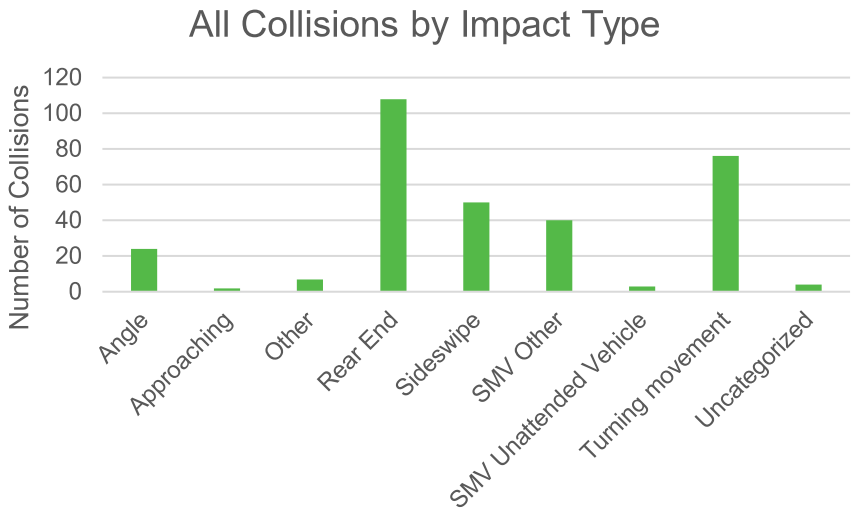
TABLE 3.1: COLLISIONS WITH VULNERABLE ROAD USERS (2015-2019)

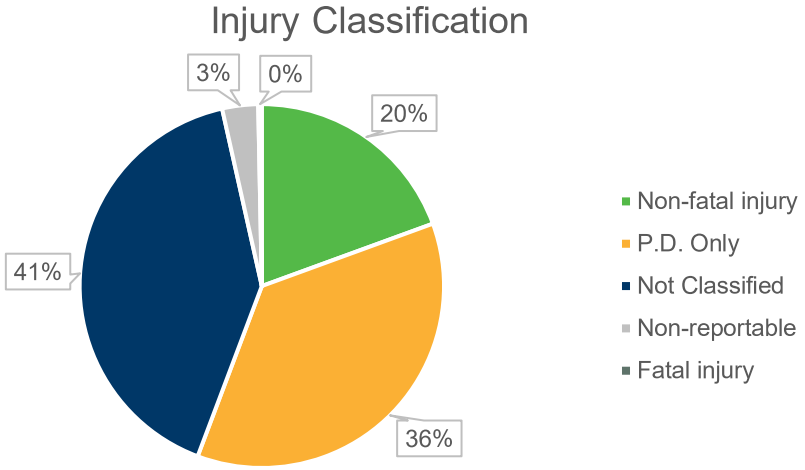
Intersection	Collision Type	
	Cyclist	Pedestrian
Veteran's Memorial Parkway and Mt. Pleasant Street	0	0
Colborne Street West and Mt. Pleasant Street	1	1
Colborne Street West and Gilkison Street	2	1
Colborne Street West and Brant Avenue/Icomm Drive	1	1
Icomm Drive and Market Street South	0	3
Icomm Drive/Greenwich Street and Clarence Street South	2	1
Total	**6**	**7**

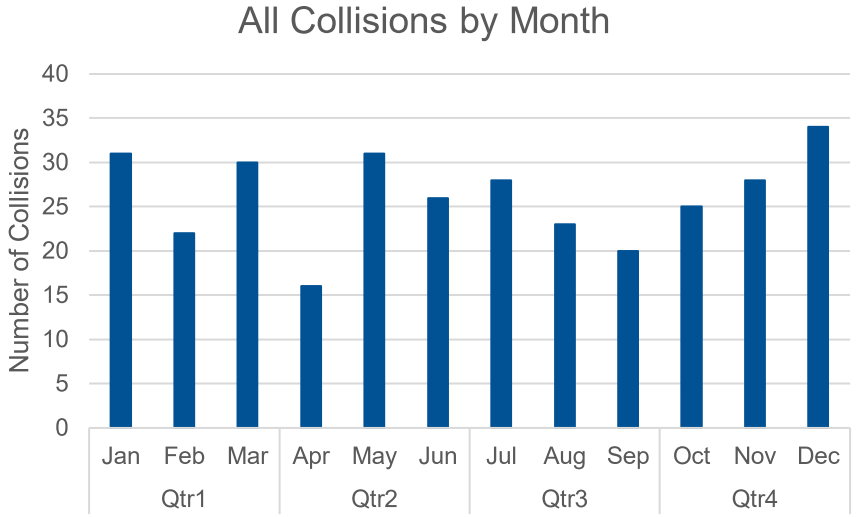
Total Collisions by Intersection (2015 to 2019)

Figure 3.1









Collision Review
All Intersections (2015 to 2019)

3.1.2 Veteran's Memorial Parkway & Mt. Pleasant Street

A total of 52 collisions were reported during the analysis period. The collision reports indicate environmental conditions were not a significant contributing factor as 80% of collisions occurred under clear conditions. **Figure 3.3** illustrates key elements of the review including impact type, classification of the collisions, monthly distribution, and environmental conditions.

The most common impact type was rear end (22 collisions), followed by single motor vehicle (SMV) other (12 collisions), and turning movement (11 collisions). None of the collisions involved a pedestrian or cyclist.

Seventy-five percent of the collisions resulted in personal damage only, were considered non-reportable or were otherwise uncategorized. The remaining 25% (13 collisions) resulted in non-fatal injuries. None of the collisions resulted in fatal injuries. Following too closely was noted as the most frequent driver action, contributing to 19% of collisions.

Collision frequency has remained relatively stable year over year, with an average of 0.9 collisions per month. Collision frequency is also relatively consistent per month, with the largest number of collisions occurring in July (8 collisions), January (7 collisions) and December (6 collisions).

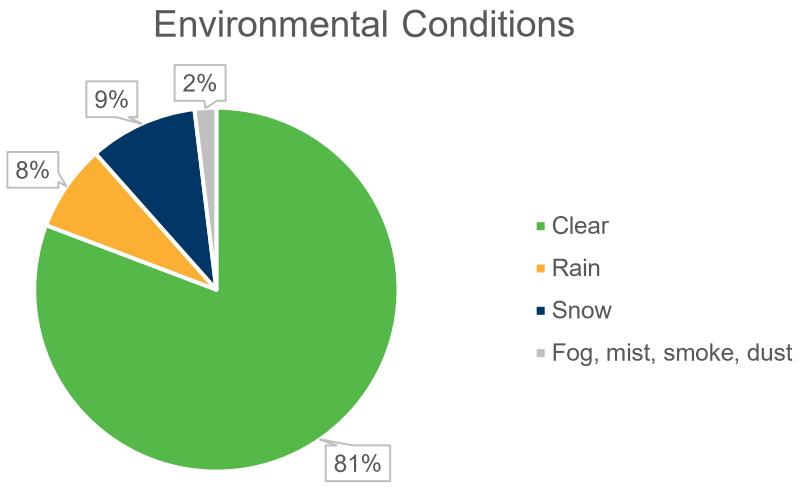
Notable trends at this intersection include the following:

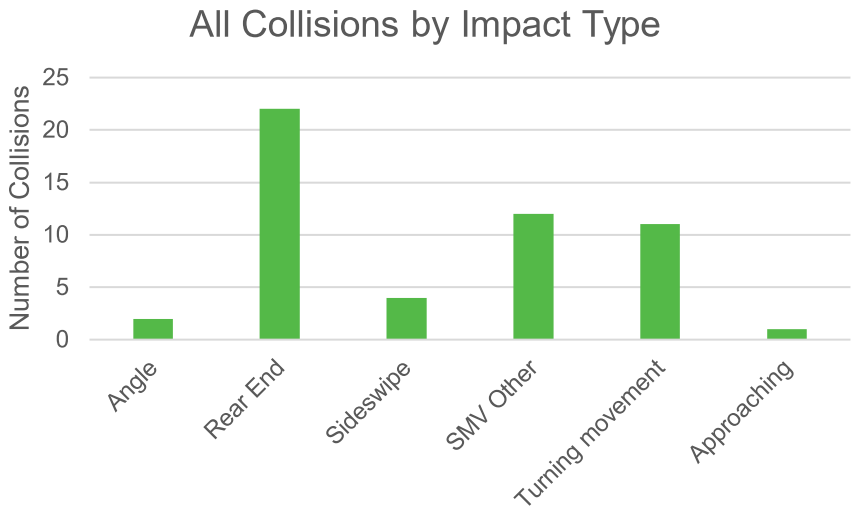
- 62% of collisions that resulted in non-fatal injuries were classified as a turning movement collision, 75% of which involved a westbound vehicle turning left;
- Of these collisions that involved a westbound left-turning vehicle, 66% occurred on a weekday between 4:00 PM and 7:00 PM;
- All the rear-end collisions occurred under clear conditions; and
- 73% of rear-end collisions involved two eastbound vehicles, or two northbound vehicles.

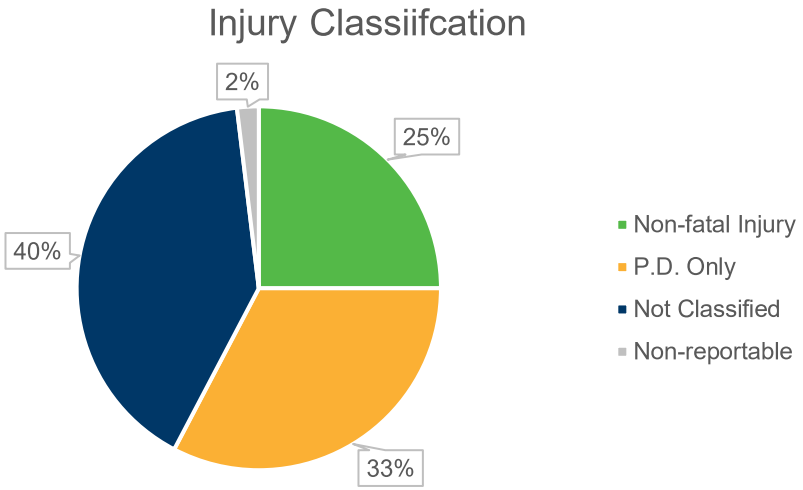
The collision history at the intersection appears to indicate driver error as the most common contributing factor, largely through following too closely. Non-fatal injuries are largely associated with turning movement classified collisions, many of which involve a westbound left-turning vehicle and an eastbound through vehicle. Since a westbound advance left-turn phase is already provided at the intersection, these

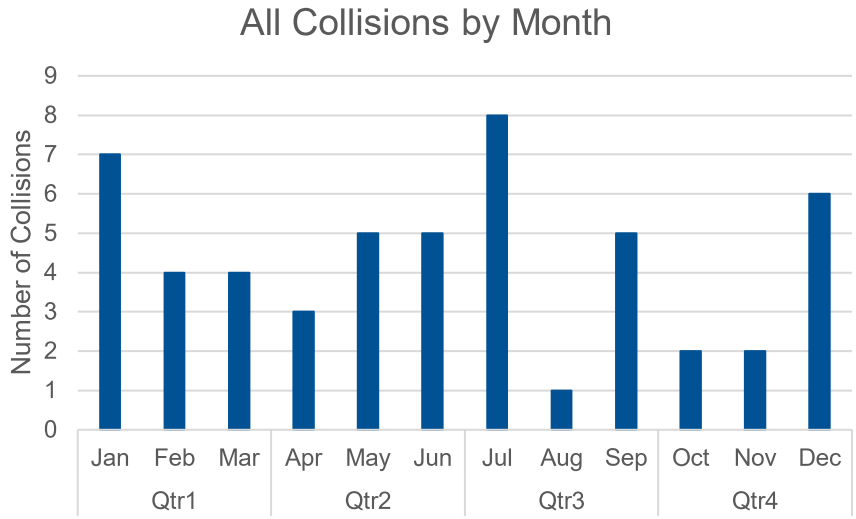
collisions may be due to westbound left-turning vehicles clearing the intersection without yielding to oncoming traffic.

The traffic analyses summarized in **Section 2.6** indicate the westbound left-turn movement at this intersection operates with an acceptable level of service (LOS C or better). However, additional green time could be allocated to the westbound left-turn phase to increase the percentage of left-turning vehicles during the protected, rather than permissive phase of this movement.









Collision Review
Veteran's Memorial Parkway and Mt. Pleasant Street

3.1.3 3.1.3 Colborne Street West and Mt. Pleasant Street

A total of 32 collisions were reported during the five-year analysis period. The collision reports indicate environmental conditions were not a significant contributing factor since 85% of collisions occurred under clear conditions. **Figure 3.4** illustrates key elements of the review including impact type, classification of the collisions, monthly distribution, and environmental conditions.

The most common impact type was rear end (9 collisions), followed by turning movement (8 collisions) and SMV other (8 collisions). One collision involved a cyclist which resulted in non-fatal injuries. Another collision involved a pedestrian which also resulted in non-fatal injuries.

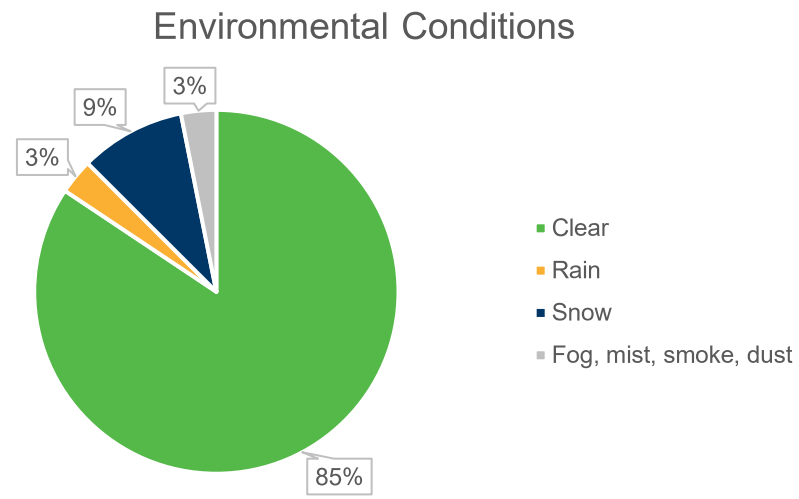
Eighty-one percent (26 collisions) resulted in personal damage only, were considered non-reportable or were otherwise uncategorized. The remaining six collisions resulted in non-fatal injuries. None of the collisions resulted in fatal injuries.

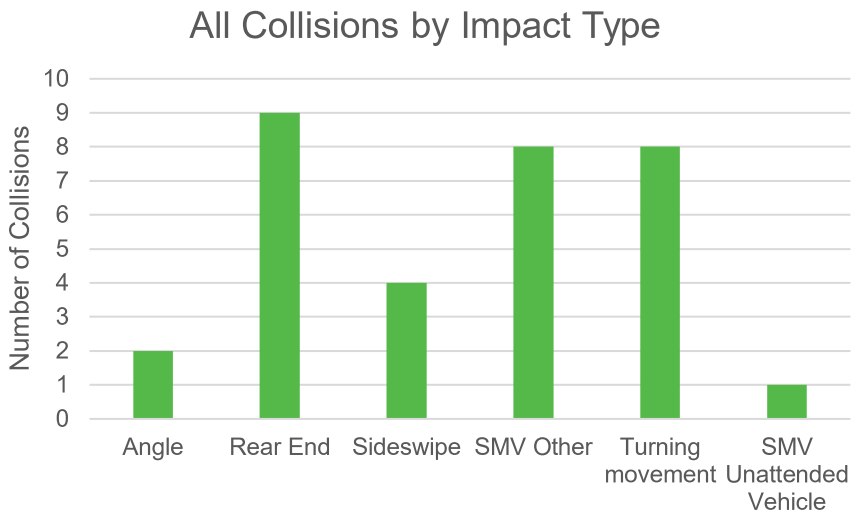
Collision frequency has remained relatively stable year over year, with an average of 0.5 collisions per month. A total of nine collisions occurred in 2017, representing the highest annual total among the five years under review. Collision frequency is also consistent month to month, with the largest number of collisions occurring in May (4 collisions) and December (4 collisions).

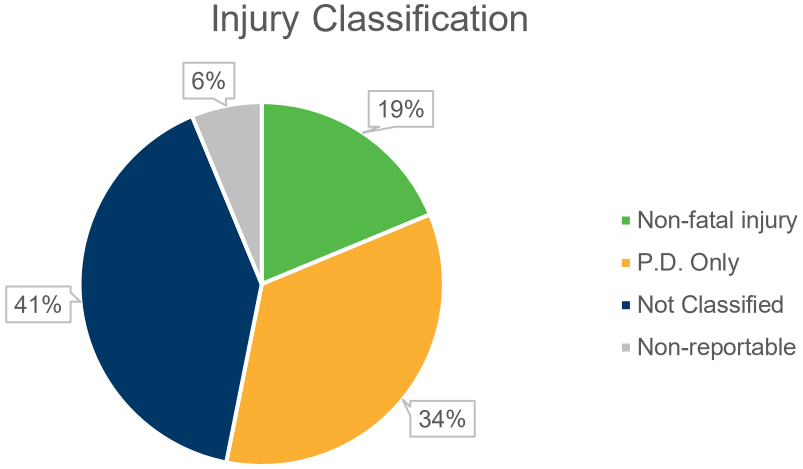
Notable trends at this intersection include the following:

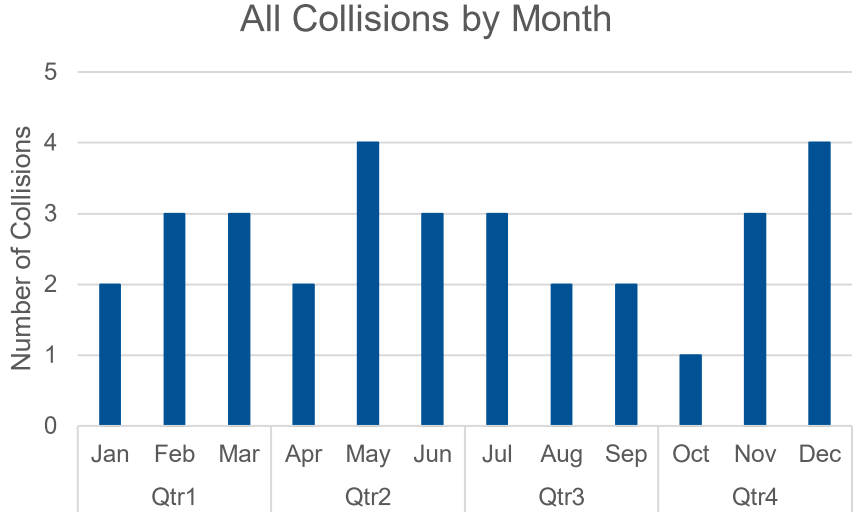
- Non-fatal injuries were exclusively related to sideswipe, SMV other and turning movement collisions;
- 75% of sideswipe collisions involved two eastbound vehicles;
- 56% of rear-end collisions involved two westbound vehicles and 33% involved two northbound vehicles; and
- The respective collisions involving the cyclist and pedestrian occurred under clear conditions, and daytime lighting conditions.

The collision history at the intersection appears to indicate driver error as the most common contributing factor. The collision involving the cyclist indicates both the cyclist and motor vehicle operator failed to yield the right-of-way to each other. The collision involving a pedestrian indicates the motor vehicle operator completed an improper turn.









Collision Review
Colborne Street West and Mt. Pleasant Street

3.1.4 Colborne Street West and Gilkison Street

A total of 42 collisions were reported during the analysis period. The collision reports indicate environmental conditions were not a significant contributing factor since approximately 74% of collisions occurred under clear conditions. **Figure 3.5** illustrates key elements of the review including impact type, classification of the collisions, monthly distribution, and environmental conditions.

The most common impact type was rear end (18 collisions) and turning movement (13 collisions). Two collisions involved a cyclist, and one collision involved a pedestrian.

Seventy nine percent (33 collisions) were uncategorized or resulted in personal damages only. Nineteen percent (8 collisions) resulted in non-fatal injuries. A fatal collision occurred in November 2016 under clear and dry conditions. This collision did not involve a cyclist or pedestrian. Disobeying traffic control (8 collisions) and following too close (8 collisions) were noted as the most frequent driver action.

Annual collision frequencies have generally been decreasing from a peak of 13 collisions in 2016 to four collisions in 2019. Over the five-year review period, the intersection has averaged 0.7 collisions per month. A larger number of collisions were observed between April and September (28 collisions), as opposed to October to March (14 collisions).

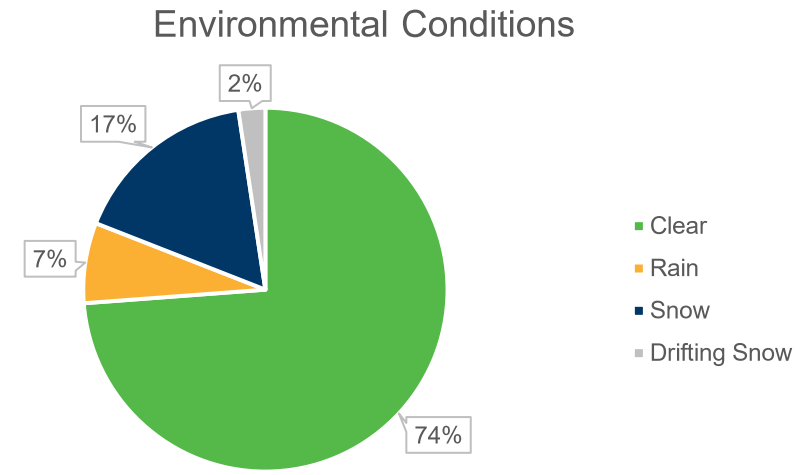
Notable trends at the intersection include the following:

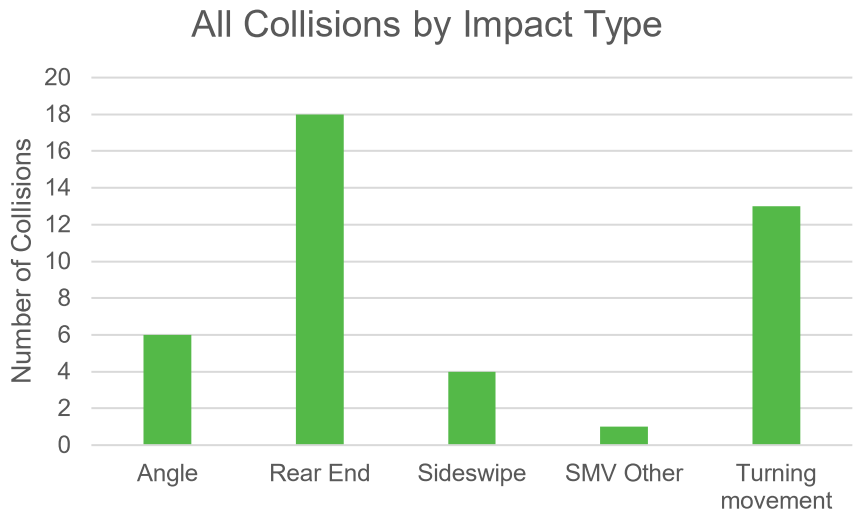
- 50% of the 18 observed rear-end collisions occurred during rain, snow or slush;
- 72% of the 18 observed rear-end collisions involved two westbound vehicles;
- 10 of the 13 turning movement collisions involved a left-turning vehicle, eight (80%) of which were eastbound or westbound left-turn maneuvers;
- Non-fatal injuries were primarily associated with angle and turning movement collisions;
- The two collisions involving cyclists occurred in September under dusk conditions; and
- The collision involving the pedestrian occurred in March, under clear, daytime conditions.

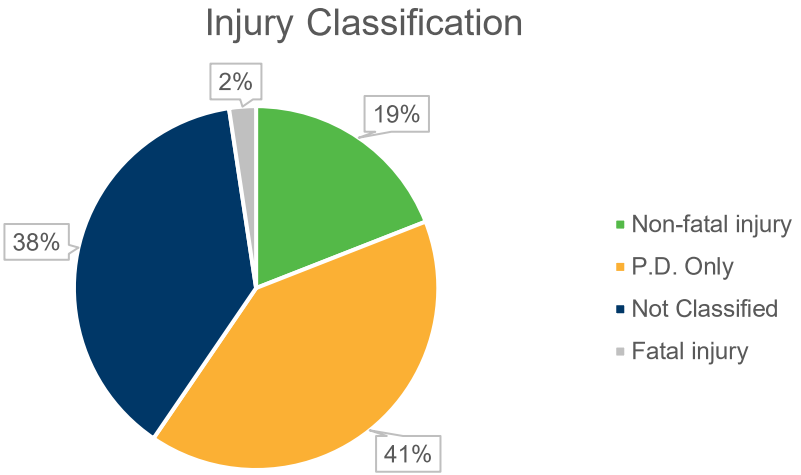
The collision data does not indicate a significant difference in rear-end collisions occurring during poor weather (rain or snow) or clear

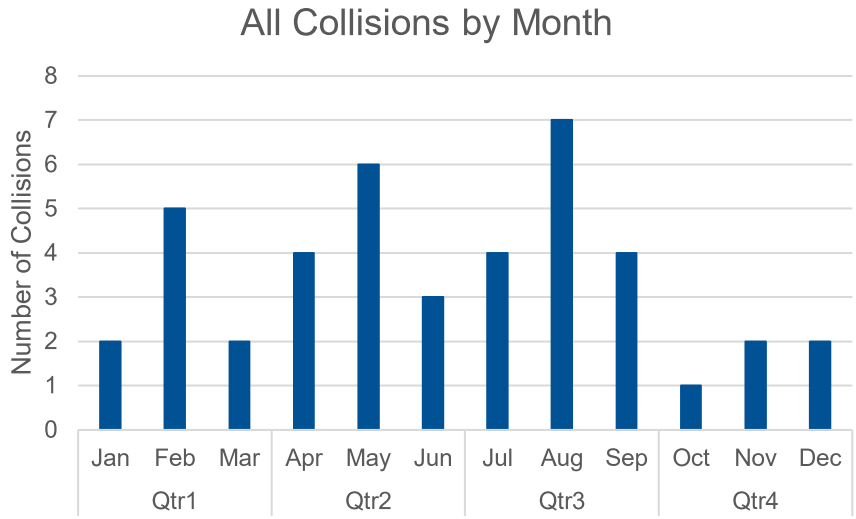
conditions. This indicates driver behaviour is likely a key contributor to these collision types. However, rear-end collisions appear to be more likely between two westbound vehicles especially between 12:00 PM and 6:30 PM. This is likely the result of higher westbound traffic volumes at this intersection in the afternoon. The vehicle maneuvers included in the reports for westbound/westbound rear-end collisions do not clarify if a stopped vehicle was intending to turn left, or were stopped at the stop bar. Therefore, it is difficult to determine whether the lack of a dedicated westbound left-turn lane is a contributing factor in a large proportion of rear-end collisions at this intersection.

Notwithstanding, the larger proportion of eastbound and westbound left-turning vehicles involved in turning movement collisions at the intersection may be the result of the shared left-turn/through lane on the eastbound and westbound approaches to the intersection. Left-turning vehicles may be facing an opposing left-turning vehicle which impedes visibility of through traffic in the adjacent curb lanes.









Collision Review
Colborne Street West and Gilkison Street

3.1.5 Colborne Street West and Brant Avenue/Icomm Drive

A total of 72 collisions were reported during the five-year analysis period. The collision reports indicate environmental conditions were not likely a contributing factor since approximately 81% of collisions occurred under clear conditions. **Figure 3.6** illustrates key elements of the review including impact type, classification of the collisions, monthly distribution, and environmental conditions.

The most common impact type was rear end (30 collisions) and sideswipe (20 collisions), combining for 69% of all reported collisions. One collision involved a cyclist, and another involved a pedestrian.

Eighty-nine percent (64 collisions) resulted in personal damage only, were considered non-reportable, or otherwise uncategorized. The remaining 11% (8 collisions) resulted in non-fatal injuries. None of the 72 collisions resulted in fatal injuries. Improper lane change was identified as the most common driver action, contributing to 13 collisions.

Annual collision frequencies have remained generally consistent between 2015 and 2019, averaging 1.2 collisions per month. A total of 23 collisions occurred in 2017, representing 32% of all collisions during the five-year period. A larger number of collisions occurred between October and March (43 collisions), as opposed to April to September (29 collisions).

Notable trends at the intersection include the following:

- 60% of rear end collisions, and 70% of sideswipe collisions involved two southbound vehicles;
- 27% of rear end collisions, and 20% of sideswipe collisions involved two eastbound vehicles; and
- 28% of rear end collisions involving two southbound vehicles were the result of following too closely;
- 71% of sideswipe collisions involving two southbound vehicles were the result of an improper lane change; and
- The collisions involving cyclists or pedestrians occurred under clear conditions, but either at dusk or at night. The collision with the pedestrian involved an eastbound vehicle travelling straight through the intersection.

The collision history at the intersection indicates 32 collisions (44%) involve two southbound vehicles approaching the intersection and results in either a rear end or sideswipe collision. Improper lane changes and following too closely are the primary driver actions

contributing to these collisions. More notably, many of these collisions occurred before, during and after the PM peak hour at the intersection.

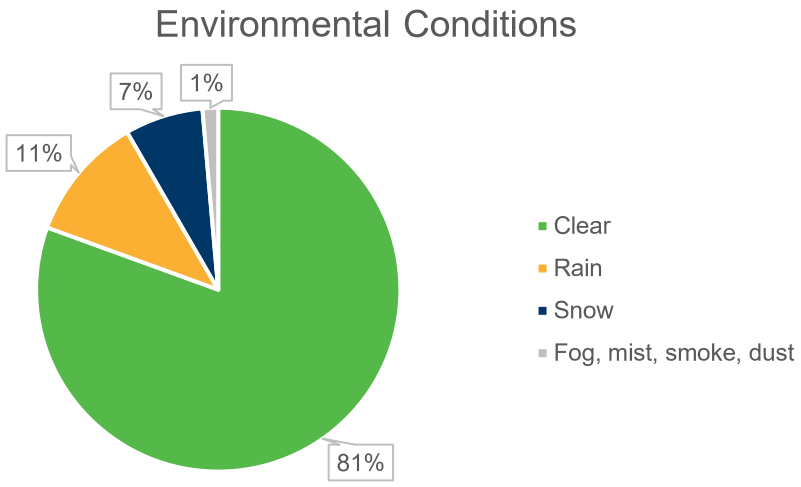
A review of the lane configuration on Brant Avenue between Dalhousie Street and Colborne Street indicates the curb lane becomes a right-turn lane. The centre lane remains a through lane, and a shared left/through lane is introduced approaching Colborne Street. Overhead lane configuration signs are installed 40 metres north of Dalhousie Street, directing motorists to the correct lane depending on their desired route (e.g., south via Icomm Drive or west via Colborne Street). Overhead signs are also provided on Dalhousie Street, with dedicated signs for the two left-turn lanes provided on the westbound approach.

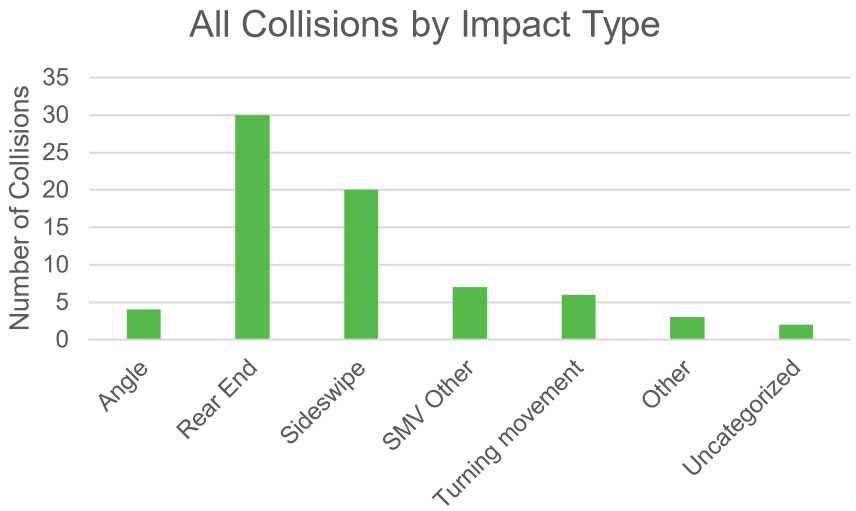
Driver confusion or inattentiveness is likely a key contributor to the pattern of sideswipe and rear end collisions at this location. This is exacerbated by the intersection spacing between Brant Avenue/Dalhousie Street and Brant Avenue/Icomm Drive/Colborne Street.

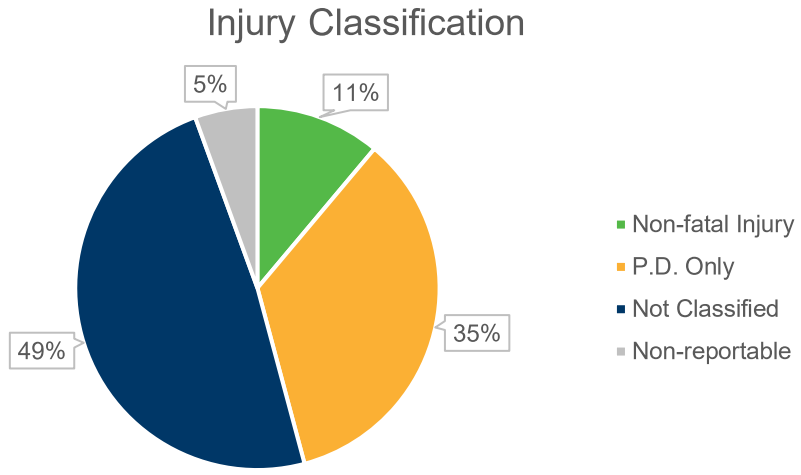
Based on field observations, the intersection does not include tracking pavement markings for the dual eastbound left turn movement. Ontario Traffic Manual (OTM) *Book 12*[6] notes that "*a dual LTL [left turn lane] shall require pavement marked 'tracking' lines for guidance of turning vehicles*" (pg. 156). Consideration could also be given to modifying the existing shared eastbound left-turn/through lane to an exclusive left-turn lane, or exclusive through lane. This would seek to eliminate slip around maneuvers from through volumes who may be stuck behind a left-turning vehicle when waiting for a pedestrian to cross the north approach of the intersection.

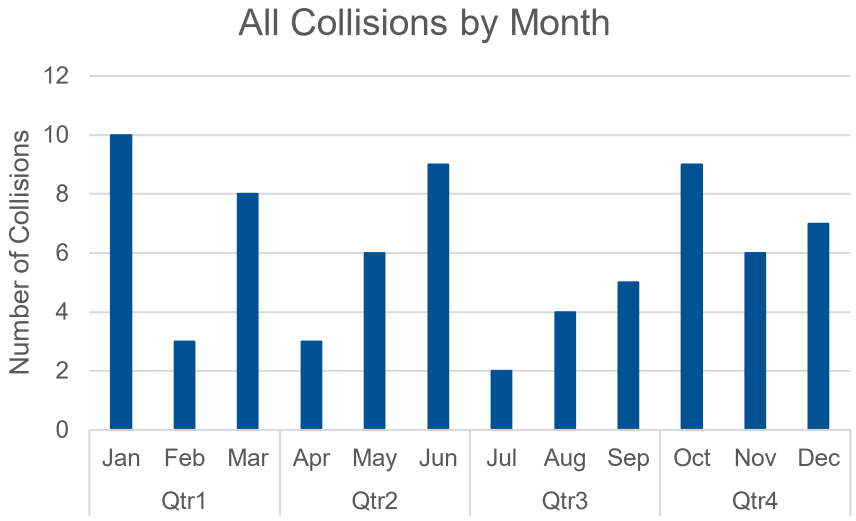
The intersection also includes an uncontrolled pedestrian crossing of the southbound channelized right-turn movement. The collision history does not identify any collisions relating to the uncontrolled crossing; however, this can present a conflict between vehicles and pedestrians. The conflict is exacerbated by the high volume of right-turning traffic (approximately 1,200 vehicles in the PM peak hour, or one every three seconds) at this intersection. This volume of traffic provides very limited crossing opportunities for pedestrians. Removal of the channelization or conversion to a "smart channel" design may reduce conflicts between vehicles and pedestrians.

[6] Ministry of Transportation, Ontario. *Ontario Traffic Manual Book 12: Traffic Signals.* March 2012.









Collision Review
Colborne Street West and Brant Avenue/Icomm Drive

3.1.6 Icomm Drive and Market Street South

A total of 42 collisions were reported during the five-year period reviewed. The collision reports indicate environmental conditions were not a contributing factor since approximately 81% of collisions occurred under clear conditions. **Figure 3.7** illustrates key elements of the review including impact type, classification of the collisions, monthly distribution, and environmental conditions.

The most common impact type was turning movement (15 collisions) followed by rear end (8 collisions), SMV other (7 collisions) and sideswipe (6 collisions). None of the collisions involved cyclists; however, two collisions involved municipal transit buses, and three collisions involved pedestrians.

Eighty-one percent (34 collisions) of the collisions resulted in personal damage, were considered non-reportable, or were otherwise uncategorized. The remaining 19% (8 collisions) resulted in non-fatal injuries. None of the collisions resulted in fatal injuries. Improper turn (11 collisions) was noted as the most frequent driver action, contributing to 26% of collisions.

Collision frequency has remained relatively stable at this intersection, with an average of 0.7 collisions per month. Fourteen collisions occurred in 2015, and 10 occurred in 2017. Seven or fewer collisions occurred in each of 2016, 2018 and 2019. A larger number of collisions occurred between October and March (33 collisions), as opposed to April to September (9 collisions).

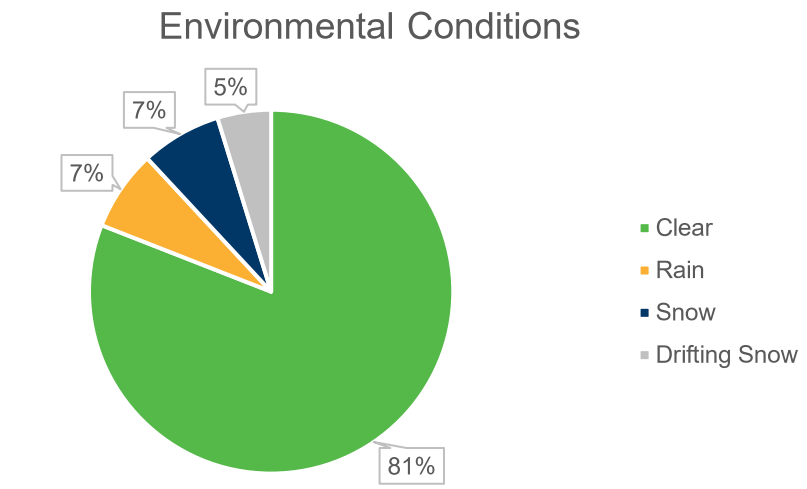
Notable trends at this intersection include the following:

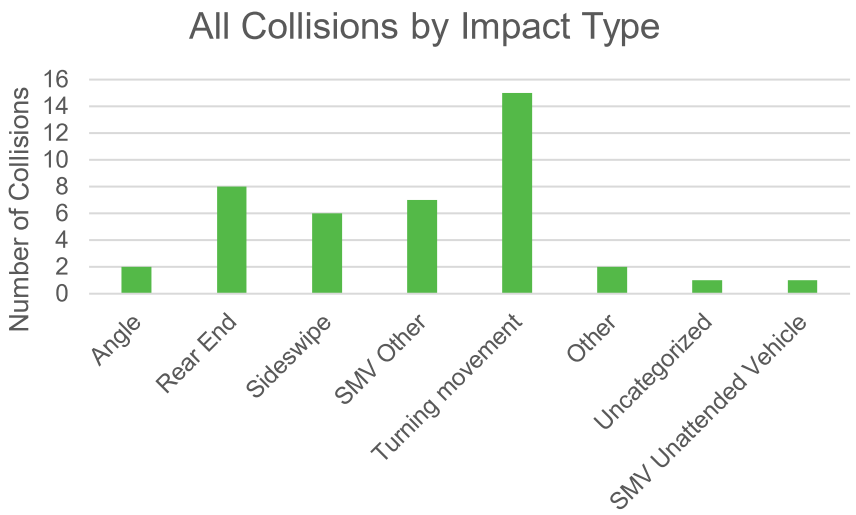
- The three collisions involving pedestrians occurred on weekdays, during daylight hours, and under clear conditions;
- Two of the collisions involving pedestrians both involved a southbound vehicle turning right;
- The third collision involving a pedestrian involved a westbound vehicle turning left;
- 63% of rear-end collisions involved two northbound vehicles; and
- Both collisions involving a municipal bus were rear end collisions with both vehicles travelling north.

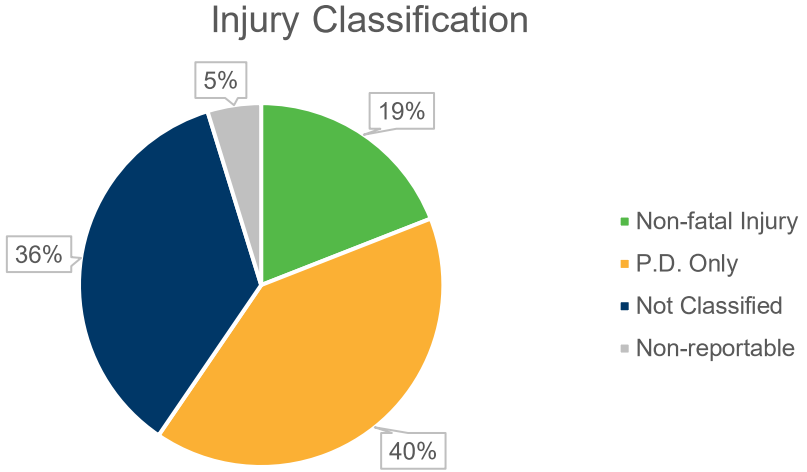
The collision history at the intersection appears to indicate driver error as the most common contributing factor. No clear trend is apparent among the high proportion of turning movement collisions, with all four directions of travel experiencing relatively similar collision frequencies.

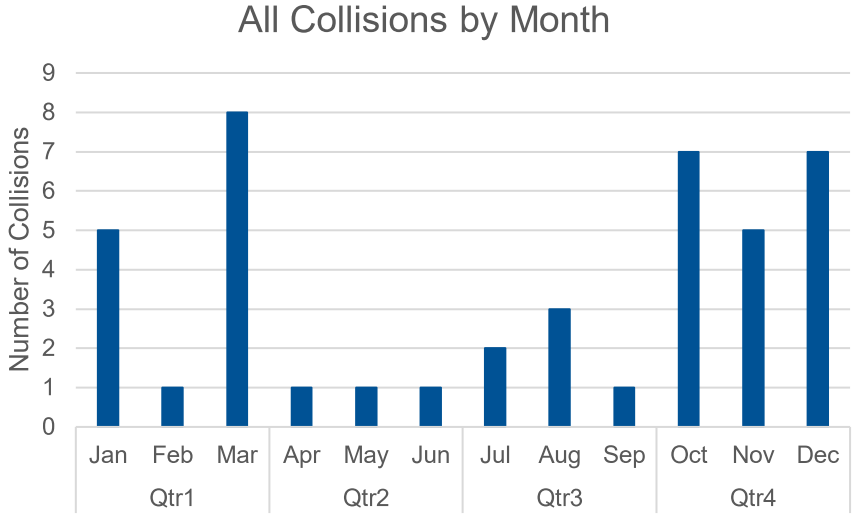
Based on a review of the collision trends, the following could be considered at the intersection:

- Restricting right-turns on red to protect pedestrians crossing between the municipal parking garage and Elements Casino;
- Providing protected-permissive left-turn phasing on the north and southbound approaches;
- Clarify lane arrangements on the southbound approach, including the painting of lane arrows to communicate permitted movements to drivers exiting the municipal parking garage; and
- Refreshing pavement markings on all intersection approaches, and select lane arrows:
  - Removal of the through arrow in the westbound curb lane, or conversion of this pavement marking to a shared through/right-arrow;
  - Removal of the right-turn arrow in the northbound curb lane, and the repainting of a shared through/right-turn arrow.









Collision Review
Icomm Drive and Market Street South

3.1.7 Icomm Drive/Greenwich Street and Clarence Street South

A total of 72 collisions were reported during the five-year period reviewed. The collision reports indicate environmental conditions were not a significant contributing factor since approximately 85% of collisions occurred under clear conditions. **Figure 3.8** illustrates key elements of the review including impact type, classification of the collisions, monthly distribution, and environmental conditions.

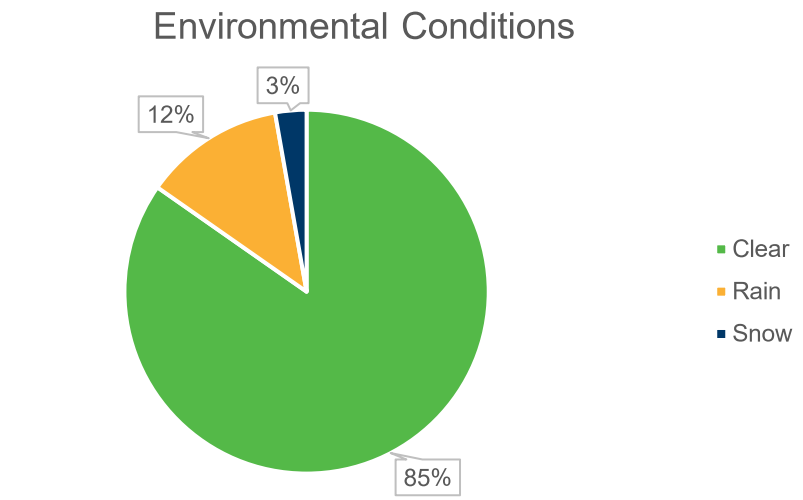
The most common impact type was turning movement (23 collisions) and rear end (21 collisions). Two collisions involved cyclists, and one collision involved a pedestrian.

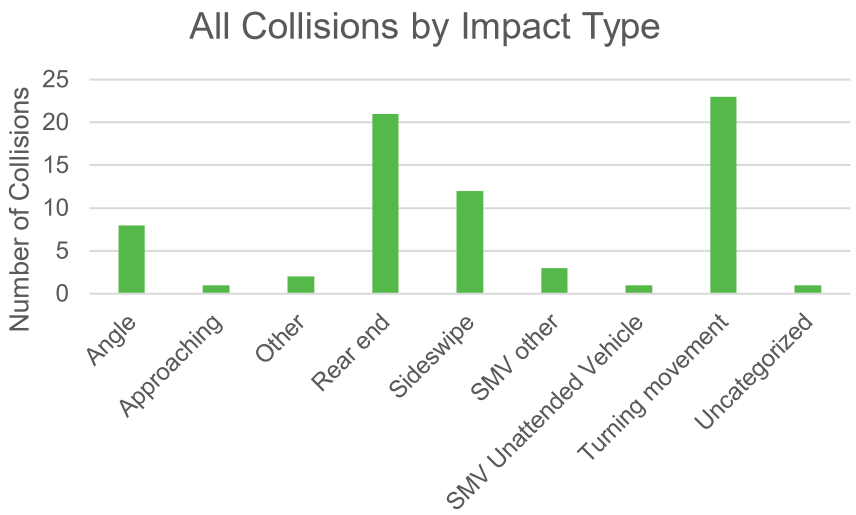
Seventy-five percent of all collisions resulted in personal damage only, were considered non-reportable, or were otherwise uncategorized. The remaining 25% resulted in non-fatal injuries. None of the collisions resulted in fatal injuries. Improper turns, disobeying traffic control and following too closely were noted as the most frequent driver action, contributing to 51% of all collisions.

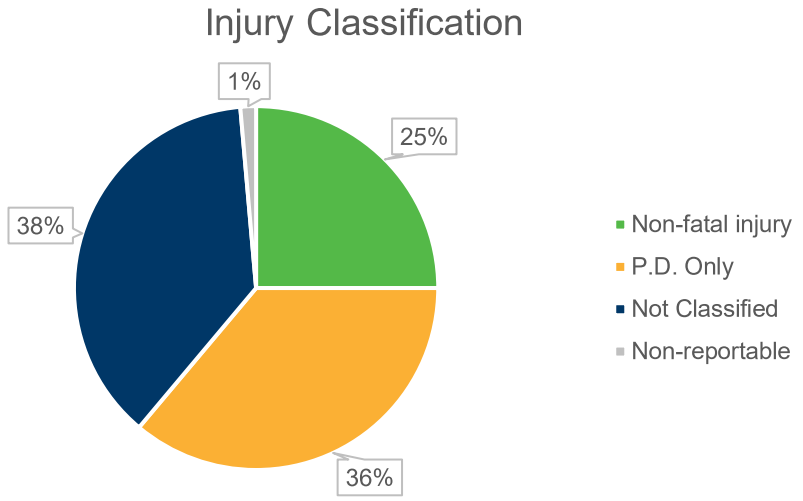
Collision frequency has remained relatively stable at this intersection, with an average of 1.2 collisions per month. Collision frequency is also relatively consistent throughout the year. No clear disparity in number of collisions was identified between October and March (37 collisions) as opposed to April to September (35 collisions). November represented the month with the highest number of collisions at 10.

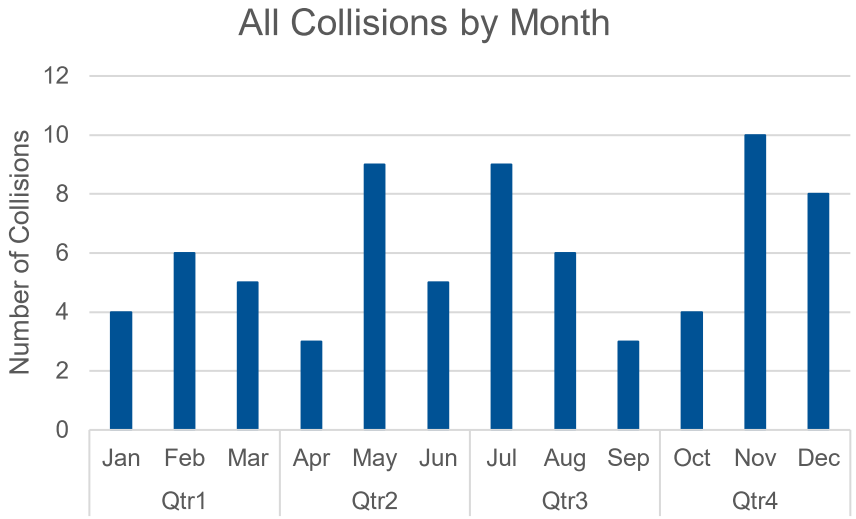
Notable trends at this intersection include the following:

- All eight angle collisions involved a southbound (75%) or westbound (25%) vehicle disobeying the traffic control or failing to yield the right-of-way;
- All 21 rear end collisions involved two eastbound, two southbound, or two northbound vehicles;
- 38% of these rear-end collisions were noted to involve wet or icy roadway surface conditions;
- 48% of turning movement collisions involved a southbound vehicle, 82% of which were executing a left-turn;
- 66% of sideswipe collisions involved two southbound vehicles;
- The two collisions involving cyclists both occurred in August, under clear conditions. One collision occurred under nighttime lighting (10:06 PM), the other occurring during daytime (5:12 PM).









Collision Review
Icomm Drive/Greenwich Street and Clarence Street South

4 Active Transportation Assessment

4.1 Transportation Master Plan Framework

In March 2021, the City finalized its *Transportation Master Plan Update.*[7] The TMP Update includes key goals and objectives for walking and cycling in the City. Specifically, the City's goal with respect to walking is to "be a complete, accessible and pedestrian-friendly community with networks that integrate with transit, paths and trails, neighbourhood amenities, parks, open space and schools." The three objectives of the TMP with respect to walking are as follows:

- Facilities provide a high level of pedestrian connectivity;
- Walking environment is safe for users; and
- Pedestrian accessibility, comfort, and mobility levels of users support walking as a preferred mode.

The City's goal with respect to cycling is to "provide safe and convenient bicycle routes suitable for all user types: utilitarian (commuting), recreational (personal or family discretionary), and sport (advanced, high level recreational)."

The five objectives of the TMP with respect to cycling are as follows:

- Ensure there is a continuous network of safe and direct routes;
- Ensure there is an ability to navigate the bicycle network with ease;
- Ensure end-of-trip facilities support cycling as a preferred mode of transportation;
- Ensure the cycling environment is safe; and
- Provide unique and specific design elements appropriate for the different types of users.

4.2 Existing Active Transportation Network

4.2.1 Pedestrian Facilities

Sidewalks are provided on both sides of all study roads, except Veteran's Memorial Parkway. However, a multi-use trail is provided on south side of Veteran's Memorial Parkway, west and east of Mt.

[7] City of Brantford. *2020 Brantford Transportation Master Plan Update.* March 2021.

Pleasant Street. This trail facility connects to the LE & N Rail Trail along the former Lake Erie and Northern Electric Railway route.

Additional multi-use trails within the study area include the Dike Trail, Fordview Trail and SC Johnson Trail, portions of which form part of the Trans Canada Trail. These trails circumvent the Grand River and at present, cross the Grand River over two dedicated structures between Colborne Street (Lorne Bridge) and Veteran's Memorial Parkway:

- Brant's Crossing Bridge: former railway bridge, readapted for pedestrian and cyclist use. The bridge was closed following a flooding and ice jam event in 2018. Based on structural investigations, the bridge was recommended to remain closed until repairs can take place to ensure its safe use by the public.;
- TH&B Crossing Bridge: former railway bridge readapted for pedestrian and cyclists use. Currently in use.

Sidewalks on Colborne Street West include a landscaped buffer, or physical barrier (along the Lorne Bridge). These elements enhance the attractiveness of the pedestrian environment by decreasing potential conflict with vehicle traffic. Sidewalks on Icomm Drive also include a landscaped buffer.

All seven study intersections include pedestrian push buttons, pedestrian signal heads, and delineated crosswalks. However, an uncontrolled pedestrian crossing exists at Colborne Street West/Brant Avenue/Icomm Drive across the channelized southbound right-turn movement. As noted in Section 3.1.5 the high volumes of vehicular traffic on this movement provide very limited crossing opportunities for pedestrians. The uncontrolled dual left-turn movement also presents a hazard to pedestrians crossing the north leg of the intersection.

4.2.2 Cycling Facilities

Cycling facilities throughout the City comprise dedicated bike lanes, shared use lanes, designated bike routes, or multi-use paths. These facilities are generally located on lower-tier roads and enhance connectivity to the City's trail network. None of the study area roads are designated cycling routes or include dedicated cycling facilities.

Cycling connectivity near the Lorne Bridge is accommodated through existing grade separated trails on the east and west sides of the Grand River. In conjunction with the Brant's Crossing Bridge, and TH&B Crossing Bridge these connections enable cyclists to cross the Grand River separated from vehicular traffic.

4.3 Cycling Facility Considerations

The rehabilitation of the Lorne Bridge, in conjunction with the damaged Brant's Crossing Bridge provide an opportunity to consider cycling facilities on the Lorne Bridge.

Ontario Traffic Manual (OTM) *Book 18 (Cycling Facilities)*[8] is intended to provide "practical guidance on the planning, design and operation of cycling facilities in Ontario."

Book 18 includes a three-step Bicycle Facility Type Selection Process intended to guide the planning and design of cycling facilities. Step 1 is a high level facility pre-selection based on 85th percentile motor vehicle operating speeds and average daily traffic volumes. Book 18 includes a three-coloured nomograph that is divided into three types of operating environments:

- **Shared Roadway (Blue)**: roadway environments with relatively low traffic volumes and low to moderate speeds. Types of bicycle facilities include shared roadways and signed bike routes with standard or wide travel lanes, with or without shared lane markings;
- **Designated Cycling Operating Space (White)**: roadway environments with moderate to high speeds and low traffic volumes, or low speeds and moderate traffic volumes. Types of bicycle facilities in this category include paved shoulders, exclusive bicycle lanes, separated bicycle lanes and/or raised cycle tracks.
- **Separated Facility or Alternate Route (Red)**: roadway environments with highs speeds and high traffic volumes. Under these conditions, alternate parallel corridors more conductive to cycling should be considered; however, if the roadway provides strong system connectivity, suitable facilities may include separated bicycle lanes, a raised cycle track, or a path in a roadway boulevard.

Figure 4.1 illustrates the Cycling Facility Pre-Selection Nomograph. Book 18 recommends a separated facility or alternate route for roadways with an AADT greater than 15,000 vehicles, and operating speeds greater than 50 km/h.

Given the estimated AADT of 24,000 vehicles on Colborne Street West, in conjunction with the posted speed limit of 50 km/h, separated bicycle facilities would be required across the Lorne Bridge. However,

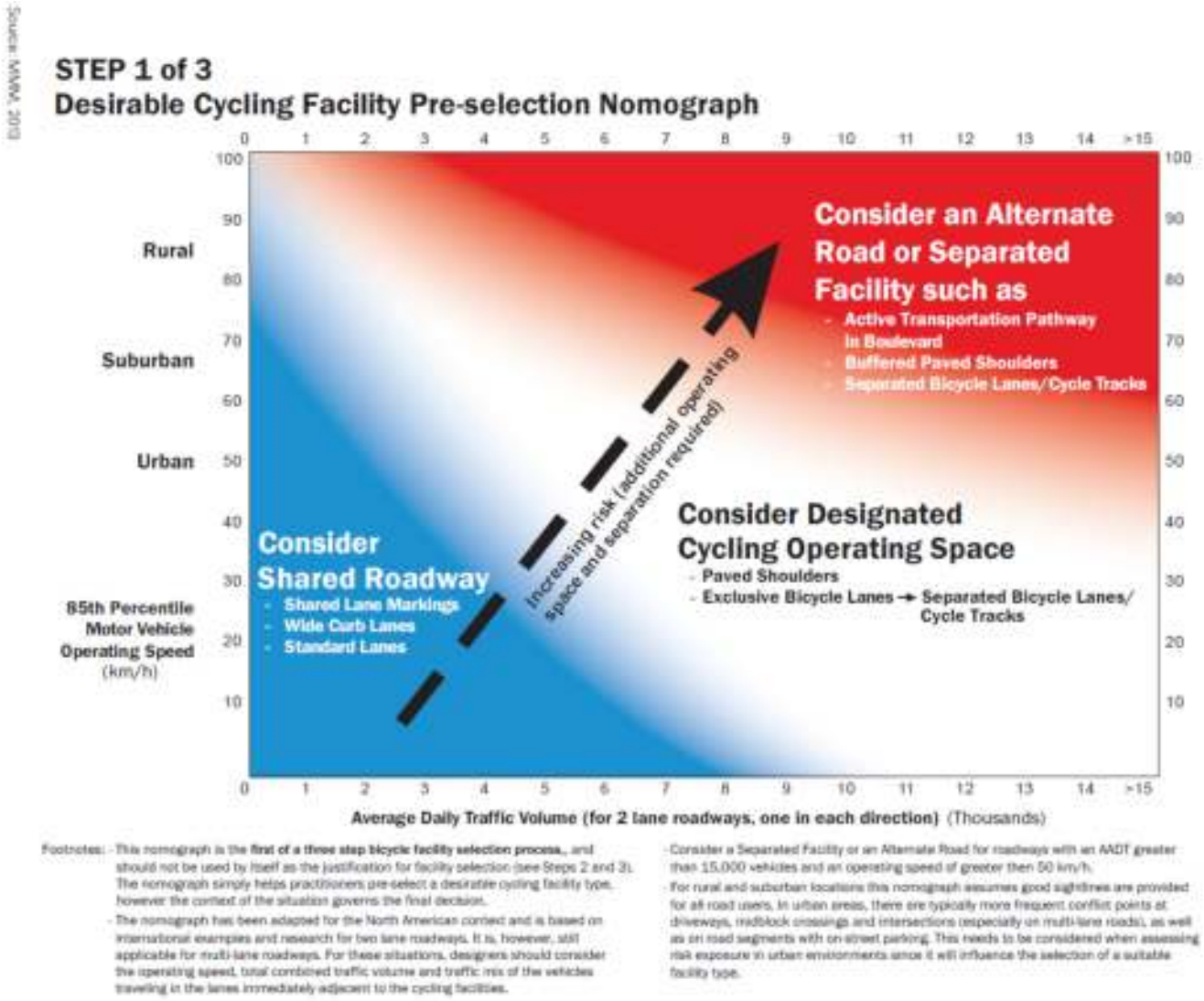
[8] Ministry of Transportation, Ontario. *Book 18: Cycling Facilities.* December 2013.

to maintain the current lane arrangement and capacity, separated facilities do not appear feasible given the limited platform width across the Lorne Bridge.

The City's *Transportation Master Plan Update*[9] recommends a future extension of Oak Park Road from Hardy Road to Colborne Street West. When the Oak Park Road Extension is constructed, future vehicle demands across the Lorne Bridge are forecast to be reduced as trips destined to west Brantford would have an alternative route. This could provide an opportunity to reallocate road space across the Lorne Bridge for separated bicycle facilities. However, separated cycling facilities on the Lorne Bridge may introduce a gap in the cycling network as few of the study area roadways are identified as permitted bicycle routes. Installation of separated cycling facilities on the Lorne Bridge would need to occur in conjunction with a bicycle network planning study.

At this time, existing alternate cycling routes across the Grand River are recommended.

[9] City of Brantford. *Transportation Master Plan Update.* March 2021.



Source: OTM Book 18 Cycling Facilities. December 2013. pg. 30

Desirable Bicycle Facility Pre-Selection Nomograph

5 Preferred Design Concept

The preferred design concept during rehabilitation of the Lorne Bridge is maintaining one travel lane per direction. Lane capacity in the City's TransCAD model assumes a theoretical capacity of 800 vehicles per hour per lane.

Based on two travel lanes per direction across the bridge, the theoretical capacity of Colborne Street West across the Grand River is 1,600 vehicles per hour per lane. Using the TransCAD lane capacity assumptions, it is assumed each lane of travel during rehabilitation will accommodate up to 800 vehicles per hour.

5.1 Detour Route Assumptions

The City's *Transportation Master Plan Update*[10] recommends a future extension of Oak Park Road from Hardy Road to Colborne Street West. At the time of writing of this Transportation Study, an Environmental Assessment was underway for this roadway extension. An extension of Oak Park Road would provide an additional crossing of the Grand River. Thus, existing and future capacity constraints on the Lorne Bridge may be lessened depending on when the Oak Park Road extension is completed, and the Lorne Bridge is rehabilitated.

However, the timing and completion of the Oak Park Road Extension is identified as a medium term project in the City's TMP, with an expected completion between 2026 and 2031. Since the timing of the Lorne Bridge rehabilitation is also unknown, the Oak Park Road Extension has not been included in the detour route assessment. This represents a conservative approach to the forecasting of detour traffic volumes on the study area roads.

Based on the estimated lane capacity in the City's TransCAD model, the detour route assumes a peak hour volume of 800 vehicles per hour, per lane, per direction on Colborne Street West. Observed vehicle trips above this capacity threshold have been reassigned on the study road network to utilize Veteran's Memorial Parkway.

The TMP Update summarized the key routing of eastbound and westbound vehicles movement across the Lorne Bridge in the PM peak hour. The analysis presented a generally equal distribution of vehicles trips along Paris Road, Brant Avenue, West Street, and Colborne Street East. Higher vehicle volumes were noted along Brant Avenue between Paris Road and Colborne Street West, since this roadway captures all traffic destined for Paris Road, Brant Avenue and

[10] Ibid.

West Street. It is assumed that vehicles detouring across Veteran's Memorial Parkway will distribute 50% towards Brant Avenue and Paris Road (via Market Street), and 50% towards Colborne Street East and West Street (via Clarence Street). Eastbound detour traffic has been further refined, by equally distributing northbound Brant Avenue traffic via the northbound left turn at Market Street/Icomm Drive and the northbound left-turn at Clarence Street/Icomm Drive/Greenwich Drive.

In both peak hours, westbound vehicles currently traversing the Lorne Bridge via southbound Brant Street, are assumed to travel further south onto Icomm Drive, and turn right onto Market Street. From Market Street, these vehicles can enter westbound Veteran's Memorial Parkway to cross the Grand River. It is possible some drivers may continue to Icomm Drive, and turn right onto southbound Clarence Street South. However, the assignment of all trips to Market Street South represents a conservative approach along the most direct detour routing.

Figure 5.1 summarizes the respective eastbound and westbound detour routing along Veteran's Memorial Parkway.

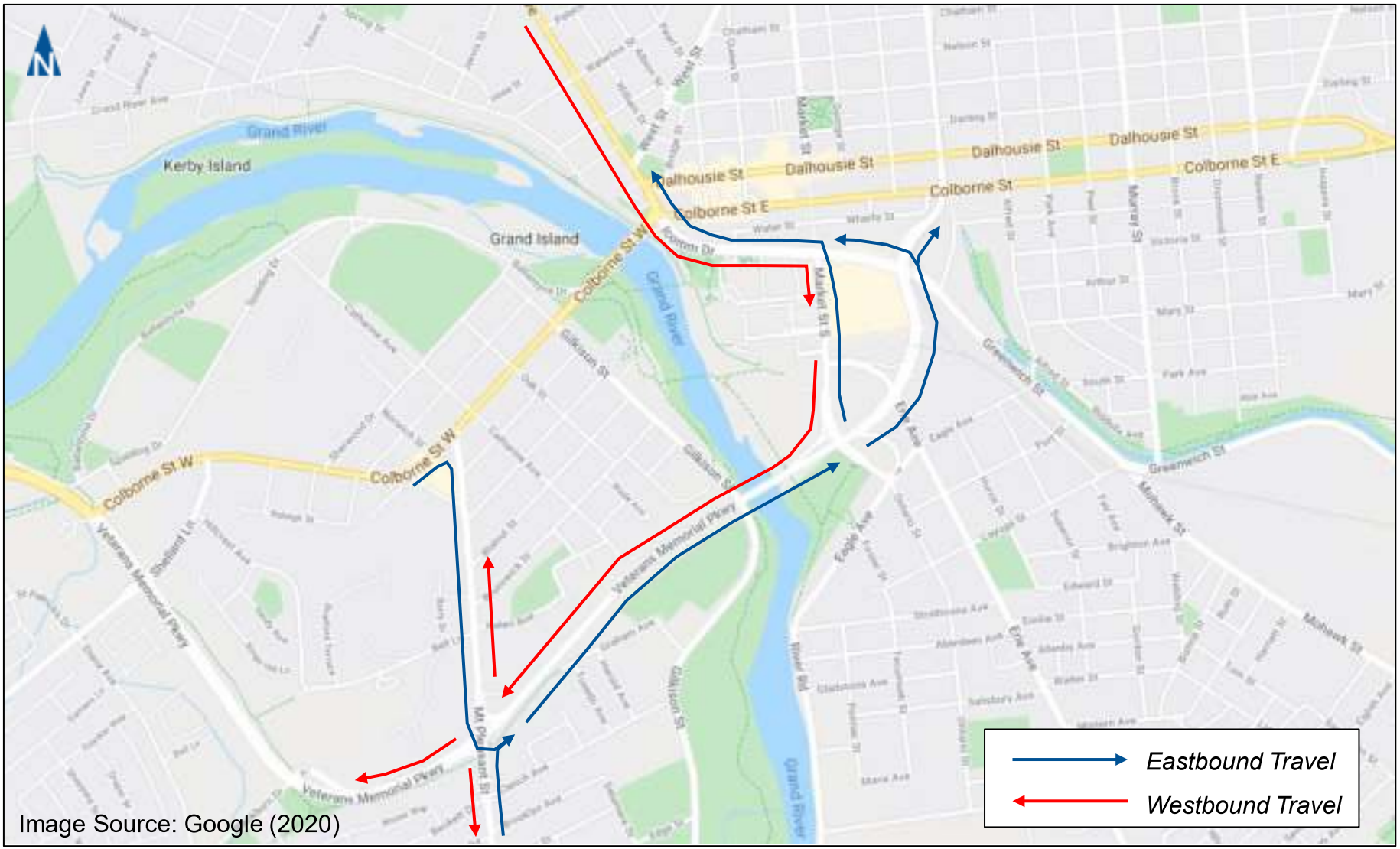
5.1.1 Intersection Lane Configurations

The existing southbound right-turn movement from Brant Avenue onto Colborne Street West transitions into the westbound curb travel lane through a channelized right-turn facility. Northbound left-turning vehicles turn into the westbound travel lane adjacent to the curb lane. This lane configuration enables the southbound right-turn movement to effectively operate as a free flow condition, except in the presence of pedestrians in the crosswalk.

During the bridge rehabilitation, it has been assumed southbound right-turning traffic, and northbound left-turning traffic will share one westbound lane across the Lorne Bridge. In addition, the southbound right-turn movement will be modified to remove the right-turn channel. This is intended to increase pedestrian safety at the intersection during rehabilitation. Southbound right-turning vehicles will need to yield to pedestrians in the crosswalk, and/or northbound left-turning vehicles clearing the intersection. The Synchro model under the detour scenario has been modified accordingly to accommodate this revised lane arrangement.

Likewise, in the eastbound direction, the Lorne Bridge currently carries three travel lanes, which transition into an exclusive left-turn lane, shared left-turn/through lane, and exclusive through lane. A short exclusive right-turn lane is also provided on Colborne Street West at Brant Avenue/Icomm Drive.

During bridge rehabilitation, it has been assumed the eastbound approach on Colborne Street West at Brant Avenue/Icomm Drive will comprise two exclusive left-turn lanes, and a shared through/right-turn lane. The existing exclusive right-turn lane will support through movements and right-turning movements. This lane configuration responds to the 3:1 ratio of eastbound left-turn movements to combined through/right-turn movements on this approach in the AM peak hour.



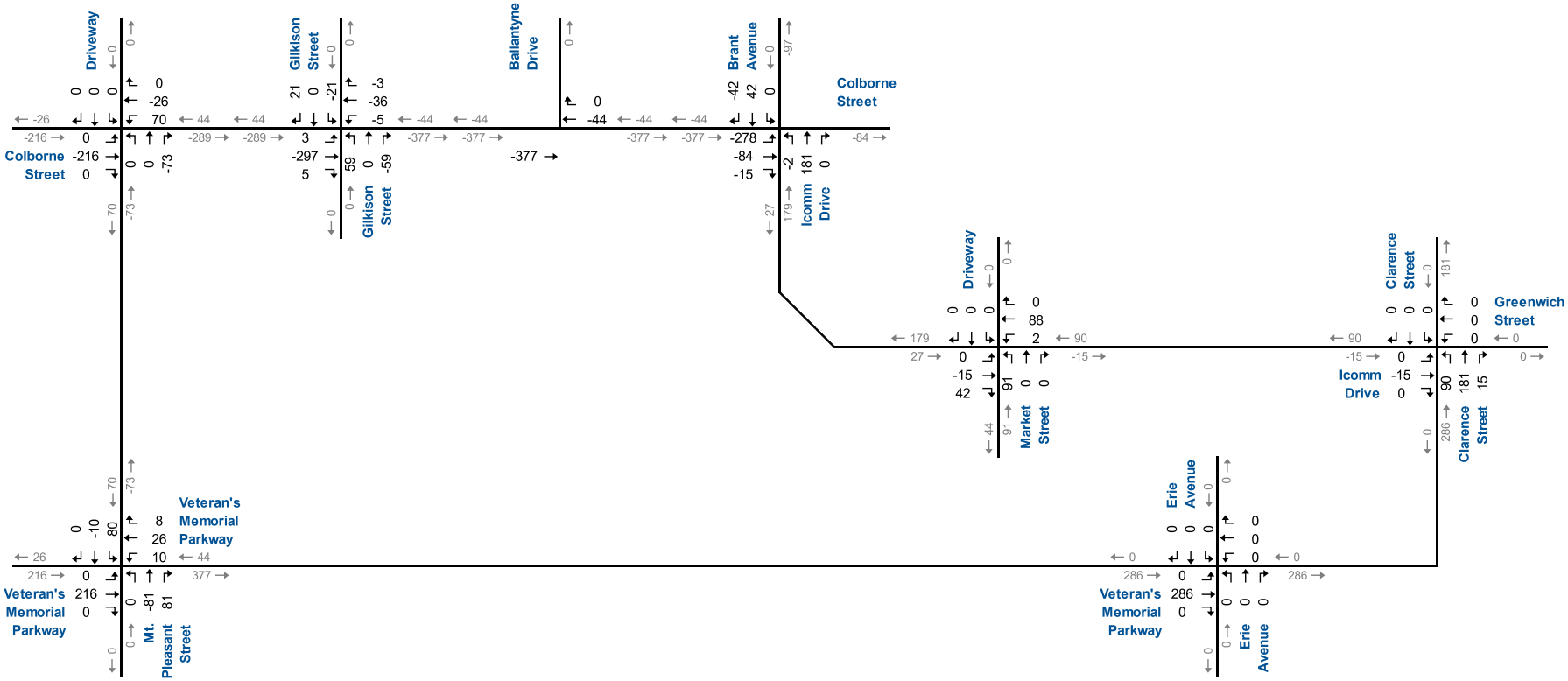
Estimated Detour Routing

Figure 5.1

5.2 Detour Traffic Forecasts

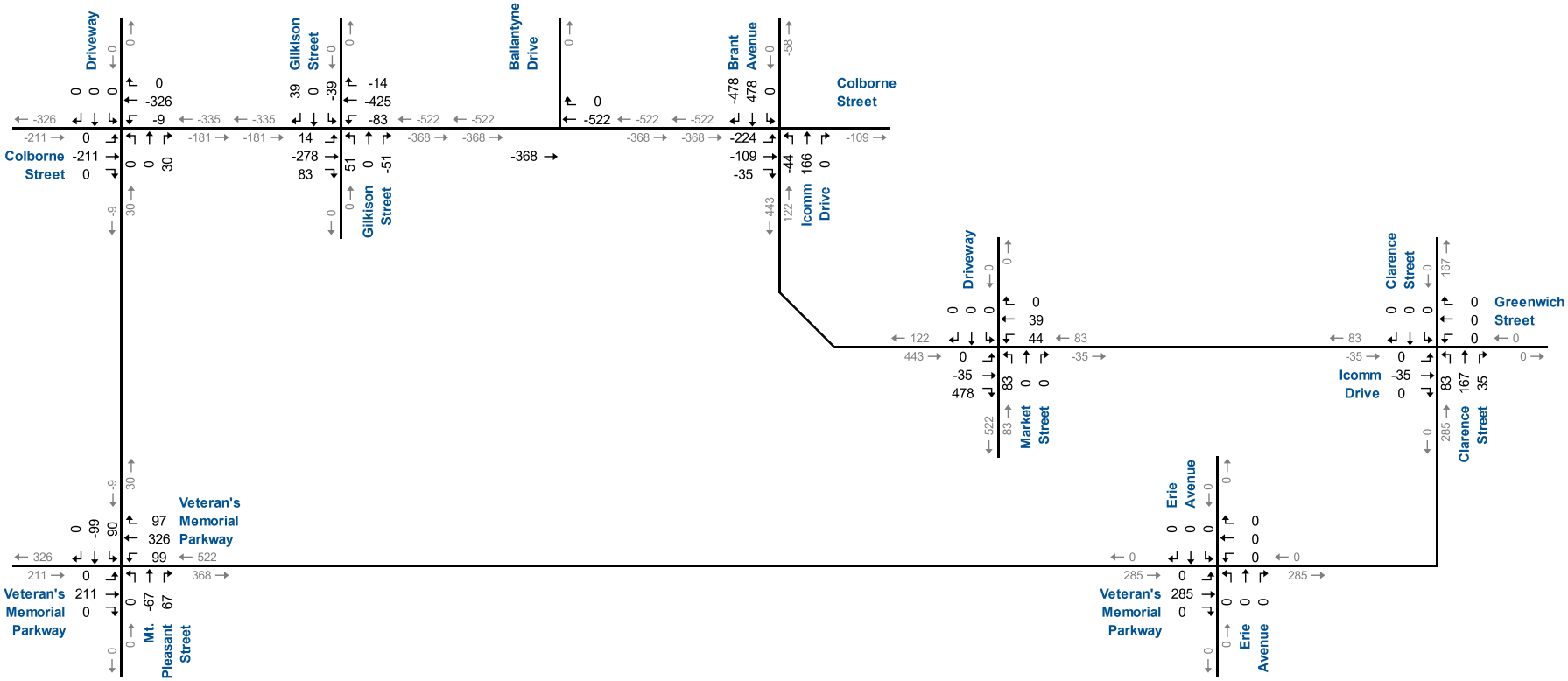
Figure 5.2 and **Figure 5.3** illustrate the reassigned traffic volumes associated with the detour route assumptions illustrated in **Figure 5.1**.

Figure 5.4 and **Figure 5.5** illustrate the ultimate future traffic volumes at the study intersections during the bridge rehabilitation.



Not to Scale

Detour Traffic Assignments
AM Peak Hour



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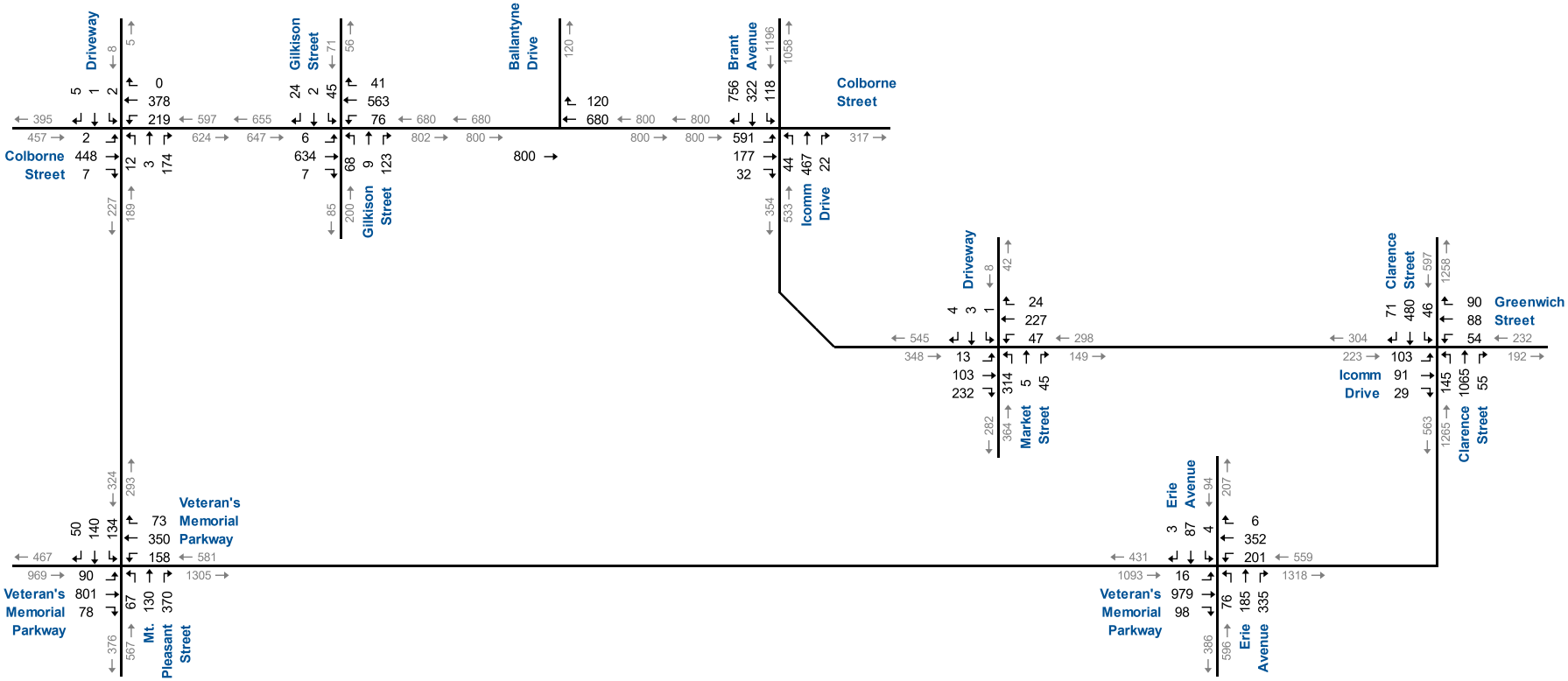
Detour Traffic Assignments
PM Peak Hour



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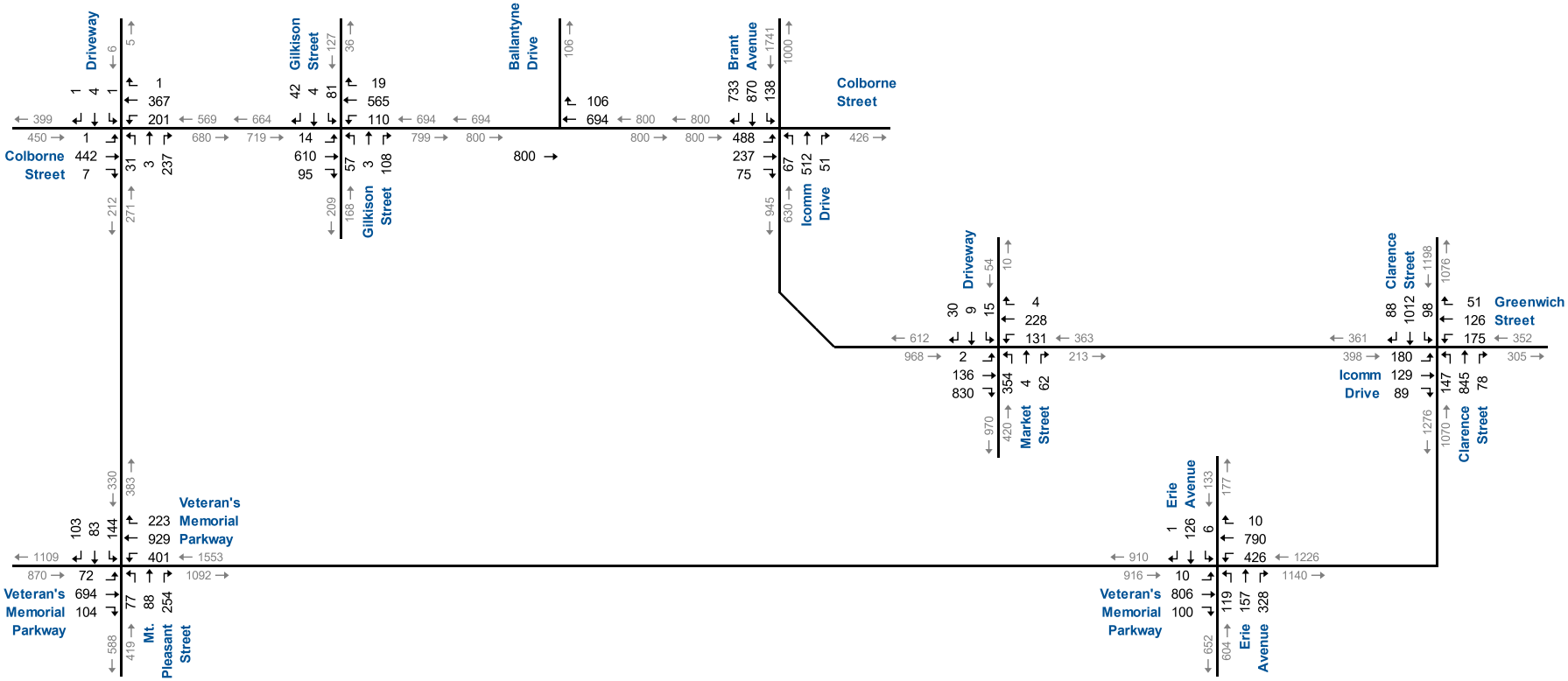
Future Traffic Volumes (Detour)
AM Peak Hour



Not to Scale

Future Traffic Volumes (Detour) PM Peak Hour

6 Traffic Control Plans

6.1 Operations and Analyses

Traffic operations under the detour scenario have been reviewed using the detour routing, and lane configurations assumptions noted in **Section 5.1**. Based on discussions with City staff, several study intersections are part of directional coordination patterns. Therefore, signal timing plans and phase structures have not been altered from existing conditions.

Table 6.1 and **Table 6.2** summarize the level of service conditions under the detour scenario. The results indicate the study intersections are forecast to operate within capacity and with acceptable levels of service in the AM peak hour. In the PM peak hour, the following critical movements are noted:

Veteran's Memorial Parkway and Mt. Pleasant Street

- The westbound left-turn movement is forecast to operate at LOS F, with a v/c ratio of 1.28

Colborne Street West and Brant Avenue/Icomm Drive

- The southbound through movement is forecast to operate at LOS D, with a v/c ratio of 1.00, and queues that may impact operations at Brant Avenue/Dalhousie Street.

  Traffic operations at Colborne Street West/Brant Avenue/Icomm Drive reflect the reassignment of approximately 500 southbound right-turn movements. The City could consider alternate lane arrangements on Brant Avenue; however, the existing roadway width and centre median limits the ability to provide an additional through lane while providing a dedicated right-turn lane. Alternatively, if the rehabilitation occurs when the Oak Park Road Extension is constructed, southbound vehicle demand during the weekday PM peak hour would likely be reduced providing for a reduction in the southbound queue length.

Icomm Drive and Market Street South

- The eastbound right-turn movement is forecast to operate at LOS F, with a v/c ratio of 0.59.

Appendix D contains the detailed Synchro reports.

TABLE 6.1: DETOUR TRAFFIC OPERATIONS – AM PEAK HOUR

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 - Veteran's Memorial Parkway & Mt. Pleasant Street	TCS	LOS	B	B	B	**B**	D	B	B	**C**	C	C	D	**D**	C	C	>	**C**	**C**
			Delay	12	15	11	**14**	44	19	17	**25**	24	28	45	**38**	23	27	>	**26**	**24**
			V/C	0.20	0.48	0.06		0.75	0.28	0.05		0.21	0.18	0.79		0.36	0.20	>		**0.71**
			Q	18	75	8		71	40	3		16	18	78		29	20	>		
			Ex	140	-	25		40	-	45		45	-	40		35	-	>		
			Avail.	122	-	17		-31	-	42		29	-	-38		6	-	>		
	2 - Mt. Pleasant Street & Colborne Street West	TCS	LOS	<	A	>	**A**	<	A	>	**A**	C	C	>	**C**	<	C	>	**C**	**A**
			Delay	<	3	>	**3**	<	3	>	**3**	33	33	>	**33**	<	32	>	**32**	**8**
			V/C	<	0.20	>		<	0.39	>		0.09	0.14	>		<	0.03	>		**0.38**
			Q	<	18	>		<	9	>		7	18	>		<	4	>		
			Ex	<	-	>		<	-	>		-	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		-	-	>		<	-	>		
	3 - Colborne Street West & Gilkison Street	TCS	LOS	<	B	>	**B**	<	A	>	**A**	<	D	>	**D**	<	C	>	**C**	**B**
			Delay	<	17	>	**17**	<	5	>	**5**	<	39	>	**39**	<	31	>	**31**	**15**
			V/C	<	0.43	>		<	0.38	>		<	0.66	>		<	0.36	>		**0.48**
			Q	<	56	>		<	24	>		<	41	>		<	19	>		
			Ex	<	-	>		<	-	>		<	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		<	-	>		<	-	>		
	4 - Colborne Street West & Ballantyne Drive	TWSC	LOS		UM		**UM**		UM	>	**UM**									
			Delay							>										
			V/C							>										
			Q							>										
			Ex							>										
			Avail.							>										
	5 - Colborne Street West & Brant Avenue/Icomm Drive	TCS	LOS	D	B	>	**C**					A	B	>	**B**	A	C	C	**C**	**C**
			Delay	39	15	>	**33**					9	11	>	**11**	0	24	26	**25**	**24**
			V/C	0.90	0.30	>						0.15	0.36	>		0.00	0.62	0.54		**0.76**
			Q	149	33	>						6	31	>		0	53	36		
			Ex	200	-	>						115	-	>		25	-	-		
			Avail.	51	-	>						109	-	>		25	-	-		
	6 - Icomm Drive & Market Street South	TCS	LOS	A	B	D	**D**	A	A	>	**A**	C	B	>	**C**	<	B	>	**B**	**C**
			Delay	9	11	53	**39**	9	9	>	**9**	34	19	>	**32**	<	19	>	**19**	**27**
			V/C	0.02	0.07	0.17		0.07	0.15	>		0.79	0.04	>		<	0.00	>		**0.40**
			Q	4	17	50		11	20	>		69	7	>		<	0	>		
			Ex	65	-	60		125	-	>		-	-	>		<	-	>		
			Avail.	61	-	10		114	-	>		-	-	>		<	-	>		
	7 - Icomm Drive/Greenwich Street & Clarence Street South	TCS	LOS	C	B	>	**B**	C	C	C	**C**	A	A	>	**A**	A	A	A	**A**	**A**
			Delay	22	14	>	**18**	31	30	30	**30**	6	7	>	**6**	6	5	4	**5**	**9**
			V/C	0.57	0.21	>		0.34	0.18	0.15		0.28	0.50	>		0.19	0.21	0.05		**0.51**
			Q	17	7	>		18	13	15		21	69	>		9	24	5		
			Ex	75	-	>		35	-	3		75	-	>		105	-	70		
			Avail.	58	-	>		17	-	-12		54	-	>		96	-	>		
	8 - Veteran's Memorial Parkway & Erie Avenue	TCS	LOS	A	B	B	**B**	B	A	>	**A**	C	D	D	**D**	C	C	>	**C**	**B**
			Delay	10	15	10	**14**	11	5	>	**8**	33	36	42	**39**	30	32	>	**32**	**20**
			V/C	0.03	0.56	0.07		0.61	0.17	>		0.37	0.58	0.71		0.02	0.28	>		**0.66**
			Q	5	94	9		31	22	>		25	50	57		3	27	>		
			Ex	50	-	50		85	-	>		30	-	30		30	-	>		
			Avail.	45	-	42		54	-	>		5	-	-27		27	-	>		

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
UM - Unopposed Movement

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

TABLE 6.2: DETOUR TRAFFIC OPERATIONS – PM PEAK HOUR

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	
PM Peak Hour	1 - Veteran's Memorial Parkway & Mt. Pleasant Street	TCS	LOS	A	A	A	**A**	F	B	B	**E**	C	C	D	**D**	C	D	>	**C**	**D**
			Delay	10	9	7	**9**	170	17	13	**56**	31	35	38	**36**	30	37	>	**34**	**38**
			V/C	0.26	0.35	0.08		1.28	0.57	0.19		0.32	0.20	0.49		0.50	0.22	>		**1.00**
			Q	13	53	9		174	104	22		21	14	36		33	15	>		
			Ex	140	-	25		40	-	45		45	-	40		35	-	>		
			Avail.	128	-	16		-134	-	23		24	-	4		2	-	>		
	2 - Mt. Pleasant Street & Colborne Street West	TCS	LOS	<	A	>	**A**	<	A	>	**A**	C	D	>	**D**	<	D	>	**D**	**B**
			Delay	<	3	>	**3**	<	2	>	**2**	34	49	>	**48**	<	37	>	**37**	**12**
			V/C	<	0.19	>		<	0.35	>		0.24	0.19	>		<	0.07	>		**0.36**
			Q	<	19	>		<	10	>		12	1	>		<	4	>		
			Ex	<	-	>		<	-	>		-	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		-	-	>		<	-	>		
	3 - Colborne Street West & Gilkison Street	TCS	LOS	<	B	>	**B**	<	A	>	**A**	<	D	>	**D**	<	D	>	**D**	**B**
			Delay	<	18	>	**18**	<	8	>	**8**	<	36	>	**36**	<	50	>	**50**	**18**
			V/C	<	0.50	>		<	0.40	>		<	0.50	>		<	0.71	>		**0.52**
			Q	<	74	>		<	45	>		<	34	>		<	37	>		
			Ex	<	-	>		<	-	>		<	-	>		<	-	>		
			Avail.	<	-	>		<	-	>		<	-	>		<	-	>		
	4 - Colborne Street West & Ballantyne Drive	TWSC	LOS		UM		**UM**		UM	>	**UM**									
			Delay							>										
			V/C							>										
			Q							>										
			Ex							>										
			Avail.							>										
	5 - Colborne Street West & Brant Avenue/Icomm Drive	TCS	LOS	C	C	>	**C**					C	C	>	**C**	A	D	C	**D**	**C**
			Delay	27	26	>	**27**					26	23	>	**24**	0	54	23	**41**	**34**
			V/C	0.74	0.71	>						0.36	0.34	>		0.00	1.00	0.52		**0.85**
			Q	119	117	>						m0.0	69	>		0	155	27		
			Ex	200	-	>						115	-	>		25	-	-		
			Avail.	81	-	>						####	-	>		25	-	-		
	6 - Icomm Drive & Market Street South	TCS	LOS	A	A	F	**F**	B	A	>	**B**	D	B	>	**D**	<	B	>	**B**	**F**
			Delay	9	9	188	**162**	10	10	>	**10**	40	20	>	**37**	<	19	>	**19**	**98**
			V/C	0.00	0.11	0.59		0.22	0.14	>		0.84	0.05	>		<	0.04	>		**0.66**
			Q	0	8	80		22	18	>		89	8	>		<	5	>		
			Ex	65	-	60		125	-	>		-	-	>		<	-	>		
			Avail.	65	-	-20		103	-	>		-	-	>		<	-	>		
	7 - Icomm Drive/Greenwich Street & Clarence Street South	TCS	LOS	C	C	>	**C**	E	C	C	**D**	E	C	>	**C**	C	B	B	**B**	**C**
			Delay	29	29	>	**29**	58	30	29	**44**	63	22	>	**28**	21	15	10	**16**	**25**
			V/C	0.49	0.18	>		0.84	0.19	0.04		0.88	0.54	>		0.49	0.58	0.06		**0.83**
			Q	49	26	>		67	19	5		70	110	>		31	91	7		
			Ex	75	-	>		35	-	3		75	-	>		105	-	70		
			Avail.	26	-	>		-32	-	-2		5	-	>		74	-	>		
	8 - Veteran's Memorial Parkway & Erie Avenue	TCS	LOS	B	C	B	**C**	D	A	>	**B**	D	D	C	**D**	C	C	>	**C**	**C**
			Delay	15	21	15	**20**	38	2	>	**14**	41	36	34	**36**	31	34	>	**34**	**22**
			V/C	0.04	0.57	0.07		0.82	0.35	>		0.63	0.55	0.37		0.04	0.43	>		**0.81**
			Q	4	80	9		76	19	>		37	44	32		5	36	>		
			Ex	50	-	50		85	-	>		30	-	30		30	-	>		
			Avail.	46	-	41		9	-	>		-7	-	-2		26	-	>		

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
UM - Unopposed Movement

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

6.2 Operations and Analyses – With Improvements

Although the study intersections are part of a larger coordinated traffic signal network; independent intersection improvements have been reviewed. These measures are considered temporary in nature and are intended solely to accommodate detour traffic during bridge rehabilitation.

Intersection operations at Colborne Street West/Brant Street/Icomm Drive depend on the ultimate lane configuration of the southbound approach.

Operations at Icomm Drive and Market Drive represent a conservative estimate. A portion of detour traffic may use the eastbound right-turn at Clarence Street South, rather than at Market Street South. The preceding analyses forecast excess capacity at Clarence Street South to accommodate additional right-turning vehicles.

The westbound left-turn movement on Veteran's Memorial Parkway at Mt. Pleasant Street is forecast to operate beyond capacity (v/c > 1.00) in the PM peak hour. OTM Book 12 recommends the provision of a protected-permissive (advance) left-turn phase if opposing traffic volume and signal timing limit capacity during the permissive left-turn phase. **Appendix E** contains the detailed advance left-turn phase warrant.

The analysis indicates the westbound left-turn movement warrants a protected-permissive phase. It is recommended a protected-permissive left-turn phase be implemented within the existing 90 second cycle length. This phase would be concurrent with the existing eastbound protected-permissive left-turn phase at this intersection.

Table 6.3 summarizes traffic operations at Veteran's Memorial Parkway and Mt. Pleasant Street with a westbound left-turn protected-permissive phase. The analysis results forecast the intersection and all movements to operate with acceptable levels of service, and within capacity. **Appendix F** contains the detailed Synchro reports.

TABLE 6.3: DETOUR TRAFFIC OPERATIONS – PM PEAK HOUR (IMPROVEMENTS)

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	
PM Peak Hour	1 - Veteran's Memorial Parkway & Mt. Pleasant Street	TCS	LOS	B	C	C	C	B	B	B	B	C	D	D	D	D	D	>	D	C
			Delay	19	32	23	30	18	16	12	16	33	37	37	36	41	53	>	48	26
			V/C	0.28	0.71	0.07		0.69	0.54	0.19		0.36	0.24	0.18		0.55	0.25	>		0.70
			Q	11	83	9		98	95	21		22	15	22		42	20	>		
			Ex	140	-	25		40	-	45		45	-	40		35	-	>		
			Avail.	129	-	16		-58	-	24		23	-	18		-7	-	>		

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
UM - Unopposed Movement
<- Shared Left/Through Lane
>- Shared Right/Through Lane

6.3 Weekend Review

With the implementation of the Preferred Design Concept, the lane reductions on Colborne Street West between Gilkison Street and Brant Avenue/Icomm Drive diverts traffic to other routes, notably Veteran's Memorial Parkway. While this is imperative to maintaining good traffic flow along Colborne Street West, it is also imperative to ensure that traffic does not exceed capacity during the weekend time periods.

Figure 5.1 illustrated the potential traffic diversion routes resulting from the reduced lane capacity on Colborne Street West. It is expected that the majority of detour traffic will rely on Veteran's Memorial Parkway, given the lack of other Grand River crossings in the City.

At a screenline analysis level, eastbound and westbound capacity during the weekend was reviewed along Colborne Street West and Veterans Memorial Parkway. Existing traffic demand along these corridors for the weekend analysis was established based on Saturday traffic count conducted at Mt. Pleasant Road with Colborne Street West and Veterans Memorial Parkway in November 2020.

Existing eastbound and westbound travel trends along Colborne Street West were noted to be similar as the weekday PM peak hour. Future travel trends under the detour scenario for the weekend time period have been based off of the weekday PM peak hour assumptions. **Table 6.4** summarized the results.

Overall, traffic diversion during the weekend period indicates Veterans Memorial Parkway will see an increase in volumes, however at a screenline analysis, capacity is available to accommodate this additional traffic.

TABLE 6.4: SCREENLINE ANALYSIS

Eastbound/Westbound Traffic Screenline			Attributes		Existing		Detour		Difference	
Number	Link/Screenline	Location	Dir.	Cap.	Vol.	v/c	Vol.	v/c	Vol.	%
1	Colborne Street West	East of Mt. Pleasant Street	EB	1600	740	0.46	584	0.37	-156	-21%
			WB	1600	838	0.52	527	0.33	-311	-37%
2	Colborne Street West	West of Mt. Pleasant Street	EB	1600	574	0.36	391	0.24	-183	-32%
			WB	1600	706	0.44	389	0.24	-317	-45%
3	Veteran's Memorial Parkway	East of Mt. Pleasant Street	EB	1600	780	0.49	1176	0.75	396	51%
			WB	1600	891	0.43	1041	0.65	350	51%
4	Veteran's Memorial Parkway	West of Mt. Pleasant Street	EB	1600	615	0.38	812	0.51	197	32%
			WB	1600	510	0.32	722	0.45	212	42%

7 Conclusions and Recommendations

7.1 Conclusions

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

- Under existing conditions, the study intersections operate with acceptable levels of service and within capacity during the weekday AM and PM peak hours;
- During the rehabilitation of the Lorne Bridge, minor modifications to signal timing phasing will be required to support diverted traffic volumes;
- The existing operating characteristics and traffic volumes crossing the Lorne Bridge signify the need for separated cycling facilities, rather than a shared roadway facility;

7.2 Recommendations

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

- The southbound channelization at Colborne Street West/Brant Avenue/Icomm Drive during rehabilitation be removed to reduce conflicts between vehicles and pedestrians at Colborne Street West/Brant Avenue/Icomm Drive;
- The City of Brantford retain at least one of the existing active transportation crossings of the Grand River (i.e. Brant's Crossing Bridge or TH&B Crossing Bridge), based on the following:
  - To maintain the current lane arrangement and capacity along Colborne Street West, separated facilities do not appear feasible given the limited platform width across the Lorne Bridge.
  - Separated cycling facilities on the Lorne Bridge may introduce a gap in the cycling network as few of the study area roadways are identified as permitted bicycle routes; and
  - Brant's Crossing Bridge and the TH&B Crossing Bridge provide strong connectivity across the Grand River, without introducing conflict points with motor vehicle traffic.
- The City of Brantford consider signal timing modifications contained herein to support diverted traffic volumes during the Lorne Bridge rehabilitation. These measures are noted as follows, and deemed necessary only in the PM peak hour:

- Veteran's Memorial Parkway & Mt. Pleasant Street: Implement a westbound protected-permissive left-turn phase within the existing intersection cycle length.

Appendix A

Turning Movement Count Data and Signal Timing

Colborne St W @ Brant St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

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

Municipality: Brantford
Site #: 0000000004
Intersection: Brant St & Colborne St W
TFR File #: 4
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S

North Leg Total:	2197			
North Entering:	1118			
North Peds:	9			
Peds Cross:	⋈			
Heavys	17	15	9	41
Trucks	9	5	3	17
Cars	720	242	98	1060
Totals	746	262	110	
Heavys	40			
Trucks	9			
Cars	1030			
Totals	1079			
East Leg Total:	375			
East Entering:	0			
East Peds:	9			
Peds Cross:	⧖			

Brant St

Heavys	Trucks	Cars	Totals
22	9	758	789

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

Colborne St W

N
W E
S

Heavys	Trucks	Cars	Totals
27	7	778	812
6	4	234	244
5	0	39	44
38	11	1051	

Colborne St

Cars	Trucks	Heavys	Totals
353	7	15	375

Icomm Dr

Peds Cross:	⧖			
West Peds:	10			
West Entering:	1100			
West Leg Total:	1889			
Cars	281			
Trucks	5			
Heavys	20			
Totals	306			
Cars	38	252	21	311
Trucks	0	2	0	2
Heavys	5	13	0	18
Totals	43	267	21	
Peds Cross:	⋈			
South Peds:	17			
South Entering:	331			
South Leg Total:	637			

Comments

Colborne St W @ Brant St

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

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

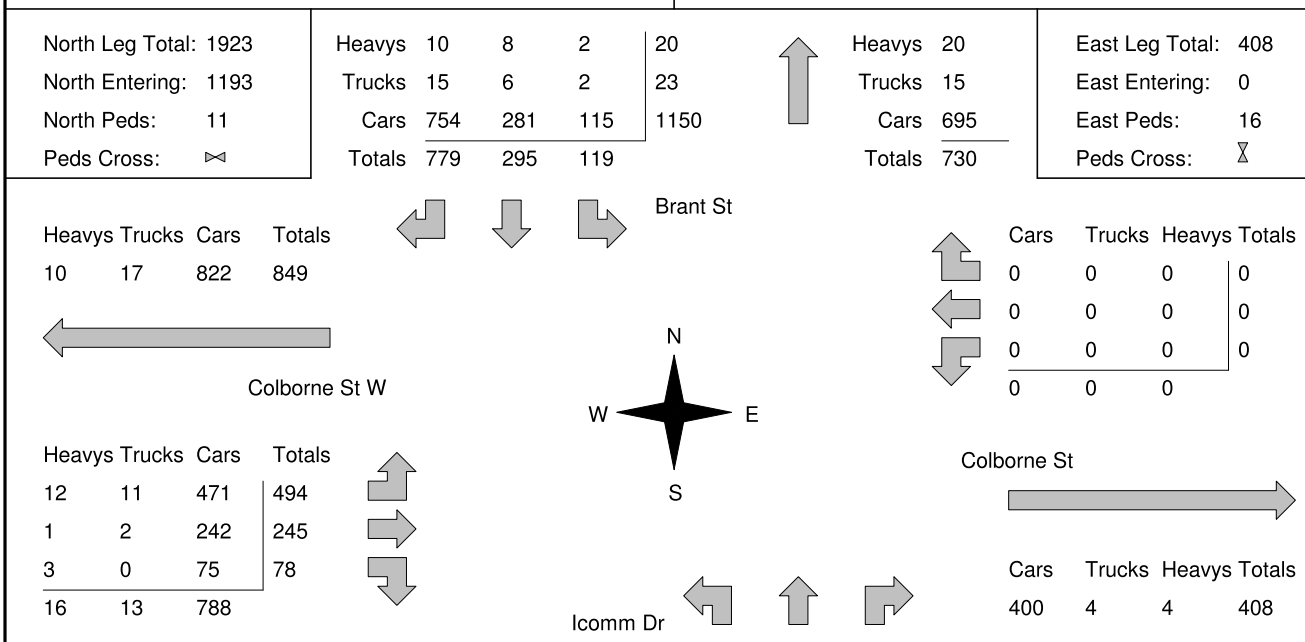
Municipality: Brantford
Site #: 0000000004
Intersection: Brant St & Colborne St W
TFR File #: 4
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S



Comments

Colborne St W @ Brant St

Afternoon Peak Diagram

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

One Hour Peak
From: 16:15:00
To: 17:15:00

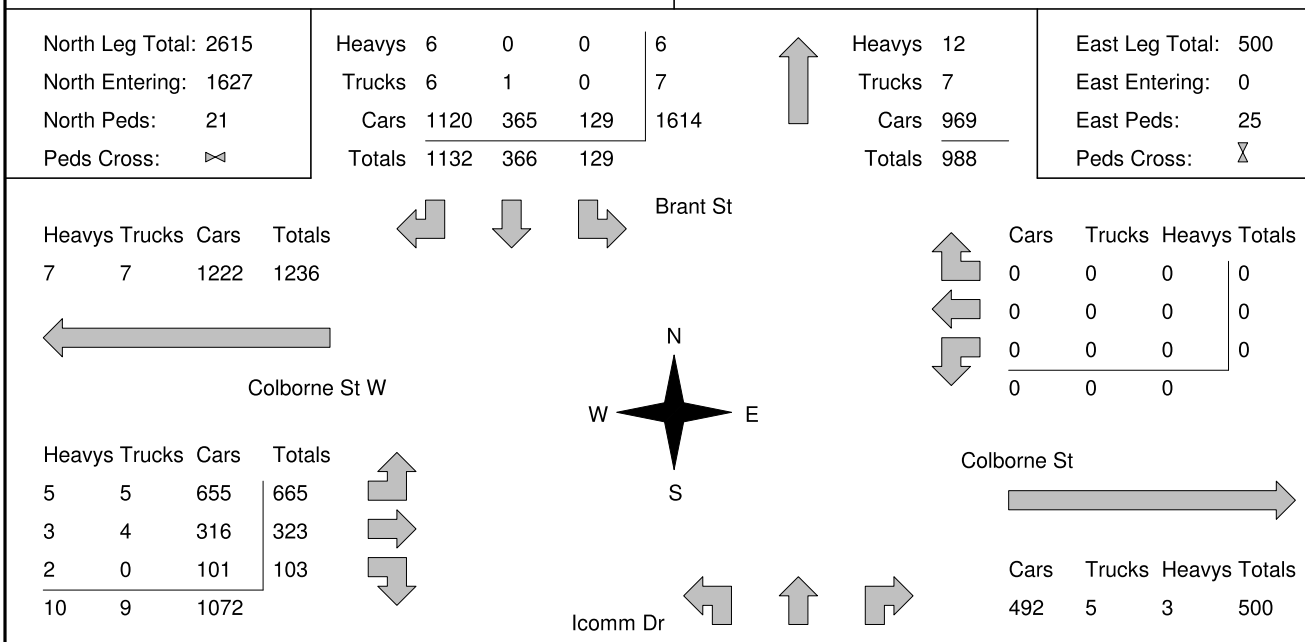
Municipality: Brantford
Site #: 0000000004
Intersection: Brant St & Colborne St W
TFR File #: 4
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S



Comments

Colborne St W @ Brant St

Total Count Diagram

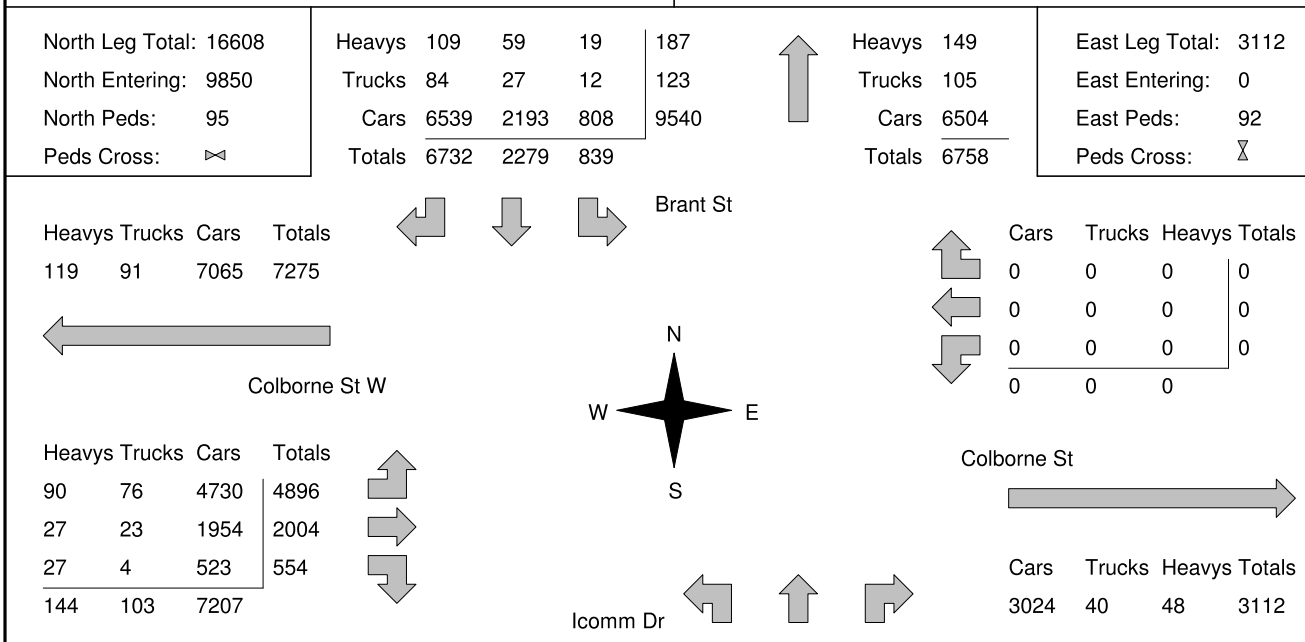
Municipality: Brantford
Site #: 0000000004
Intersection: Brant St & Colborne St W
TFR File #: 4
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Brant St runs N/S



Comments

Colborne St W @ Gilkison St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

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

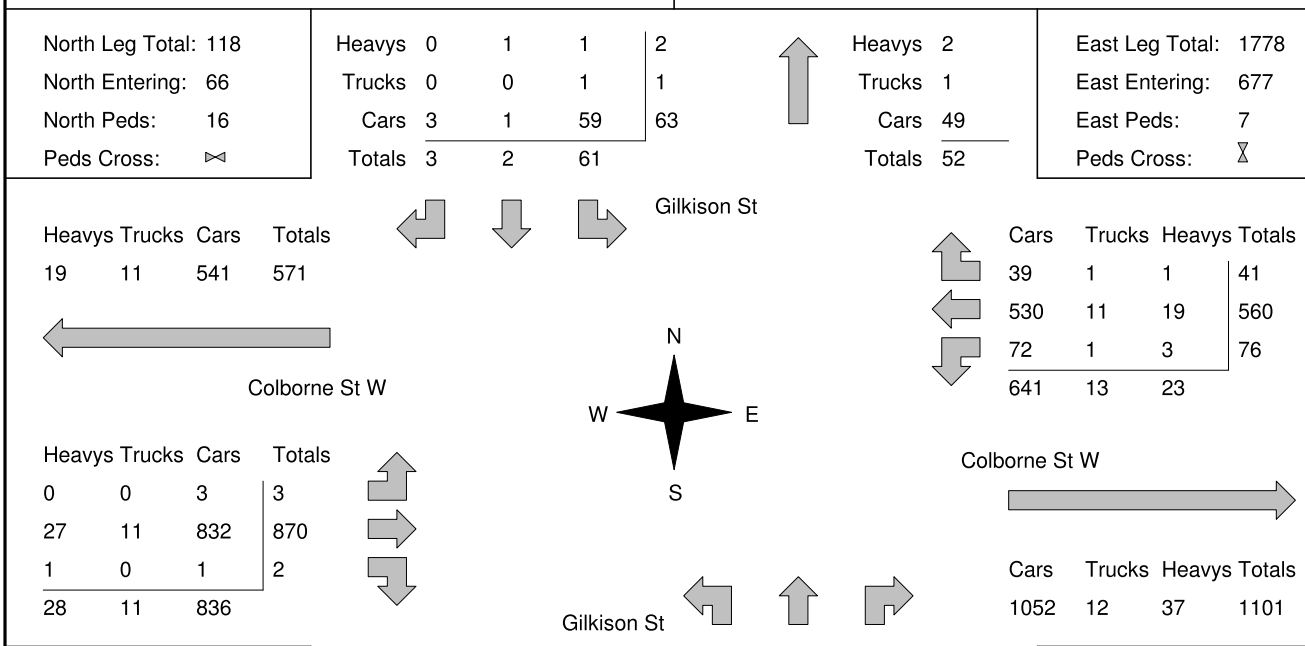
Municipality: Brantford
Site #: 0000000003
Intersection: Colborne St W & Gilkison St
TFR File #: 3
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Gilkison St

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

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

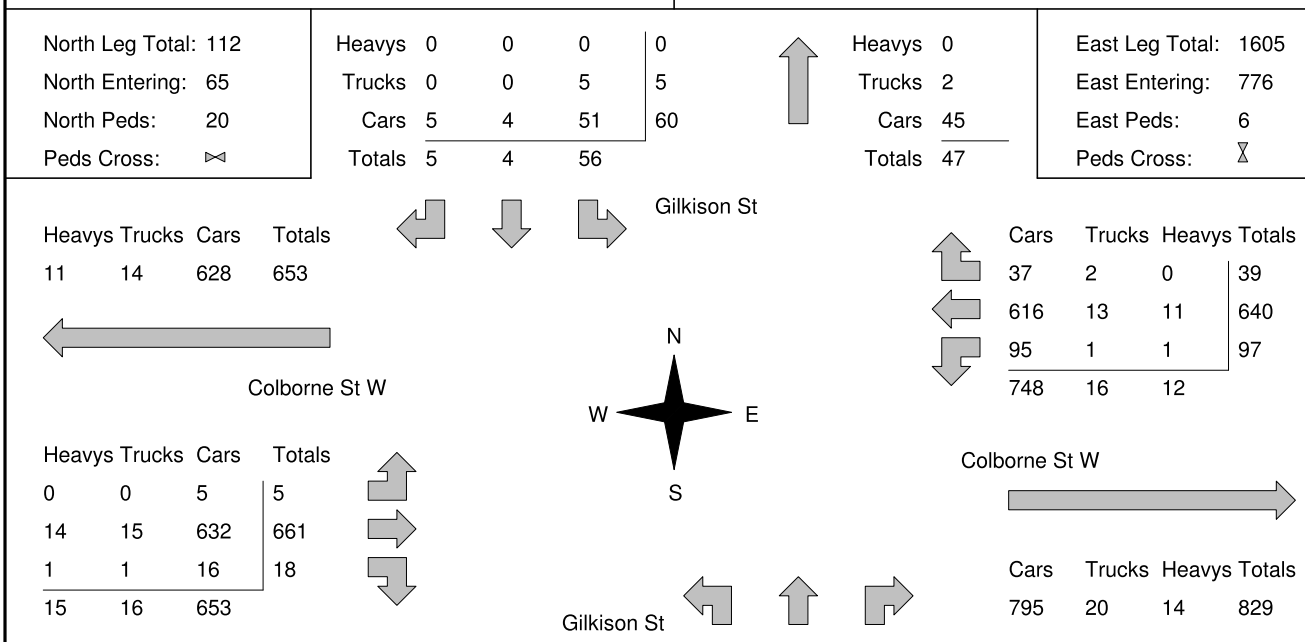
Municipality: Brantford
Site #: 0000000003
Intersection: Colborne St W & Gilkison St
TFR File #: 3
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Gilkison St

Afternoon Peak Diagram

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

One Hour Peak
From: 16:30:00
To: 17:30:00

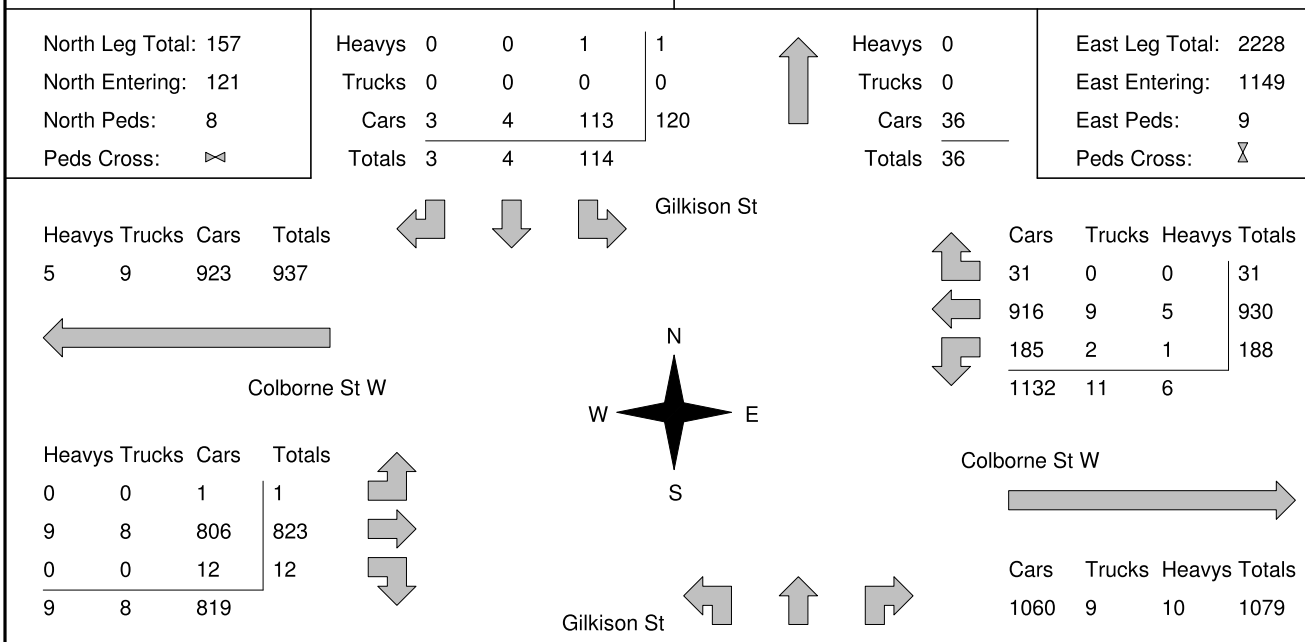
Municipality: Brantford
Site #: 0000000003
Intersection: Colborne St W & Gilkison St
TFR File #: 3
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Gilkison St

Total Count Diagram

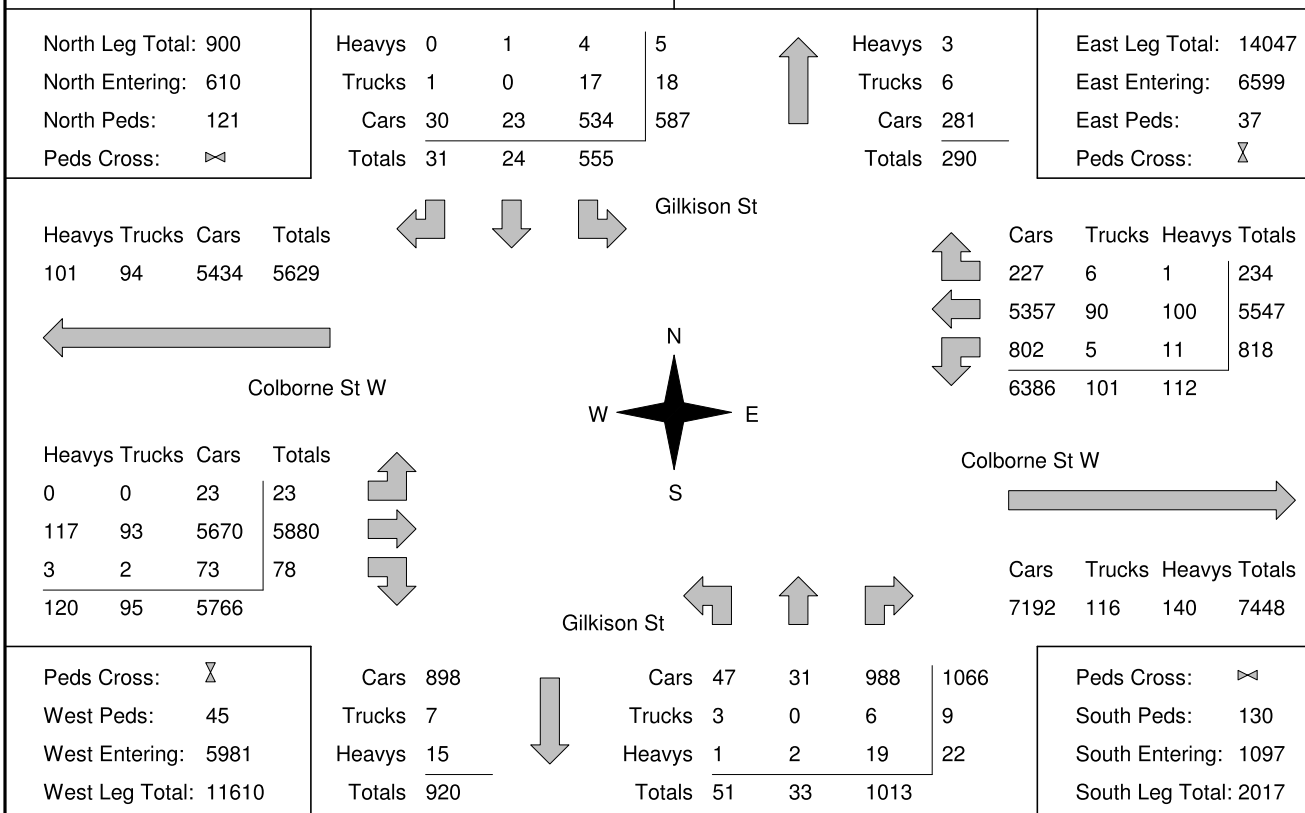
Municipality: Brantford
Site #: 0000000003
Intersection: Colborne St W & Gilkison St
TFR File #: 3
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Mt Pleasant St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

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

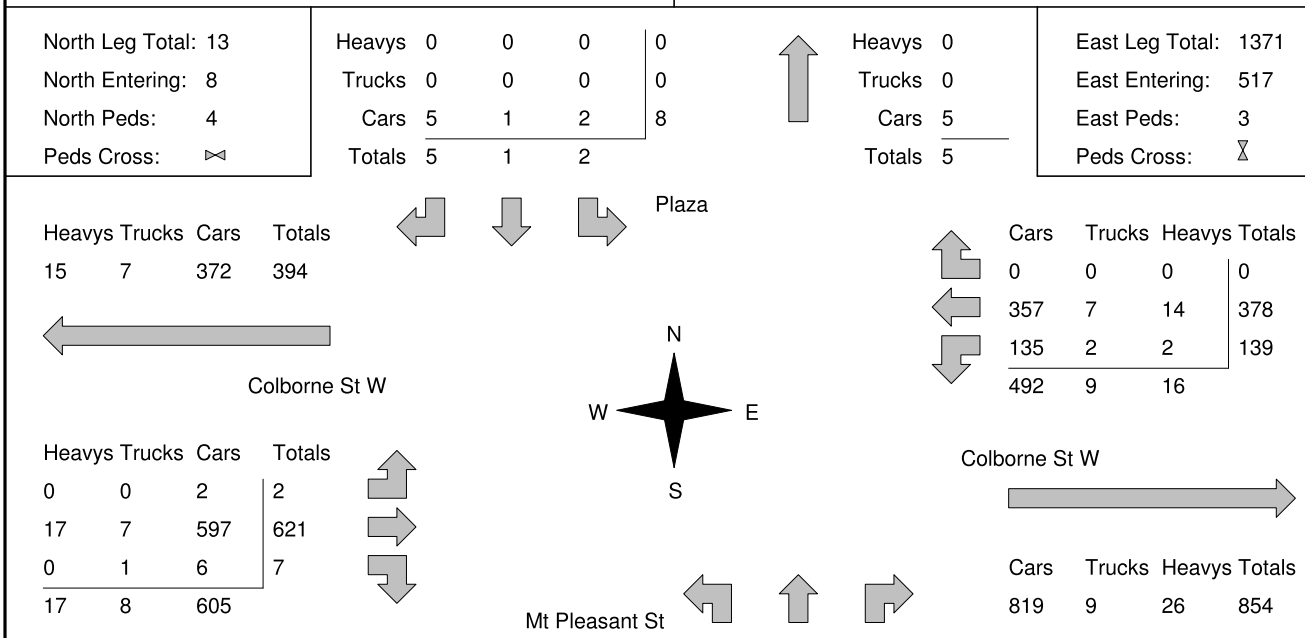
Municipality: Brantford
Site #: 0000000002
Intersection: Colborne St W & Mt Pleasant St
TFR File #: 2
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Mt Pleasant St

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

One Hour Peak
From: 11:45:00
To: 12:45:00

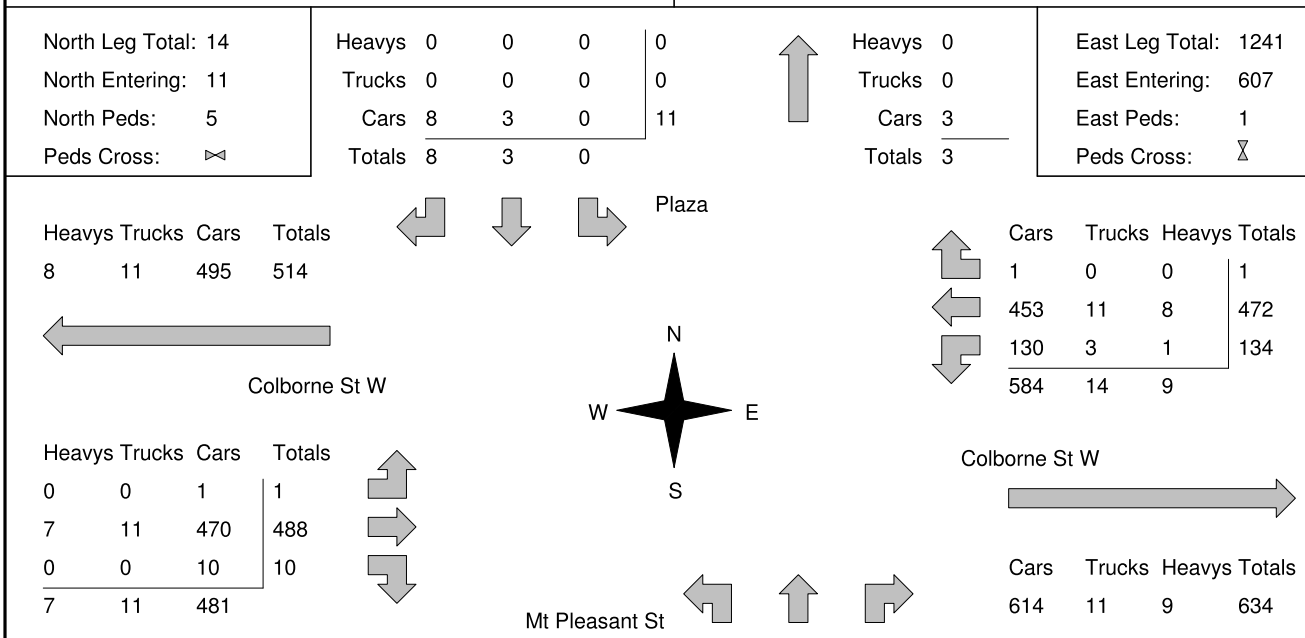
Municipality: Brantford
Site #: 0000000002
Intersection: Colborne St W & Mt Pleasant St
TFR File #: 2
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Mt Pleasant St

Afternoon Peak Diagram

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

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

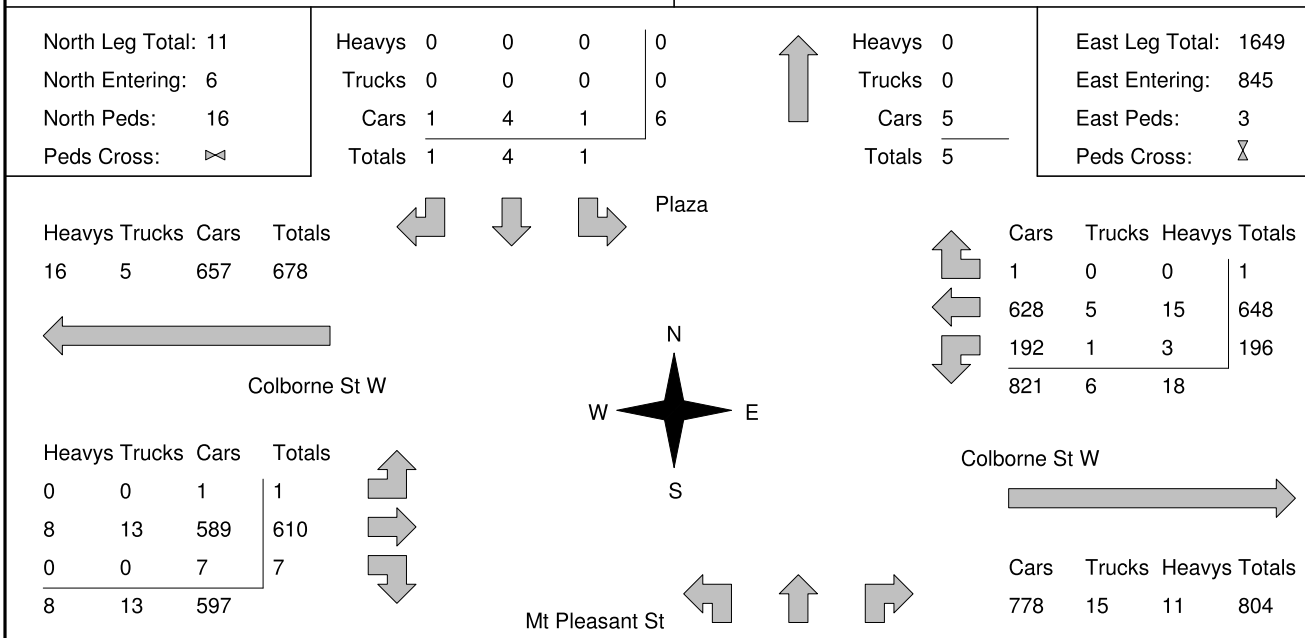
Municipality: Brantford
Site #: 0000000002
Intersection: Colborne St W & Mt Pleasant St
TFR File #: 2
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Mt Pleasant St

Total Count Diagram

Municipality: Brantford
Site #: 0000000002
Intersection: Colborne St W & Mt Pleasant St
TFR File #: 2
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E

North Leg Total:	116			
North Entering:	79			
North Peds:	54			
Peds Cross:	⋈			
Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	51	22	6	79
Totals	51	22	6	
Heavys	0			
Trucks	0			
Cars	37			
Totals	37			
East Leg Total:	10701			
East Entering:	5106			
East Peds:	18			
Peds Cross:	⧖			

Plaza

Heavys	Trucks	Cars	Totals
84	67	3967	4118

Colborne St W

Cars	Trucks	Heavys	Totals
5	0	0	5
3747	66	82	3895
1174	13	19	1206
4926	79	101	

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Heavys	Trucks	Cars	Totals
0	0	15	15
68	71	4030	4169
0	3	54	57
68	74	4099	

Colborne St W

Cars	Trucks	Heavys	Totals
5413	85	97	5595

Mt Pleasant St

Peds Cross:	⧖			
West Peds:	40			
West Entering:	4241			
West Leg Total:	8359			
Cars	1250			
Trucks	16			
Heavys	19			
Totals	1285			
Cars	169	17	1377	1563
Trucks	1	0	14	15
Heavys	2	0	29	31
Totals	172	17	1420	
Peds Cross:	⋈			
South Peds:	88			
South Entering:	1609			
South Leg Total:	2894			

Comments

Icomm Dr @ Market St S

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:15:00
To: 9:15:00

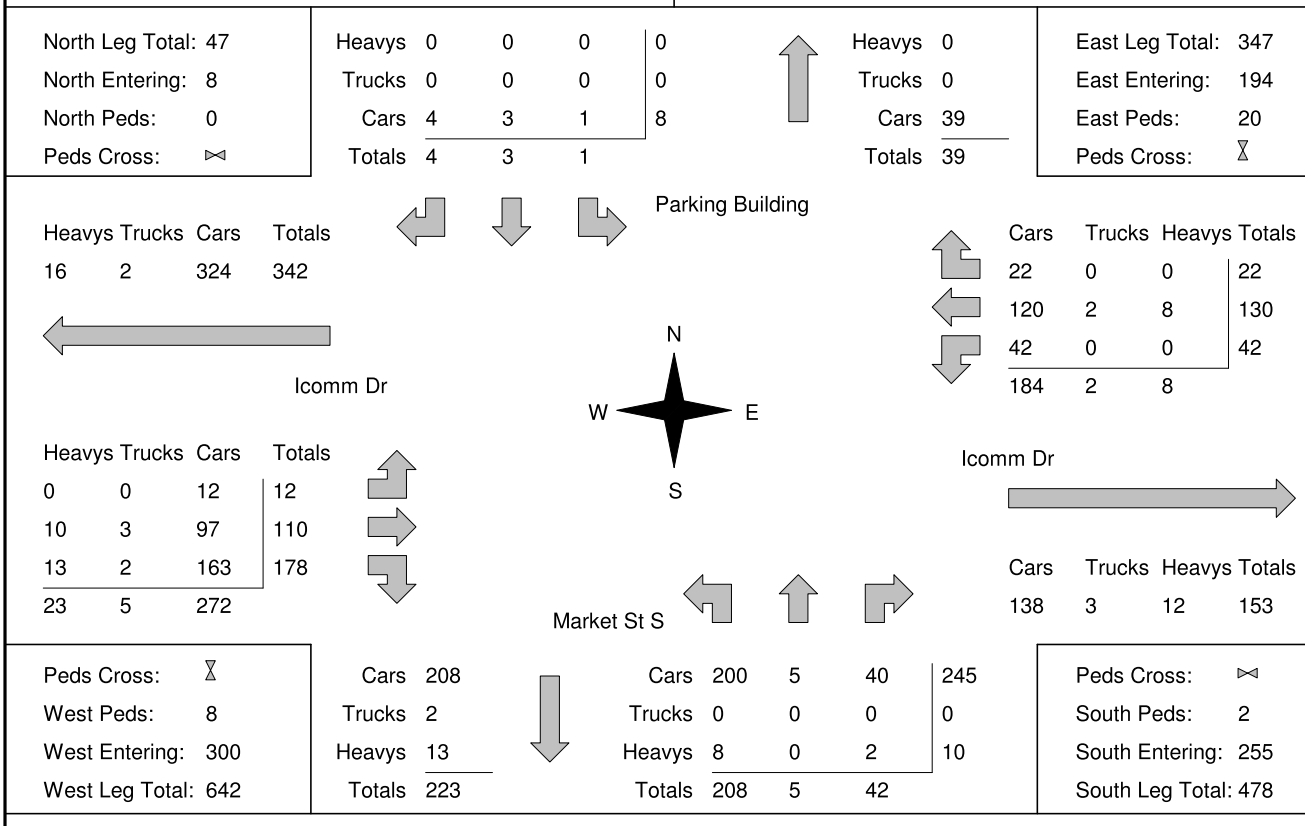
Municipality: Brantford
Site #: 0000000005
Intersection: Icomm Dr & Market St S
TFR File #: 5
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Icomm Dr runs W/E



Comments

Icomm Dr @ Market St S

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

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

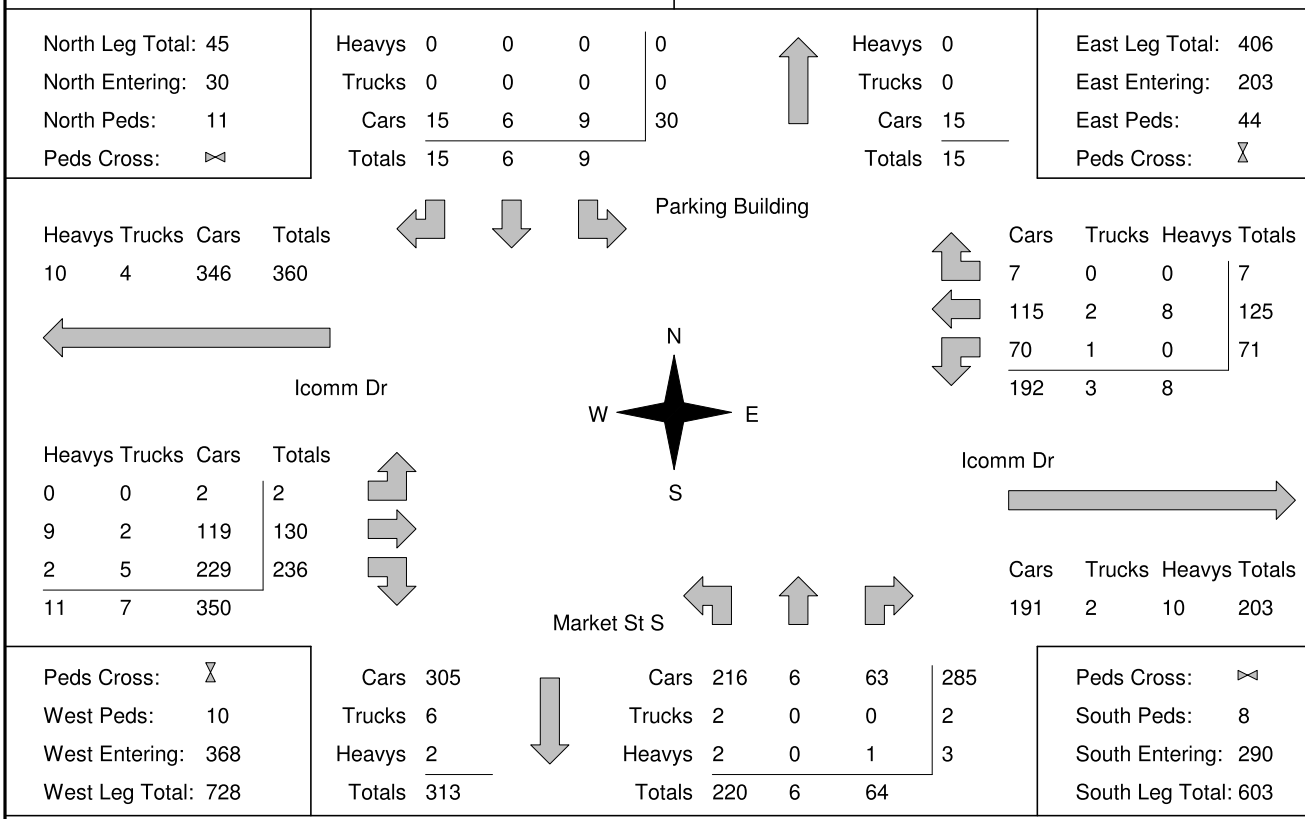
Municipality: Brantford
Site #: 0000000005
Intersection: Icomm Dr & Market St S
TFR File #: 5
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Icomm Dr runs W/E



Comments

Icomm Dr @ Market St S

Afternoon Peak Diagram

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

One Hour Peak
From: 16:30:00
To: 17:30:00

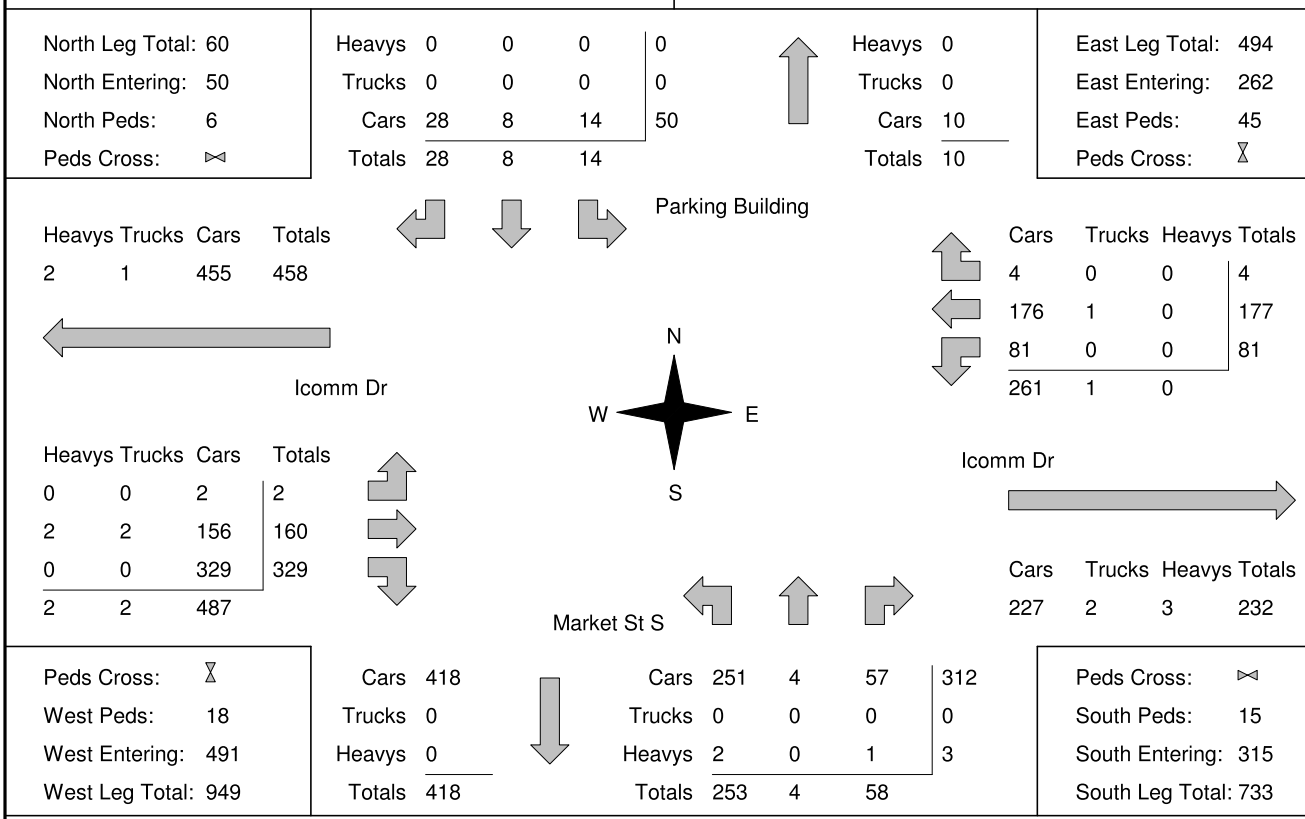
Municipality: Brantford
Site #: 0000000005
Intersection: Icomm Dr & Market St S
TFR File #: 5
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Icomm Dr runs W/E



Comments

Icomm Dr @ Market St S

Total Count Diagram

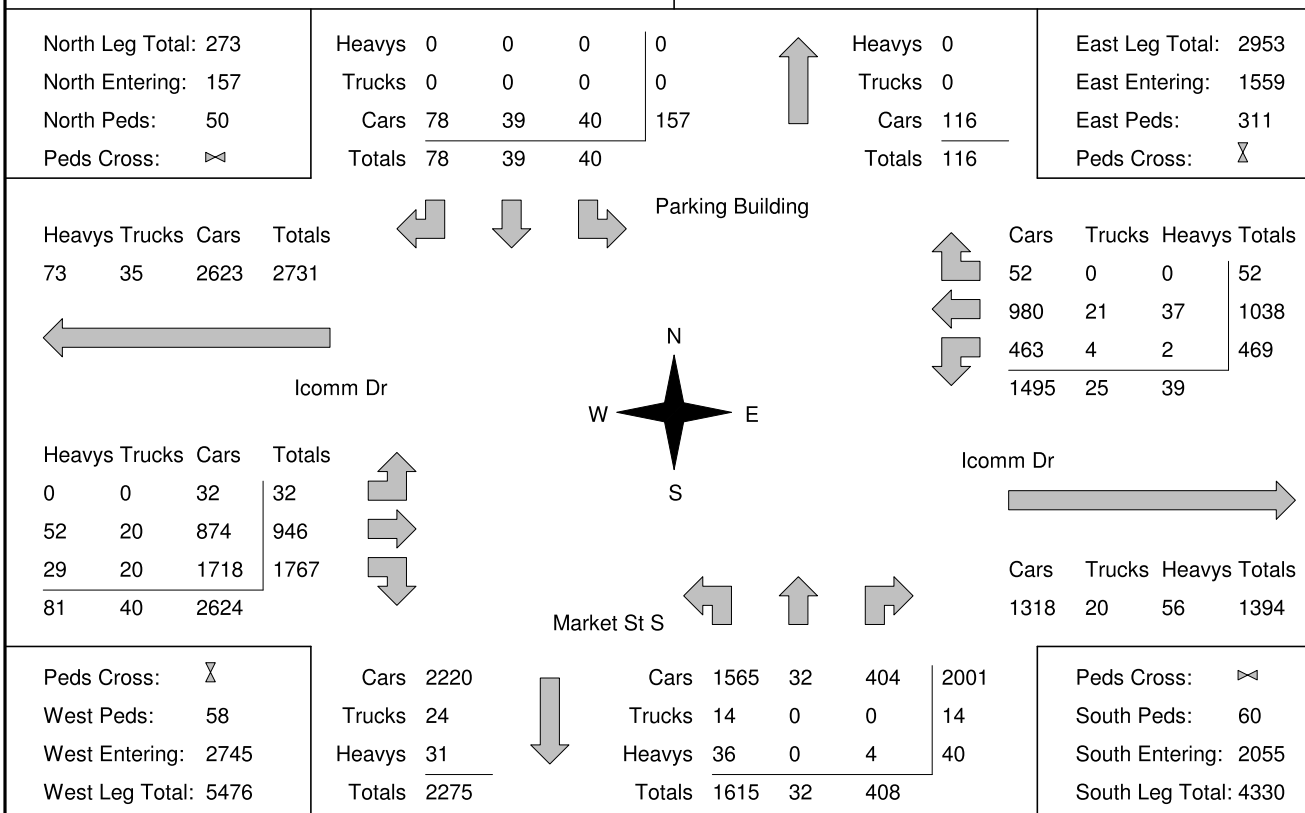
Municipality: Brantford
Site #: 0000000005
Intersection: Icomm Dr & Market St S
TFR File #: 5
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Icomm Dr runs W/E



Comments

Icomm Dr @ Clarence St S

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 8:15:00
To: 9:15:00

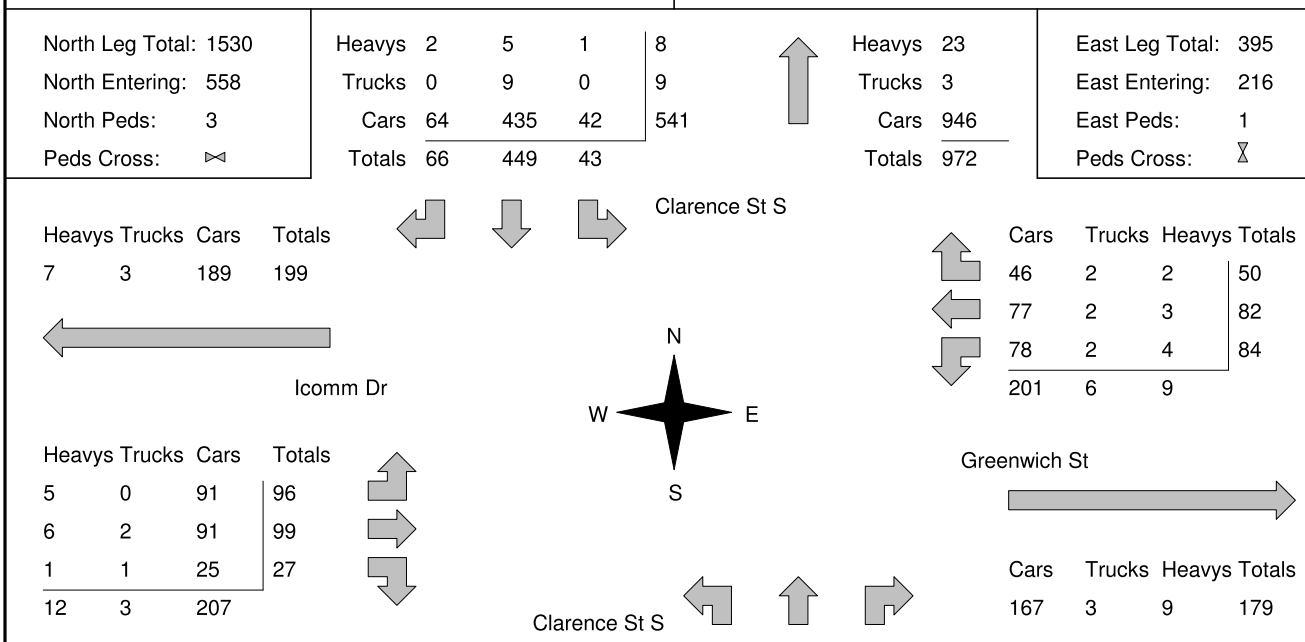
Municipality: Brantford
Site #: 0000000006
Intersection: Clarence St S & Icomm Dr
TFR File #: 6
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Clarence St S runs N/S



Comments

Icomm Dr @ Clarence St S

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

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

Municipality: Brantford
Site #: 0000000006
Intersection: Clarence St S & Icomm Dr
TFR File #: 6
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Clarence St S runs N/S

North Leg Total:	1443			
North Entering:	662			
North Peds:	4			
Peds Cross:	⋈			
Heavys	0	5	0	5
Trucks	2	8	1	11
Cars	63	533	50	646
Totals	65	546	51	
Heavys	8			
Trucks	9			
Cars	764			
Totals	781			
East Leg Total:	483			
East Entering:	265			
East Peds:	7			
Peds Cross:	⧖			

Clarence St S

Heavys	Trucks	Cars	Totals
8	3	195	206

	Cars	Trucks	Heavys	Totals
	56	0	1	57
	90	1	7	98
	108	1	1	110
	254	2	9	

Icomm Dr

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Heavys	Trucks	Cars	Totals
3	0	153	156
6	0	119	125
1	2	63	66
10	2	335	

Greenwich St

Cars	Trucks	Heavys	Totals
206	4	8	218

Clarence St S

Peds Cross:	⧖			
West Peds:	37			
West Entering:	347			
West Leg Total:	553			
Cars	704			
Trucks	11			
Heavys	7			
Totals	722			
Cars	42	555	37	634
Trucks	0	9	3	12
Heavys	1	4	2	7
Totals	43	568	42	
Peds Cross:	⋈			
South Peds:	23			
South Entering:	653			
South Leg Total:	1375			

Comments

Icomm Dr @ Clarence St S

Afternoon Peak Diagram

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

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Brantford
Site #: 0000000006
Intersection: Clarence St S & Icomm Dr
TFR File #: 6
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Clarence St S runs N/S

North Leg Total:	1970			
North Entering:	1120			
North Peds:	8			
Peds Cross:	⋈			
Heavys	0	4	0	4
Trucks	0	2	1	3
Cars	82	940	91	1113
Totals	82	946	92	
Heavys	10			
Trucks	11			
Cars	829			
Totals	850			
East Leg Total:	615			
East Entering:	330			
East Peds:	0			
Peds Cross:	⧖			

Clarence St S

Heavys	Trucks	Cars	Totals
0	2	258	260

Cars	Trucks	Heavys	Totals
47	0	1	48
117	1	0	118
164	0	0	164
328	1	1	

Icomm Dr

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Heavys	Trucks	Cars	Totals
2	1	165	168
1	0	152	153
0	1	82	83
3	2	399	

Greenwich St

Cars	Trucks	Heavys	Totals
282	2	1	285

Clarence St S

Peds Cross:	⧖			
West Peds:	35			
West Entering:	404			
West Leg Total:	664			
Cars	1186			
Trucks	3			
Heavys	4			
Totals	1193			
Cars	59	617	39	715
Trucks	1	10	1	12
Heavys	0	7	0	7
Totals	60	634	40	
Peds Cross:	⋈			
South Peds:	24			
South Entering:	734			
South Leg Total:	1927			

Comments

Icomm Dr @ Clarence St S

Total Count Diagram

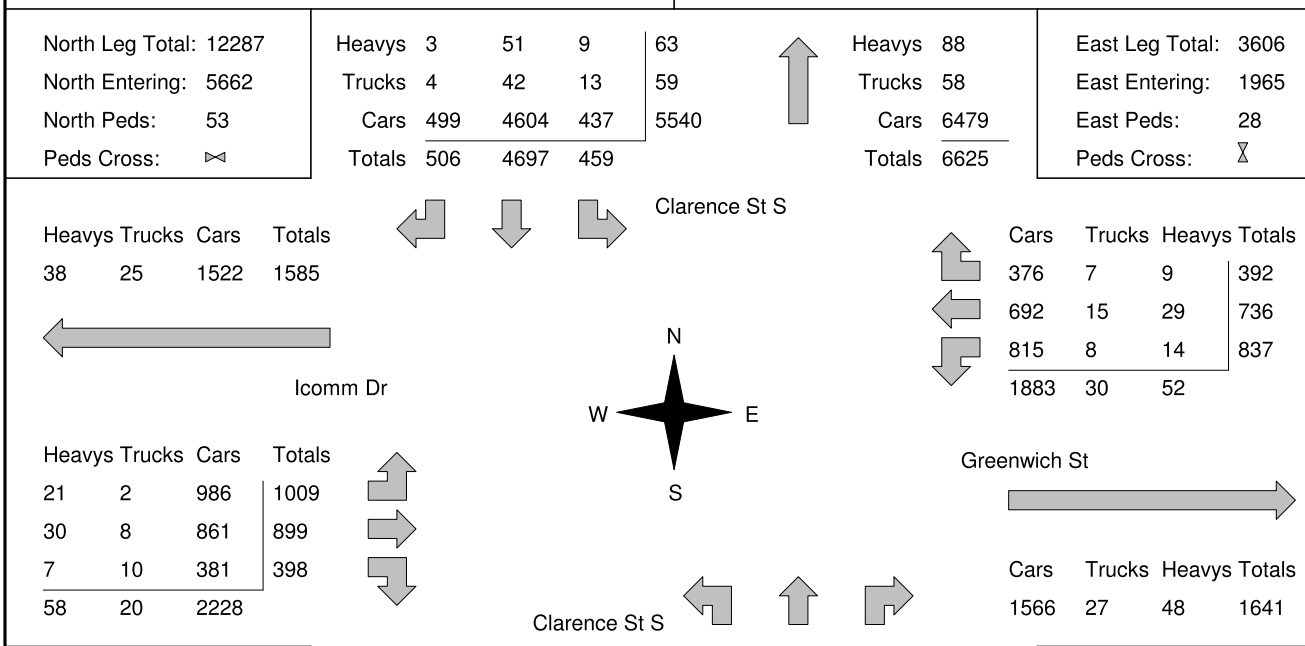
Municipality: Brantford
Site #: 0000000006
Intersection: Clarence St S & Icomm Dr
TFR File #: 6
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Clarence St S runs N/S



Comments

Veterans Memorial Pkwy @ Mt Pleasant St

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

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

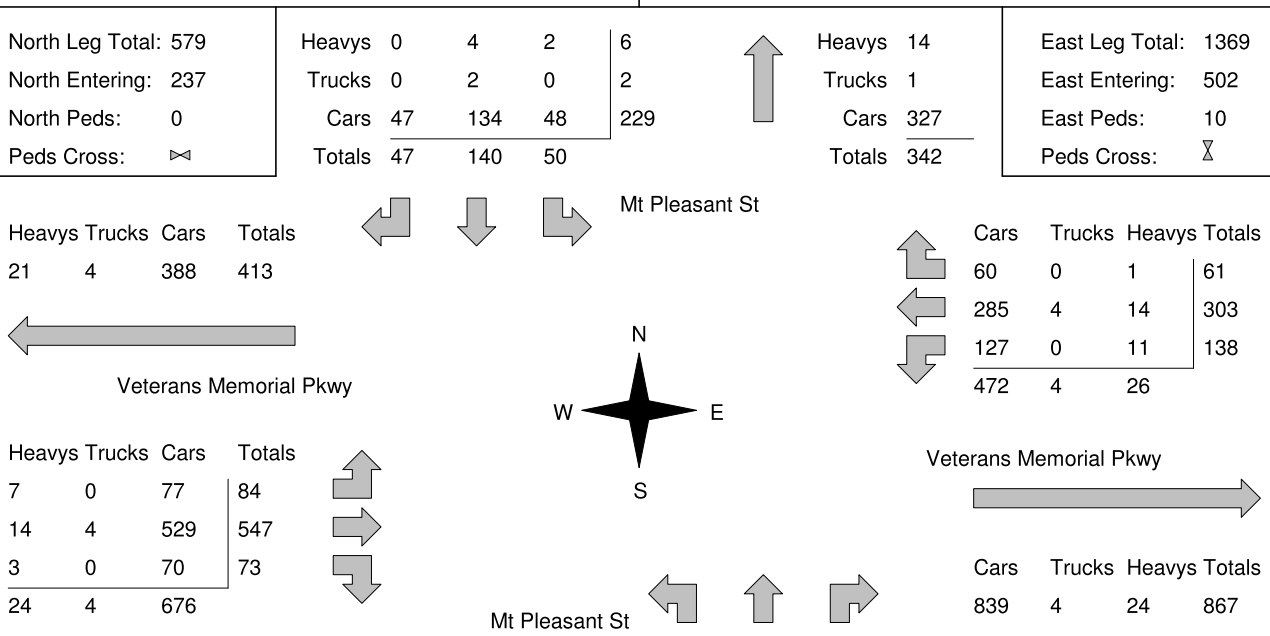
Municipality: Brantford
Site #: 0000000001
Intersection: Veterans Memorial Pkwy & Mt Pleas
TFR File #: 1
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Veterans Memorial Pkwy runs W/E



Comments

Veterans Memorial Pkwy @ Mt Pleasant St

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

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

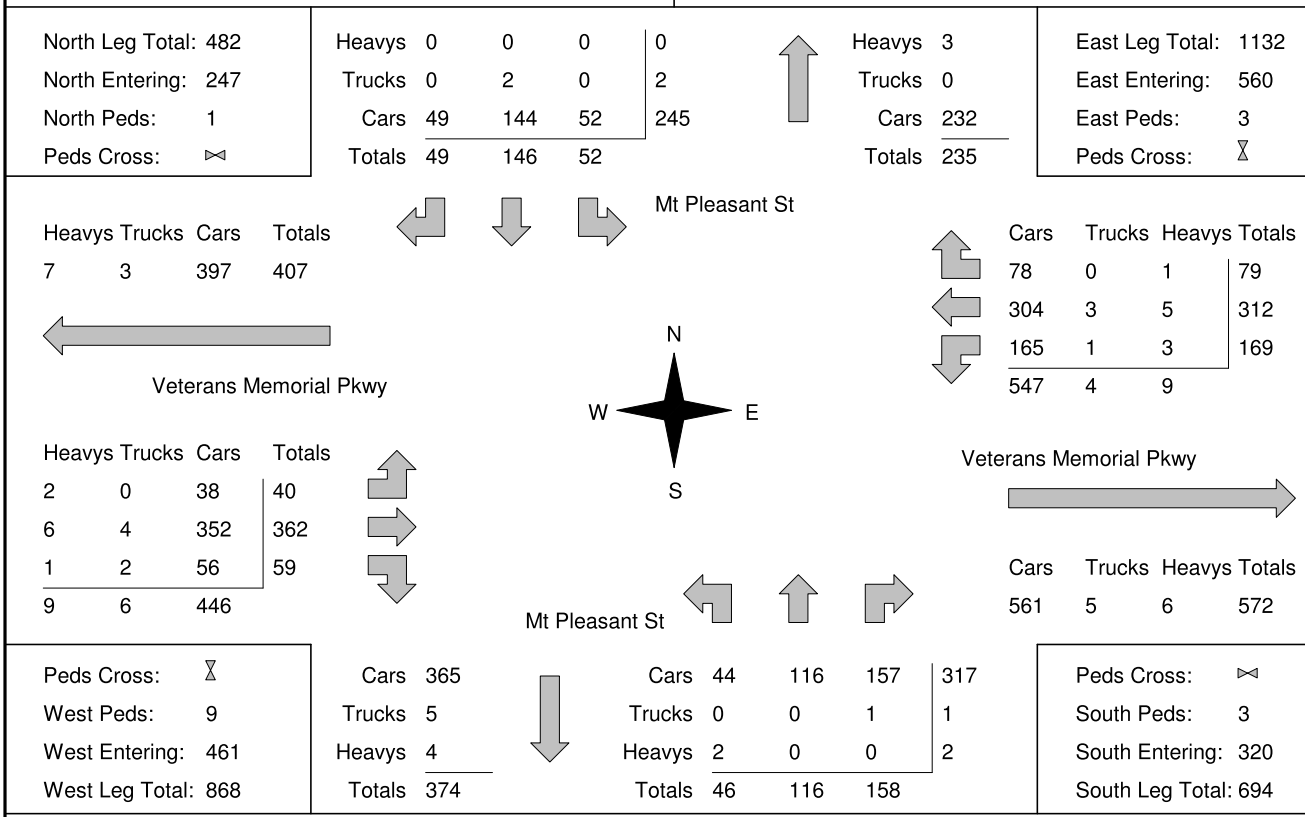
Municipality: Brantford
Site #: 0000000001
Intersection: Veterans Memorial Pkwy & Mt Pleas
TFR File #: 1
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Veterans Memorial Pkwy runs W/E



Comments

Veterans Memorial Pkwy @ Mt Pleasant 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

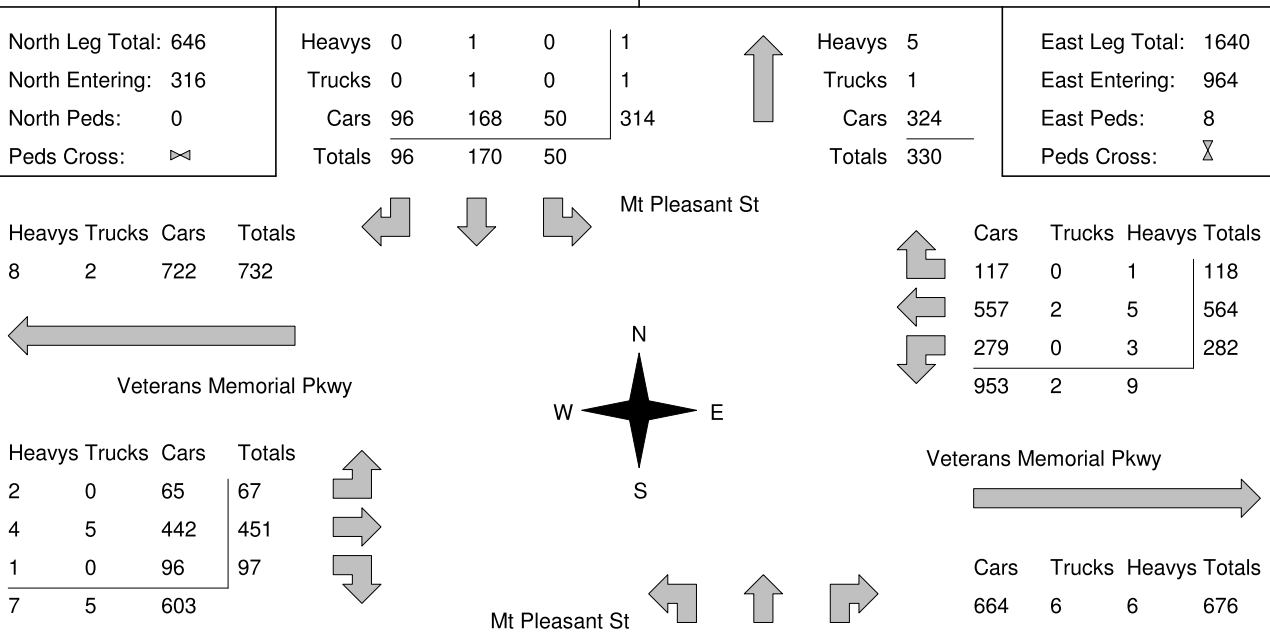
Municipality: Brantford
Site #: 0000000001
Intersection: Veterans Memorial Pkwy & Mt Pleas
TFR File #: 1
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Veterans Memorial Pkwy runs W/E



Comments

Veterans Memorial Pkwy @ Mt Pleasant St

Total Count Diagram

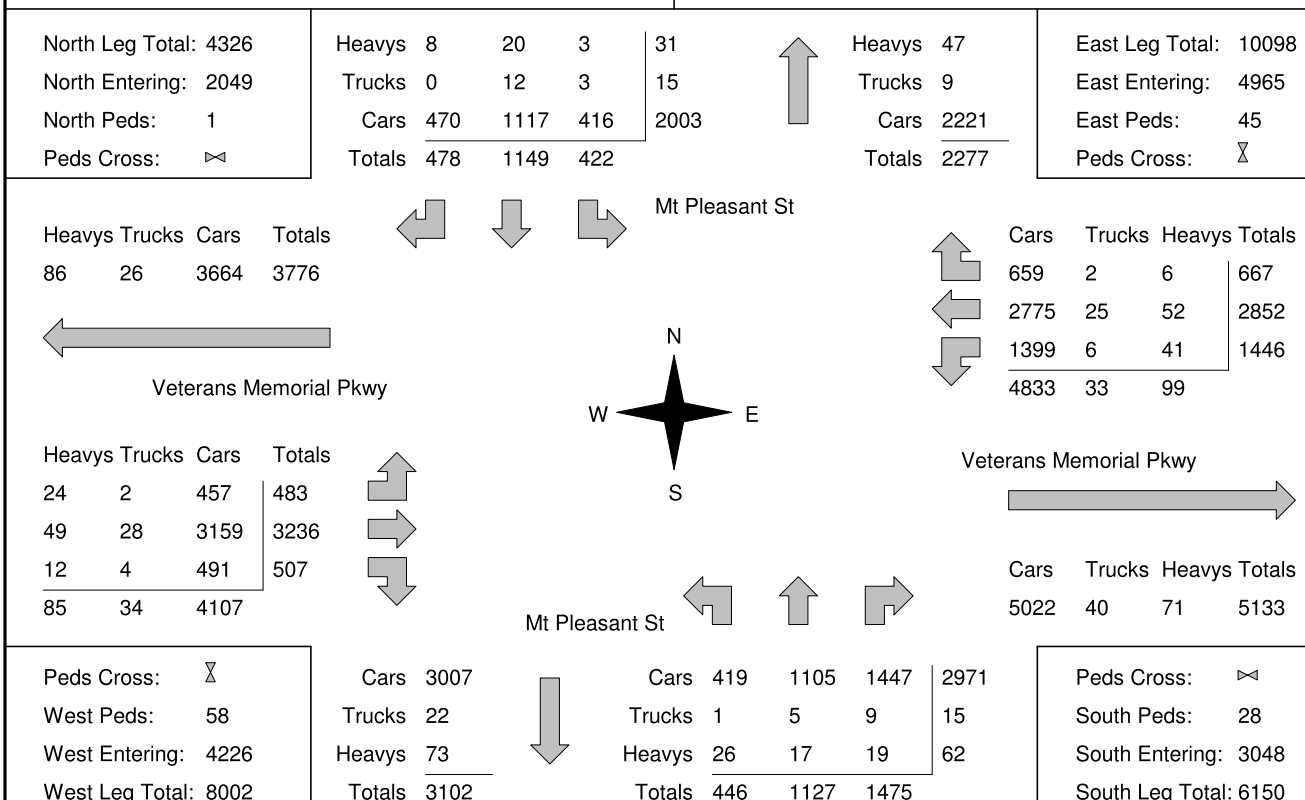
Municipality: Brantford
Site #: 0000000001
Intersection: Veterans Memorial Pkwy & Mt Pleas
TFR File #: 1
Count date: 4-Nov-2020

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Veterans Memorial Pkwy runs W/E



Comments

Colborne St W @ Mt Pleasant St

Mid-day Peak Diagram

Specified Period
From: 9:00:00
To: 17:00:00

One Hour Peak
From: 13:30:00
To: 14:30:00

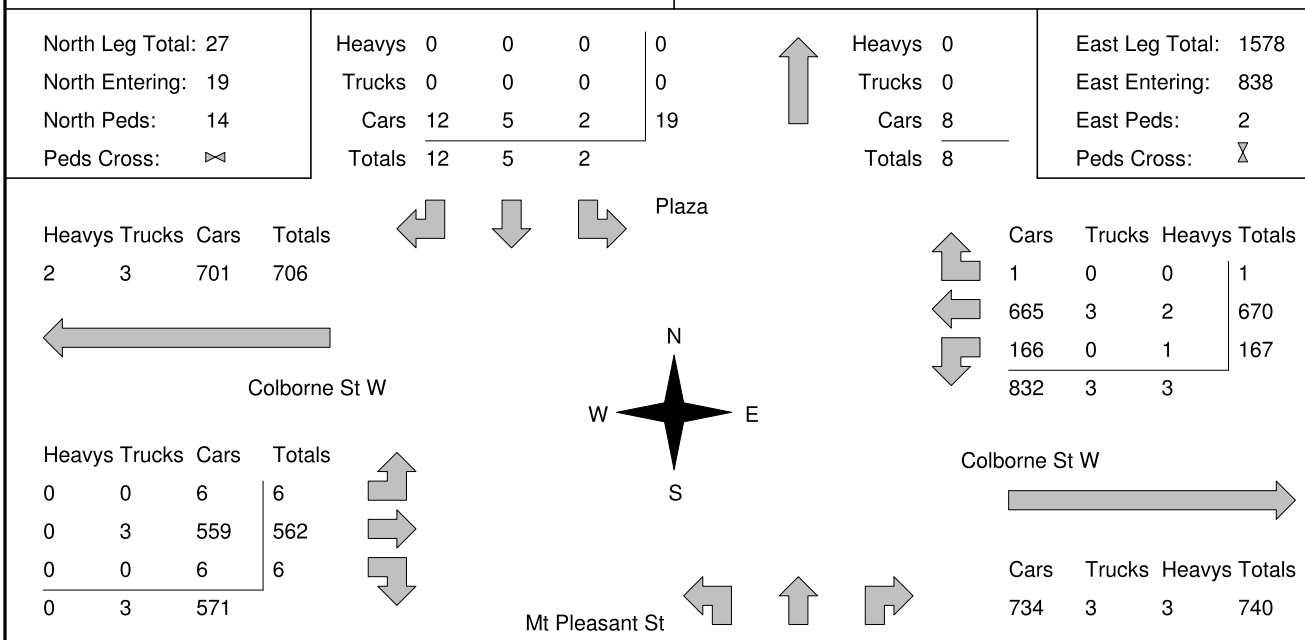
Municipality: Brantford
Site #: 0000000002
Intersection: Colborne St W & Mt Pleasant St
TFR File #: 2
Count date: 21-Nov-2020

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E



Comments

Colborne St W @ Mt Pleasant St

Total Count Diagram

Municipality: Brantford
Site #: 0000000002
Intersection: Colborne St W & Mt Pleasant St
TFR File #: 2
Count date: 21-Nov-2020

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Colborne St W runs W/E

North Leg Total:	148			
North Entering:	96			
North Peds:	48			
Peds Cross:	⋈			

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	67	18	11	96
Totals	67	18	11	

Heavys	0	
Trucks	0	
Cars	52	
Totals	52	

East Leg Total:	11189		
East Entering:	5501		
East Peds:	9		
Peds Cross:	⧖		

Heavys	Trucks	Cars	Totals
27	27	4609	4663

Plaza

Cars	Trucks	Heavys	Totals
2	0	0	2
4333	26	27	4386
1107	3	3	1113
5442	29	30	

Colborne St W

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Heavys	Trucks	Cars	Totals
0	0	32	32
7	28	4312	4347
0	1	62	63
7	29	4406	

Colborne St W

Cars	Trucks	Heavys	Totals
5627	35	26	5688

Mt Pleasant St

Peds Cross:	⧖		
West Peds:	21		
West Entering:	4442		
West Leg Total:	9105		

Cars	1187			
Trucks	4			
Heavys	3			
Totals	1194			

Cars	209	18	1304	1531
Trucks	1	0	7	8
Heavys	0	0	19	19
Totals	210	18	1330	

Peds Cross:	⋈		
South Peds:	57		
South Entering:	1558		
South Leg Total:	2752		

Comments

Veterans Memorial Pkwy @ Mt Pleasant St

Mid-day Peak Diagram

Specified Period
From: 9:00:00
To: 17:00:00

One Hour Peak
From: 11:45:00
To: 12:45:00

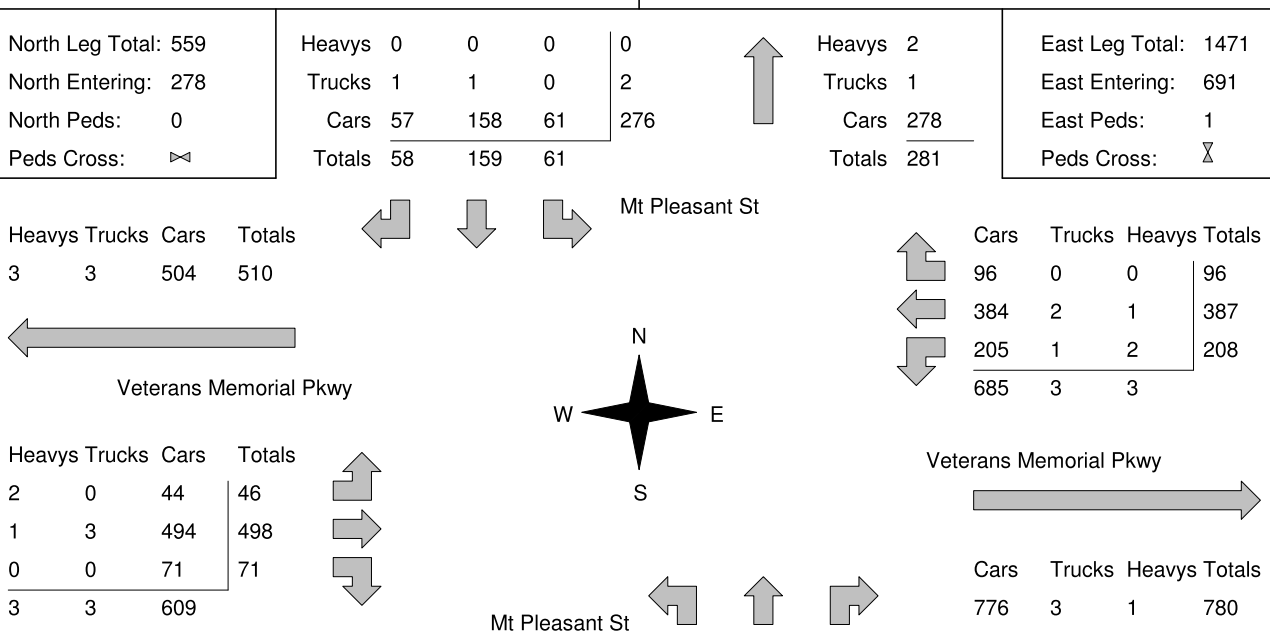
Municipality: Brantford
Site #: 0000000001
Intersection: Veterans Memorial Pkwy & Mt Pleas
TFR File #: 1
Count date: 21-Nov-2020

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Veterans Memorial Pkwy runs W/E



Comments

Veterans Memorial Pkwy @ Mt Pleasant St

Total Count Diagram

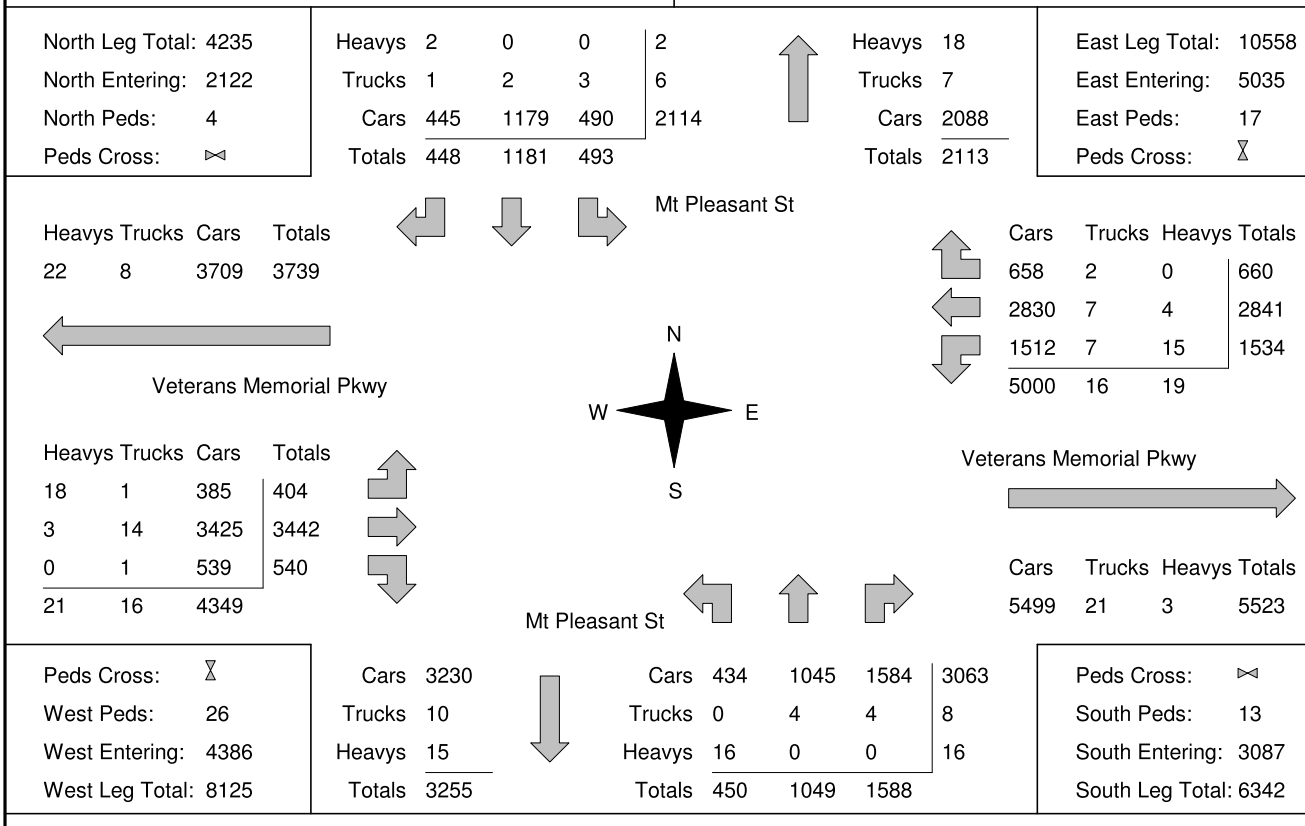
Municipality: Brantford
Site #: 0000000001
Intersection: Veterans Memorial Pkwy & Mt Pleas
TFR File #: 1
Count date: 21-Nov-2020

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

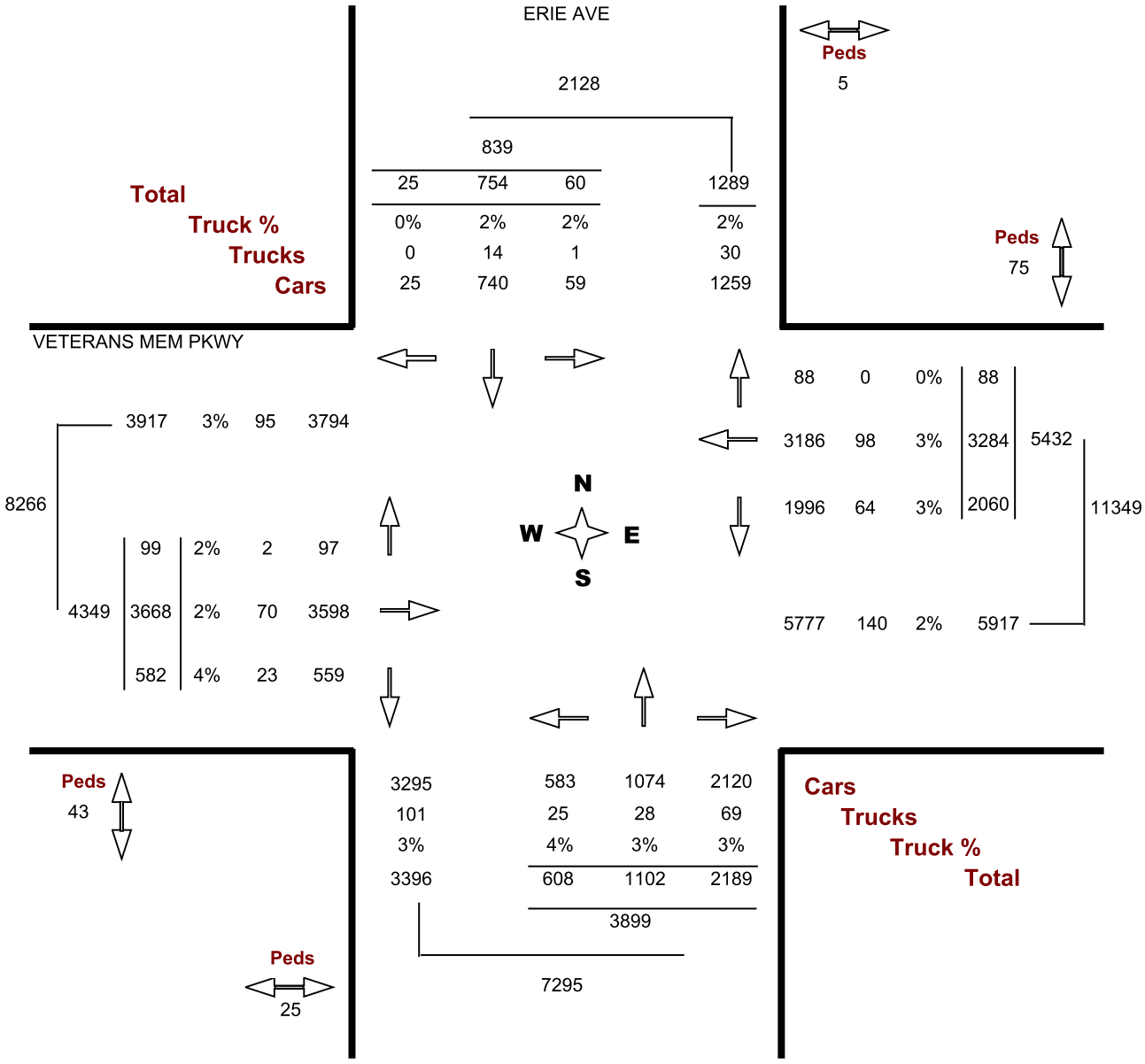
Major Road: Veterans Memorial Pkwy runs W/E



Comments

Turning Movements Count - Full Study Report

Location..... ERIE AVE @ VETERANS MEM PKWY
Municipality..... BRANTFORD
GeoID..... N1685
Count Date..... Wednesday, 21 May, 2014



City of Brantford Engineering Department
Traffic Signal Timing Sheet

Intersection of :

Clarence Street @ Erie Avenue

Phase	1 SB LT. CLARENCE	2 NB CLARENCE	3	4 EB ERIE	5	6 SB CLARENCE	7	8 WB ERIE
Min Green	7	10		7		10		7
Walk		7		7		7		7
Ped Clear		20		18		20		18
h Extensi				3.0				3.0
Max 1	12	30		18		30		18
Max 2	15	35		20		35		20
Amber	3.0	4.0		4.0		4.0		4.0
d Clearan	1.0	2.0		2.0		2.0		2.0
Red Rever	2.0	2.0		2.0		2.0		2.0

CLARENCE STREET @ ERIE AVENUE

AM PLAN

Cycle Length	80	CoS	701	Offset	66

Phase 1	11	Phase 2	49	Phase 3		Phase 4	30
Phase 5		Phase 6	60	Phase 7		Phase 8	30

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

OFF PEAK PLAN

Cycle Length	80	CoS	702	Offset	76

Phase 1		Phase 2	47	Phase 3		Phase 4	33
Phase 5		Phase 6	47	Phase 7		Phase 8	33

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

PM PEAK PLAN

Cycle Length	90	CoS	703	Offset	16

Phase 1	16	Phase 2	45	Phase 3		Phase 4	29
Phase 5		Phase 6	61	Phase 7		Phase 8	29

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

NIGHT PLAN (STEP 5)

Cycle Length		CoS		Offset	

Phase 1		Phase 2		Phase 3		Phase 4	
Phase 5		Phase 6		Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Time of Days Steps and Patterns

Step	Program	Plan Begins	Plan
Step 1	1	06:00	1
Step 2	1	09:00	2
Step 3	1	14:30	3
Step 4	1	18:00	2
Step 5	1	22:15	5
Step 6	2	09:00	3
Step 7	2	18:00	2
Step 8	2	22:15	5
Step 9	3	09:00	3
Step 10	3	18:00	5

Notes:
Program 1 - Monday to Friday
Program 2 - Saturday
Program 3 - Sunday

CITY OF BRANTFORD ENGINEERING DEPARTMENT
TRAFFIC SIGNAL TIMING SHEET

INTERSECTION OF :

CLARENCE STREET @ ICOMM DRIVE @ GREENWICH STREET

PHASE	1	2 NB CLARENCE	3	4 EB ICOMM	5	6 SB CLARENCE	7 EB LT.	8 WB GREENWICH
MIN GREEN		10		7		10	7	7
WALK		7		7		7		7
PED CLEAR		30		25		30		25
H EXTENSI				3.0				3.0
MAX 1		30		18		30	11	18
MAX 2		35		20		35	12	20
AMBER		4.0		4.0		4.0	3.0	4.0
D CLEARAN		2.0		2.0		2.0	1.0	2.0
RED REVER		2.0		2.0		2.0	2.0	2.0

CLARENCE STREET @ ICOMM DRIVE @ GREENWICH STREET

AM PLAN

Cycle Length	80	CoS	701	Offset	75

Phase 1		Phase 2	52	Phase 3		Phase 4	28
Phase 5		Phase 6	52	Phase 7		Phase 8	28

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

OFF PEAK PLAN

Cycle Length	80	CoS	702	Offset	78

Phase 1		Phase 2	42	Phase 3		Phase 4	38
Phase 5		Phase 6	42	Phase 7	12	Phase 8	26

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

PM PEAK PLAN

Cycle Length	90	CoS	703	Offset	72

Phase 1		Phase 2	52	Phase 3		Phase 4	38
Phase 5		Phase 6	52	Phase 7	12	Phase 8	26

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

NIGHT PLAN (STEP 5)

Cycle Length		CoS		Offset	

Phase 1		Phase 2		Phase 3		Phase 4	
Phase 5		Phase 6		Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Time of Days Steps and Patterns

Step	Program	Plan Begins	Plan
Step 1	1	06:00	1
Step 2	1	09:00	2
Step 3	1	14:30	3
Step 4	1	18:00	2
Step 5	1	22:15	5
Step 6	2	09:00	3
Step 7	2	18:00	2
Step 8	2	22:15	5
Step 9	3	09:00	3
Step 10	3	18:00	5

Notes:
Program 1 - Monday to Friday
Program 2 - Saturday
Program 3 - Sunday

CITY OF BRANTFORD ENGINEERING DEPARTMENT
TRAFFIC SIGNAL TIMING SHEET

INTERSECTION OF :

COLBORNE STREET @ BRANT AVENUE @ IUCOMM DRIVE

PHASE	1 SB LT. BRANT	2 NB BRANT	3	4 EB COLBORNE	5 NB LT. BRANT	6 SB BRANT	7	8
MIN GREEN	7	10		7		10		
WALK		7		7		7		
PED CLEAR		18		25		20		
H EXTENSI				3.0				
MAX 1	12	30		30		30		
MAX 2	15	35		35		35		
AMBER	3.0	4.0		4.0		4.0		
D CLEARAN	1.0	2.0		2.0		2.0		
RED REVER	2.0	2.0		2.0		2.0		

COLBORNE STREET @ BRANT AVENUE @ ICOMM DRIVE

AM PLAN

Cycle Length	80	CoS	701	Offset	60

Phase 1	11	Phase 2	30	Phase 3		Phase 4	39
Phase 5	11	Phase 6	30	Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

OFF PEAK PLAN

Cycle Length	80	CoS	702	Offset	66

Phase 1	11	Phase 2	31	Phase 3		Phase 4	38
Phase 5	11	Phase 6	31	Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

PM PEAK PLAN

Cycle Length	90	CoS	703	Offset	80

Phase 1	12	Phase 2	35	Phase 3		Phase 4	43
Phase 5	12	Phase 6	35	Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

NIGHT PLAN (STEP 5)

Cycle Length	75	CoS	705	Offset	46

Phase 1		Phase 2	35	Phase 3		Phase 4	40
Phase 5		Phase 6	35	Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Time of Days Steps and Patterns

Step	Program	Plan Begins	Plan
Step 1	1	06:00	1
Step 2	1	09:00	2
Step 3	1	14:30	3
Step 4	1	18:00	2
Step 5	1	22:15	5
Step 6	2	09:00	3
Step 7	2	18:00	2
Step 8	2	22:15	5
Step 9	3	09:00	3
Step 10	3	18:00	5

Notes:
Program 1 - Monday to Friday
Program 2 - Saturday
Program 3 - Sunday

City of Brantford Engineering Department
Traffic Signal Timing Sheet

Intersection of :

Colborne Street West @ Gilkison Street

Phase	1 WB LT. COLBORNE	2 EB COLBORNE	3	4 NB GILKISON	5	6 WB COLBORNE	7	8 SB GILKISON
Min Green	6	10		7		10		7
Walk		10		10		10		10
Ped Clear		15		17		15		17
h Extensi				3.0				3.0
Max 1	11	30		18		30		18
Max 2	15	35		20		35		20
Amber	3.0	4.0		4.0		4.0		4.0
d Clearan	1.0	2.0		2.0		2.0		2.0
Red Rever	2.0	2.0		2.0		2.0		2.0

Colborne Street West @ Gilkison Street

AM PLAN

Cycle Length	80	CoS	701	Offset	0

Phase 1	10	Phase 2	46	Phase 3		Phase 4	24
Phase 5		Phase 6	56	Phase 7		Phase 8	24

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

OFF PEAK PLAN

Cycle Length	80	CoS	702	Offset	45

Phase 1	10	Phase 2	43	Phase 3		Phase 4	21
Phase 5		Phase 6	53	Phase 7		Phase 8	21

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

PM PEAK PLAN

Cycle Length	90	CoS	703	Offset	76

Phase 1	14	Phase 2	49	Phase 3		Phase 4	27
Phase 5		Phase 6	63	Phase 7		Phase 8	27

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

NIGHT PLAN (STEP 5)

Cycle Length		CoS		Offset	

Phase 1		Phase 2		Phase 3		Phase 4	
Phase 5		Phase 6		Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Time of Days Steps and Patterns

Step	Program	Plan Begins	Plan
Step 1	1	06:00	1
Step 2	1	09:00	2
Step 3	1	14:30	3
Step 4	1	18:00	2
Step 5	1	22:15	5
Step 6	2	09:00	3
Step 7	2	18:00	2
Step 8	2	22:15	5
Step 9	3	09:00	3
Step 10	3	18:00	5

Notes:
Program 1 - Monday to Friday
Program 2 - Saturday
Program 3 - Sunday

City of Brantford Engineering Department
Traffic Signal Timing Sheet

Intersection of :

Colborne Street West @ Mount Pleasant Street

Phase	1 WB LT. COLBORNE	2 EB COLBORNE	3	4 NB MT PLEASANT	5	6 WB COLBORNE	7	8 SB PLAZA
Min Green	6	10		7		10		7
Walk		7		7		7		7
Ped Clear		14		12		14		12
h Extensi				3.0				3.0
Max 1	11	30		18		30		18
Max 2	15	35		20		35		20
Amber	3.0	4.0		4.0		4.0		4.0
d Clearan	1.0	2.0		2.0		2.0		2.0
Red Rever	2.0	2.0		2.0		2.0		2.0

Colborne Street West @ Mount Pleasant Street

AM PLAN

Cycle Length	80	CoS	701	Offset	35

Phase 1	10	Phase 2	48	Phase 3		Phase 4	22
Phase 5		Phase 6	58	Phase 7		Phase 8	22

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

OFF PEAK PLAN

Cycle Length	80	CoS	702	Offset	42

Phase 1	10	Phase 2	47	Phase 3		Phase 4	23
Phase 5		Phase 6	57	Phase 7		Phase 8	23

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

PM PEAK PLAN

Cycle Length	90	CoS	703	Offset	16

Phase 1	10	Phase 2	52	Phase 3		Phase 4	28
Phase 5		Phase 6	62	Phase 7		Phase 8	28

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

NIGHT PLAN (STEP 5)

Cycle Length		CoS		Offset	

Phase 1		Phase 2		Phase 3		Phase 4	
Phase 5		Phase 6		Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Time of Days Steps and Patterns

Step	Program	Plan Begins	Plan
Step 1	1	06:00	1
Step 2	1	09:00	2
Step 3	1	14:30	3
Step 4	1	18:00	2
Step 5	1	22:15	5
Step 6	2	09:00	3
Step 7	2	18:00	2
Step 8	2	22:15	5
Step 9	3	09:00	3
Step 10	3	18:00	5

Notes:
Program 1 - Monday to Friday
Program 2 - Saturday
Program 3 - Sunday

CITY OF BRANTFORD ENGINEERING DEPARTMENT
TRAFFIC SIGNAL TIMING SHEET

INTERSECTION OF ICOMM DRIVE @ MARKET STREET

PHASE	1 **WB L.T. Icomm**	2 **WB Icomm**	3	4 **NB Market**	5	6 **EB Icomm**		8 **SB Parkade**
MIN GREEN	7	10		7		10		7
WALK		7		7		7		7
PED CLEAR		10		10		10		10
VEH EXTENSION				3.0				3.0
MAX 1	7	30		18		30		18
MAX 2		35		20		35		20
AMBER	3.0	4.0		4.0		4.0		4.0
RED CLEARANCE	1.0	2.0		2.0		2.0		2.0

ICOMM DRIVE @ MARKET STREET

AM PLAN

Cycle Length	80	CoS	701	Offset	40

Phase 1		Phase 2	40	Phase 3		Phase 4	40
Phase 5		Phase 6	40	Phase 7		Phase 8	40

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

OFF PEAK PLAN

Cycle Length	80	CoS	702	Offset	41

Phase 1		Phase 2	47	Phase 3		Phase 4	33
Phase 5		Phase 6	47	Phase 7		Phase 8	33

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

PM PEAK PLAN (STEP 3)

Cycle Length	90	CoS	703	Offset	49

Phase 1	12	Phase 2	33	Phase 3		Phase 4	45
Phase 5		Phase 6	45	Phase 7		Phase 8	45

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

NIGHT PLAN (STEP 5)

Cycle Length		CoS		Offset	

Phase 1		Phase 2		Phase 3		Phase 4	
Phase 5		Phase 6		Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Time of Days Steps and Patterns

Step	Program	Plan Begins	Plan
Step 1	1	06:00	1
Step 2	1	09:00	2
Step 3	1	14:30	3
Step 4	1	18:00	2
Step 5	1	22:15	5
Step 6	2	09:00	3
Step 7	2	18:00	2
Step 8	2	22:00	5
Step 9	3	09:00	3
Step 10	3	18:00	5

Notes:
Program 1 - Monday to Friday
Program 2 - Saturday
Program 3 - Sunday

City of Brantford Engineering Department
Traffic Signal Timing Sheet

Intersection of :

Veterans Memorial Parkway @ Mount Pleasant Street

Phase	1	2 NB V.M.P.	3 WB LT MT PLEASANT	4 EB MT PLEASANT	5 NB LT V.M.P.	6 SB V.M.P	7 EB LT MT PLEASANT	8 WB MT PLEASANT
Min Green		10	7	7	7	10	7	7
Walk		7		7		7		7
Ped Clear		21		20		21		20
Veh Extension			3.0	3.0	3.0		3.0	3.0
Max 1		30	11	18	11	15	11	18
Max 2		30	12	20	15	20	12	20
Amber		4.0	3.0	4.0	3.0	4.0	3.0	4.0
Red Clearance		2.0	1.0	2.0	1.0	2.0	1.0	2.0
Red Revert		2.0	2.0	2.0	2.0	2.0	2.0	2.0

- Inhibit Max Enabled

Veterans Memorial Parkway @ Mount Pleasant Street

AM Plan (Step 1)

Cycle Length	90	CoS	701	Offset	40

Phase 1		Phase 2	48	Phase 3	11	Phase 4	31
Phase 5	13	Phase 6	35	Phase 7	11	Phase 8	31

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Off Peak Plan (Step 2)

Cycle Length	80	CoS	702	Offset	3

Phase 1		Phase 2	48	Phase 3		Phase 4	32
Phase 5		Phase 6	48	Phase 7		Phase 8	32

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

PM PEAK PLAN (STEP 3)

Cycle Length	90	CoS	703	Offset	5

Phase 1		Phase 2	57	Phase 3	11	Phase 4	25
Phase 5	16	Phase 6	41	Phase 7	11	Phase 8	25

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

NIGHT PLAN (STEP 5)

Cycle Length		CoS		Offset	

Phase 1		Phase 2		Phase 3		Phase 4	
Phase 5		Phase 6		Phase 7		Phase 8	

Phase	1	2	3	4	5	6	7	8
Coordinated								
Vehicle Recall								
Vehicle Max Recall								
Pedestrian Recall								

Time of Days Steps and Patterns

Step	Program	Plan Begins	Plan
Step 1	1	06:00	1
Step 2	1	09:00	2
Step 3	1	14:30	3
Step 4	1	18:00	2
Step 5	1	22:00	5
Step 6	2	09:00	3
Step 7	2	18:00	2
Step 8	2	22:00	5
Step 9	3	09:00	3
Step 10	3	18:00	5

Notes:
Program 1 - Monday to Friday
Program 2 - Saturday
Program 3 - Sunday

Appendix B

Base Year Traffic Operations Reports

Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	585	78	148	324	65	67	211	289	54	150	50
Future Volume (vph)	90	585	78	148	324	65	67	211	289	54	150	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	70.0			70.0			85.0			50.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor			0.99	1.00			1.00		0.98	0.99	1.00	
Frt			0.850			0.850			0.850		0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3505	1553	1671	3406	1583	1626	3471	1568	1736	3361	0
Flt Permitted	0.497			0.410			0.616			0.609		
Satd. Flow (perm)	874	3505	1533	721	3406	1583	1051	3471	1534	1105	3361	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			85			133			282		50	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		260.6			217.6			319.9			889.7	
Travel Time (s)		13.4			11.2			23.0			64.1	
Confl. Peds. (#/hr)			1	1			5		10	10		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	3%	4%	8%	6%	2%	11%	4%	3%	4%	4%	0%
Adj. Flow (vph)	98	636	85	161	352	71	73	229	314	59	163	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	636	85	161	352	71	73	229	314	59	217	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												
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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	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	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	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	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	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	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	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	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	

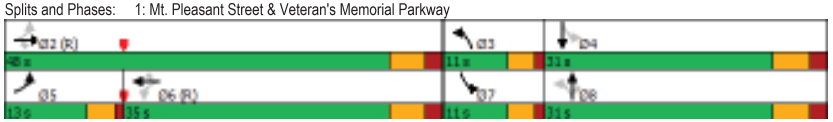
Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	6	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	11.0	34.0	34.0	34.0	34.0	34.0	11.0	33.0	33.0	11.0	33.0	
Total Split (s)	13.0	48.0	48.0	35.0	35.0	35.0	11.0	31.0	31.0	11.0	31.0	
Total Split (%)	14.4%	53.3%	53.3%	38.9%	38.9%	38.9%	12.2%	34.4%	34.4%	12.2%	34.4%	
Maximum Green (s)	9.0	42.0	42.0	29.0	29.0	29.0	7.0	25.0	25.0	7.0	25.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		21.0	21.0	21.0	21.0	21.0		20.0	20.0		20.0	
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	
Act Effct Green (s)	59.1	57.1	57.1	47.3	47.3	47.3	19.7	12.1	12.1	19.7	12.1	
Actuated g/C Ratio	0.66	0.63	0.63	0.53	0.53	0.53	0.22	0.13	0.13	0.22	0.13	
v/c Ratio	0.15	0.29	0.08	0.43	0.20	0.08	0.27	0.49	0.70	0.20	0.44	
Control Delay	7.9	8.9	2.5	22.0	14.3	0.5	25.9	38.9	15.1	24.6	29.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.9	8.9	2.5	22.0	14.3	0.5	25.9	38.9	15.1	24.6	29.3	
LOS	A	A	A	C	B	A	C	D	B	C	C	
Approach Delay		8.1			14.7			25.3			28.3	
Approach LOS		A			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 40 (44%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 16.8		Intersection LOS: B	
Intersection Capacity Utilization 66.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Mt. Pleasant Street & Veteran's Memorial Parkway



Queues
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	98	636	85	161	352	71	73	229	314	59	217
v/c Ratio	0.15	0.29	0.08	0.43	0.20	0.08	0.27	0.49	0.70	0.20	0.44
Control Delay	7.9	8.9	2.5	22.0	14.3	0.5	25.9	38.9	15.1	24.6	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	8.9	2.5	22.0	14.3	0.5	25.9	38.9	15.1	24.6	29.3
Queue Length 50th (m)	6.1	25.7	0.0	18.3	18.2	0.0	10.1	20.8	5.3	8.1	14.9
Queue Length 95th (m)	15.2	43.7	6.5	46.2	33.5	1.1	18.7	29.4	28.7	15.7	23.6
Internal Link Dist (m)		236.6			193.6			295.9			865.7
Turn Bay Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0	
Base Capacity (vph)	655	2223	1003	378	1789	894	274	964	629	291	969
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.29	0.08	0.43	0.20	0.08	0.27	0.24	0.50	0.20	0.22

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	585	78	148	324	65	67	211	289	54	150	50
Future Volume (vph)	90	585	78	148	324	65	67	211	289	54	150	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1671	3505	1533	1671	3406	1583	1623	3471	1534	1728	3360	
Flt Permitted	0.50	1.00	1.00	0.41	1.00	1.00	0.62	1.00	1.00	0.61	1.00	
Satd. Flow (perm)	875	3505	1533	722	3406	1583	1052	3471	1534	1108	3360	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	636	85	161	352	71	73	229	314	59	163	54
RTOR Reduction (vph)	0	0	32	0	0	35	0	0	244	0	43	0
Lane Group Flow (vph)	98	636	53	161	352	36	73	229	70	59	174	0
Confl. Peds. (#/hr)			1	1			5		10	10		5
Heavy Vehicles (%)	8%	3%	4%	8%	6%	2%	11%	4%	3%	4%	4%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	56.3	56.3	56.3	45.7	45.7	45.7	17.7	12.1	12.1	17.7	12.1	
Effective Green, g (s)	56.3	56.3	56.3	45.7	45.7	45.7	17.7	12.1	12.1	17.7	12.1	
Actuated g/C Ratio	0.63	0.63	0.63	0.51	0.51	0.51	0.20	0.13	0.13	0.20	0.13	
Clearance Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	605	2192	958	366	1729	803	242	466	206	256	451	
v/s Ratio Prot	0.01	c0.18			0.10		c0.02	c0.07		0.01	0.05	
v/s Ratio Perm	0.09		0.03	c0.22		0.02	0.04		0.05	0.03		
v/c Ratio	0.16	0.29	0.06	0.44	0.20	0.04	0.30	0.49	0.34	0.23	0.39	
Uniform Delay, d1	6.8	7.7	6.5	14.0	12.2	11.2	30.4	36.1	35.3	30.1	35.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3	0.1	3.8	0.3	0.1	0.7	0.8	1.0	0.5	0.5	
Delay (s)	6.9	8.0	6.6	17.8	12.4	11.3	31.1	36.9	36.3	30.5	36.1	
Level of Service	A	A	A	B	B	B	C	D	D	C	D	
Approach Delay (s)		7.8			13.8			35.9			34.9	
Approach LOS		A			B			D			C	

Intersection Summary				
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	66.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	664	7	149	404	0	12	3	247	2	1	5
Future Volume (vph)	2	664	7	149	404	0	12	3	247	2	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00		1.00	0.98			0.99	
Frt		0.998						0.852			0.916	
Flt Protected					0.987		0.950				0.988	
Satd. Flow (prot)	0	3460	0	0	3387	0	1656	1519	0	0	1704	0
Flt Permitted		0.954			0.633		0.752				0.426	
Satd. Flow (perm)	0	3301	0	0	2170	0	1308	1519	0	0	734	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2						268			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		277.2			409.8			889.7			110.5	
Travel Time (s)		20.0			29.5			64.1			8.0	
Confl. Peds. (#/hr)	4		10	10		4	2		3	3		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	14%	3%	6%	0%	9%	0%	5%	0%	0%	0%
Adj. Flow (vph)	2	722	8	162	439	0	13	3	268	2	1	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	732	0	0	601	0	13	271	0	0	8	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)		0.0			0.0			7.2			7.2	
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												
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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0		10.0	27.0		25.0	25.0		25.0	25.0	
Total Split (s)	48.0	48.0		10.0	58.0		22.0	22.0		22.0	22.0	
Total Split (%)	60.0%	60.0%		12.5%	72.5%		27.5%	27.5%		27.5%	27.5%	
Maximum Green (s)	42.0	42.0		6.0	52.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0			14.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		59.1			59.1		8.9	8.9			8.9	
Actuated g/C Ratio		0.74			0.74		0.11	0.11			0.11	
v/c Ratio		0.30			0.38		0.09	0.67			0.09	
Control Delay		4.2			2.5		31.2	13.2			24.0	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		4.2			2.5		31.2	13.2			24.0	
LOS		A			A		C	B			C	
Approach Delay		4.2			2.5			14.0			24.0	
Approach LOS		A			A			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 35 (44%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 5.4		Intersection LOS: A	
Intersection Capacity Utilization 65.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Mt. Pleasant Street/Plaza & Colborne Street West

Queues
2: Mt. Pleasant Street/Plaza & Colborne Street West

Base Year: AM Peak Hour

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	732	601	13	271	8
v/c Ratio	0.30	0.38	0.09	0.67	0.09
Control Delay	4.2	2.5	31.2	13.2	24.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	2.5	31.2	13.2	24.0
Queue Length 50th (m)	14.2	0.3	2.0	0.5	0.5
Queue Length 95th (m)	30.8	0.9	6.6	20.5	4.1
Internal Link Dist (m)	253.2	385.8		865.7	86.5
Turn Bay Length (m)					
Base Capacity (vph)	2438	1602	261	518	150
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.38	0.05	0.52	0.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Mt. Pleasant Street/Plaza & Colborne Street West

Base Year: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	664	7	149	404	0	12	3	247	2	1	5
Future Volume (vph)	2	664	7	149	404	0	12	3	247	2	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.98			0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	
Frt		1.00			1.00		1.00	0.85			0.92	
Flt Protected		1.00			0.99		0.95	1.00			0.99	
Satd. Flow (prot)		3461			3382		1652	1518			1702	
Flt Permitted		0.95			0.63		0.75	1.00			0.43	
Satd. Flow (perm)		3303			2171		1308	1518			733	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	722	8	162	439	0	13	3	268	2	1	5
RTOR Reduction (vph)	0	1	0	0	0	0	0	238	0	0	4	0
Lane Group Flow (vph)	0	731	0	0	601	0	13	33	0	0	4	0
Confl. Peds. (#/hr)	4		10	10		4	2		3	3		2
Heavy Vehicles (%)	0%	4%	14%	3%	6%	0%	9%	0%	5%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		59.1			59.1		8.9	8.9			8.9	
Effective Green, g (s)		59.1			59.1		8.9	8.9			8.9	
Actuated g/C Ratio		0.74			0.74		0.11	0.11			0.11	
Clearance Time (s)		6.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2440			1603		145	168			81	
v/s Ratio Prot								c0.02				
v/s Ratio Perm		0.22			c0.28		0.01				0.00	
v/c Ratio		0.30			0.37		0.09	0.20			0.04	
Uniform Delay, d1		3.5			3.8		31.9	32.3			31.8	
Progression Factor		1.00			0.45		1.00	1.00			1.00	
Incremental Delay, d2		0.3			0.1		0.3	0.6			0.2	
Delay (s)		3.8			1.8		32.2	32.9			32.0	
Level of Service		A			A		C	C			C	
Approach Delay (s)		3.8			1.8			32.8			32.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

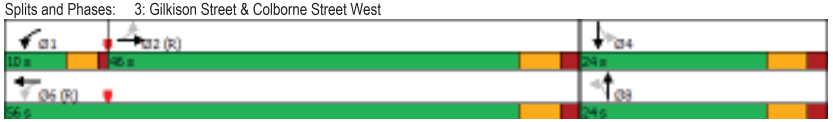
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	931	2	81	599	44	9	9	182	66	2	3
Future Volume (vph)	3	931	2	81	599	44	9	9	182	66	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00			0.98			1.00	
Frt					0.991			0.877			0.995	
Flt Protected					0.994			0.998			0.955	
Satd. Flow (prot)	0	3468	0	0	3377	0	0	1400	0	0	1560	0
Flt Permitted		0.953			0.694			0.983			0.408	
Satd. Flow (perm)	0	3305	0	0	2357	0	0	1379	0	0	664	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					16			198			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			139.0			106.4			116.6	
Travel Time (s)		29.5			10.0			7.7			8.4	
Confl. Peds. (#/hr)	16		15	15		16	4		7	7		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	50%	5%	5%	5%	0%	13%	5%	3%	50%	0%
Parking (#/hr)								0			0	
Adj. Flow (vph)	3	1012	2	88	651	48	10	10	198	72	2	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1017	0	0	787	0	0	218	0	0	77	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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.14	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		10.0	31.0		33.0	33.0		33.0	33.0	
Total Split (s)	46.0	46.0		10.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	57.5%	57.5%		12.5%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	40.0	40.0		6.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		Max	C-Max		None	None		None	None	
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0			15.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		40.0			55.4			12.6			12.6	
Actuated g/C Ratio		0.50			0.69			0.16			0.16	
v/c Ratio		0.62			0.45			0.57			0.73	
Control Delay		21.1			6.0			12.1			66.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		21.1			6.0			12.1			66.2	
LOS		C			A			B			E	
Approach Delay		21.1			6.0			12.1			66.2	
Approach LOS		C			A			B			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 89.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Gilkison Street & Colborne Street West



Queues
3: Gilkison Street & Colborne Street West

Base Year: AM Peak Hour

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	1017	787	218	77
v/c Ratio	0.62	0.45	0.57	0.73
Control Delay	21.1	6.0	12.1	66.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.1	6.0	12.1	66.2
Queue Length 50th (m)	74.7	20.2	2.8	11.6
Queue Length 95th (m)	91.3	35.5	20.6	#27.3
Internal Link Dist (m)	385.8	115.0	82.4	92.6
Turn Bay Length (m)				
Base Capacity (vph)	1652	1757	463	150
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.45	0.47	0.51

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

HCM Signalized Intersection Capacity Analysis
3: Gilkison Street & Colborne Street West

Base Year: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	931	2	81	599	44	9	9	182	66	2	3
Future Volume (vph)	3	931	2	81	599	44	9	9	182	66	2	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.98			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.88			0.99	
Flt Protected		1.00			0.99			1.00			0.96	
Satd. Flow (prot)		3467			3377			1400			1554	
Flt Permitted		0.95			0.69			0.98			0.41	
Satd. Flow (perm)		3305			2357			1380			664	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1012	2	88	651	48	10	10	198	72	2	3
RTOR Reduction (vph)	0	0	0	0	5	0	0	167	0	0	2	0
Lane Group Flow (vph)	0	1017	0	0	782	0	0	51	0	0	75	0
Confl. Peds. (#/hr)	16		15	15		16	4		7	7		4
Heavy Vehicles (%)	0%	4%	50%	5%	5%	5%	0%	13%	5%	3%	50%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		40.0			55.4			12.6			12.6	
Effective Green, g (s)		40.0			55.4			12.6			12.6	
Actuated g/C Ratio		0.50			0.69			0.16			0.16	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1652			1777			217			104	
v/s Ratio Prot					c0.06							
v/s Ratio Perm		c0.31			0.24			0.04			c0.11	
v/c Ratio		0.62			0.44			0.24			0.72	
Uniform Delay, d1		14.4			5.4			29.5			32.0	
Progression Factor		1.32			0.94			1.00			1.00	
Incremental Delay, d2		1.6			0.7			0.6			21.9	
Delay (s)		20.7			5.8			30.1			54.0	
Level of Service		C			A			C			D	
Approach Delay (s)		20.7			5.8			30.1			54.0	
Approach LOS		C			A			C			D	

Intersection Summary					
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	89.5%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
4: Colborne Street West & Ballantyne Drive

Base Year: AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1177	724	120	0	0
Future Volume (vph)	0	1177	724	120	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.979			
Flt Protected						
Satd. Flow (prot)	0	3610	3534	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	3610	3534	0	0	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		139.0	290.1		218.0	
Travel Time (s)		10.0	20.9		15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1279	787	130	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1279	917	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Colborne Street West & Ballantyne Drive

Base Year: AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1177	724	120	0	0
Future Volume (Veh/h)	0	1177	724	120	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1279	787	130	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		139	290			
pX, platoon unblocked					0.79	
vC, conflicting volume	917				1492	458
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	917				1094	458
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	752				167	555

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	640	640	525	392
Volume Left	0	0	0	0
Volume Right	0	0	0	130
cSH	1700	1700	1700	1700
Volume to Capacity	0.38	0.38	0.31	0.23
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

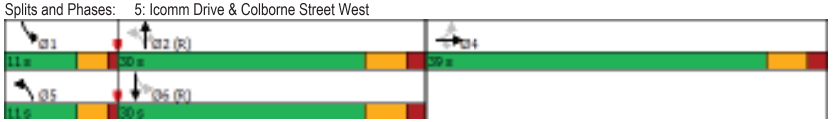
Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		35.9%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	869	261	47	0	0	0	46	286	22	118	280	798
Future Volume (vph)	869	261	47	0	0	0	46	286	22	118	280	798
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	200.0		5.0	0.0		0.0	115.0		215.0	25.0		0.0
Storage Lanes	1		1	0		0	1		1	1		1
Taper Length (m)	25.0			7.5			25.0			25.0		
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00
Ped Bike Factor	0.99	1.00	0.98				0.99		0.98		1.00	0.99
Frt			0.850						0.850			0.850
Flt Protected	0.950	0.970					0.950				0.985	
Satd. Flow (prot)	1579	3225	1455	0	0	0	1612	3406	1615	0	3266	1568
Flt Permitted	0.950	0.970					0.408				0.751	
Satd. Flow (perm)	1569	3212	1419	0	0	0	688	3406	1582	0	2486	1545
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95						95			867
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		290.1			441.2			487.2			182.2	
Travel Time (s)		20.9			31.8			35.1			13.1	
Confl. Peds. (#/hr)	9		17	17		9	10		9	9		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	11%	0%	0%	0%	12%	6%	0%	11%	8%	3%
Adj. Flow (vph)	945	284	51	0	0	0	50	311	24	128	304	867
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	472	757	51	0	0	0	50	311	24	0	432	867
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												
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				1	2	1	1	2	1
Detector Template	Left	Thru	Right				Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0				2.0	10.0	2.0	2.0	10.0	2.0
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				2.0	0.6	2.0	2.0	0.6	2.0
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	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm				pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4				2		2	6		Free
Detector Phase	4	4	4				5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0				7.0	10.0	10.0	7.0	10.0	
Minimum Split (s)	38.0	38.0	38.0				11.0	31.0	31.0	11.0	31.0	
Total Split (s)	39.0	39.0	39.0				11.0	30.0	30.0	11.0	30.0	
Total Split (%)	48.8%	48.8%	48.8%				13.8%	37.5%	37.5%	13.8%	37.5%	
Maximum Green (s)	33.0	33.0	33.0				7.0	24.0	24.0	7.0	24.0	
Yellow Time (s)	4.0	4.0	4.0				3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0				1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0				0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	6.0				4.0	6.0	6.0		6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0	3.0	3.0	3.0	
Recall Mode	Max	Max	Max				None	C-Max	C-Max	None	C-Max	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	25.0	25.0	25.0					18.0	18.0		18.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	33.0	33.0	33.0				37.0	35.0	35.0		28.4	80.0
Actuated g/C Ratio	0.41	0.41	0.41				0.46	0.44	0.44		0.36	1.00
v/c Ratio	0.73	0.57	0.08				0.13	0.21	0.03		0.49	0.56
Control Delay	28.7	22.8	4.6				10.6	12.7	1.0		23.9	1.5
Queue Delay	0.0	0.0	0.0				0.0	0.0	0.0		0.0	0.0
Total Delay	28.7	22.8	4.6				10.6	12.7	1.0		23.9	1.5
LOS	C	C	A				B	B	A		C	A
Approach Delay		24.3						11.7			8.9	
Approach LOS		C						B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 60 (75%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 15.9		Intersection LOS: B	
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Icomm Drive & Colborne Street West



Queues
5: Icomm Drive & Colborne Street West

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	472	757	51	50	311	24	432	867
v/c Ratio	0.73	0.57	0.08	0.13	0.21	0.03	0.49	0.56
Control Delay	28.7	22.8	4.6	10.6	12.7	1.0	23.9	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	22.8	4.6	10.6	12.7	1.0	23.9	1.5
Queue Length 50th (m)	52.3	41.6	0.4	5.6	22.9	0.2	30.5	0.0
Queue Length 95th (m)	84.7	62.4	m2.2	9.8	25.1	m0.9	45.7	0.0
Internal Link Dist (m)		266.1			463.2		158.2	
Turn Bay Length (m)	200.0		5.0	115.0		215.0		
Base Capacity (vph)	647	1324	641	399	1490	745	882	1545
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.57	0.08	0.13	0.21	0.03	0.49	0.56

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

HCM Signalized Intersection Capacity Analysis
5: Icomm Drive & Colborne Street West

Base Year: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	869	261	47	0	0	0	46	286	22	118	280	798
Future Volume (vph)	869	261	47	0	0	0	46	286	22	118	280	798
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0				4.0	6.0	6.0		6.0	4.0
Lane Util. Factor	0.91	0.91	1.00				1.00	0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98				1.00	1.00	0.98		1.00	0.99
Flpb, ped/bikes	0.99	1.00	1.00				1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85				1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	0.97	1.00				0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1569	3211	1419				1609	3406	1582		3261	1545
Flt Permitted	0.95	0.97	1.00				0.41	1.00	1.00		0.75	1.00
Satd. Flow (perm)	1569	3211	1419				691	3406	1582		2487	1545
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	945	284	51	0	0	0	50	311	24	128	304	867
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	14	0	0	0
Lane Group Flow (vph)	472	757	21	0	0	0	50	311	11	0	432	867
Confl. Peds. (#/hr)	9		17	17		9	10		9	9		10
Heavy Vehicles (%)	4%	4%	11%	0%	0%	0%	12%	6%	0%	11%	8%	3%
Turn Type	Perm	NA	Perm				pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4				2		2	6		Free
Actuated Green, G (s)	33.0	33.0	33.0				35.0	35.0	35.0		26.8	80.0
Effective Green, g (s)	33.0	33.0	33.0				35.0	35.0	35.0		26.8	80.0
Actuated g/C Ratio	0.41	0.41	0.41				0.44	0.44	0.44		0.34	1.00
Clearance Time (s)	6.0	6.0	6.0				4.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	647	1324	585				350	1490	692		833	1545
v/s Ratio Prot							0.01	0.09				
v/s Ratio Perm	c0.30	0.24	0.01				0.05		0.01		0.17	c0.56
v/c Ratio	0.73	0.57	0.04				0.14	0.21	0.02		0.52	0.56
Uniform Delay, d1	19.7	18.1	14.0				13.3	13.9	12.7		21.4	0.0
Progression Factor	1.11	1.16	4.92				0.82	0.88	1.00		1.00	1.00
Incremental Delay, d2	5.8	1.5	0.1				0.2	0.3	0.0		0.5	1.5
Delay (s)	27.7	22.4	69.1				11.1	12.5	12.8		22.0	1.5
Level of Service	C	C	E				B	B	B		C	A
Approach Delay (s)		26.2			0.0			12.4			8.3	
Approach LOS		C			A			B			A	

Intersection Summary					
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.74				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	87.4%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	118	190	45	139	24	223	5	45	1	3	4
Future Volume (vph)	13	118	190	45	139	24	223	5	45	1	3	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		60.0	125.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	35.0			25.0			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor			0.99	1.00			0.99	0.96			0.99	
Frt			0.850		0.978			0.864			0.925	
Flt Protected	0.950			0.950			0.950				0.994	
Satd. Flow (prot)	1805	3223	1495	1805	3305	0	1736	1514	0	0	3281	0
Flt Permitted	0.640			0.671			0.752				0.937	
Satd. Flow (perm)	1216	3223	1473	1272	3305	0	1359	1514	0	0	3083	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207		26			49			693	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		487.2			250.0			115.0			104.0	
Travel Time (s)		35.1			18.0			8.3			7.5	
Confl. Peds. (#/hr)			2	2			8		20	20		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	12%	8%	0%	8%	0%	4%	0%	5%	0%	0%	0%
Adj. Flow (vph)	14	128	207	49	151	26	242	5	49	1	3	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	128	207	49	177	0	242	54	0	0	8	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												
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	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		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	2.0	0.6		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	

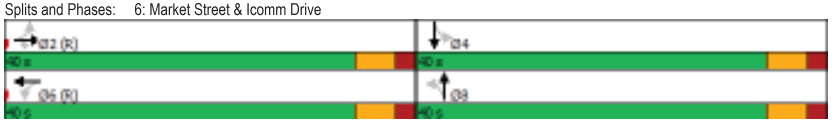
Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	34.0	34.0	34.0	34.0	34.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	48.2	48.2	48.2	48.2	48.2		19.8	19.8			19.8	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.25	0.25			0.25	
v/c Ratio	0.02	0.07	0.21	0.06	0.09		0.72	0.13			0.01	
Control Delay	9.2	9.5	8.5	7.4	5.6		38.9	7.7			0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	9.2	9.5	8.5	7.4	5.6		38.9	7.7			0.0	
LOS	A	A	A	A	A		D	A			A	
Approach Delay		8.9			6.0			33.2				
Approach LOS		A			A			C				

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 40 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 16.3		Intersection LOS: B	
Intersection Capacity Utilization 45.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Market Street & Icomm Drive



Queues
6: Market Street & Icomm Drive

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	14	128	207	49	177	242	54	8
v/c Ratio	0.02	0.07	0.21	0.06	0.09	0.72	0.13	0.01
Control Delay	9.2	9.5	8.5	7.4	5.6	38.9	7.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	9.5	8.5	7.4	5.6	38.9	7.7	0.0
Queue Length 50th (m)	1.0	5.7	20.8	2.3	3.5	35.4	0.6	0.0
Queue Length 95th (m)	m3.9	17.6	43.9	8.0	9.6	52.9	7.9	0.0
Internal Link Dist (m)		463.2			226.0		91.0	80.0
Turn Bay Length (m)	65.0		60.0	125.0				
Base Capacity (vph)	732	1940	969	766	2000	577	671	1708
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.21	0.06	0.09	0.42	0.08	0.00

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
6: Market Street & Icomm Drive

Base Year: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	118	190	45	139	24	223	5	45	1	3	4
Future Volume (vph)	13	118	190	45	139	24	223	5	45	1	3	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00			0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.96			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.86			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1805	3223	1473	1801	3305		1716	1514			3269	
Flt Permitted	0.64	1.00	1.00	0.67	1.00		0.75	1.00			0.94	
Satd. Flow (perm)	1216	3223	1473	1272	3305		1359	1514			3084	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	128	207	49	151	26	242	5	49	1	3	4
RTOR Reduction (vph)	0	0	82	0	10	0	0	37	0	0	6	0
Lane Group Flow (vph)	14	128	125	49	167	0	242	17	0	0	2	0
Confl. Peds. (#/hr)			2	2			8		20	20		8
Heavy Vehicles (%)	0%	12%	8%	0%	8%	0%	4%	0%	5%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	48.2	48.2	48.2	48.2	48.2		19.8	19.8			19.8	
Effective Green, g (s)	48.2	48.2	48.2	48.2	48.2		19.8	19.8			19.8	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.25	0.25			0.25	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	732	1941	887	766	1991		336	374			763	
v/s Ratio Prot		0.04			0.05			0.01				
v/s Ratio Perm	0.01		c0.08	0.04			c0.18				0.00	
v/c Ratio	0.02	0.07	0.14	0.06	0.08		0.72	0.05			0.00	
Uniform Delay, d1	6.4	6.6	6.9	6.6	6.7		27.6	22.9			22.7	
Progression Factor	1.03	1.16	4.70	0.83	0.80		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.3	0.2	0.1		7.4	0.1			0.0	
Delay (s)	6.6	7.7	32.8	5.6	5.4		35.0	23.0			22.7	
Level of Service	A	A	C	A	A		C	C			C	
Approach Delay (s)		22.5			5.4			32.8			22.7	
Approach LOS		C			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.31			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	45.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	106	29	54	88	90	55	884	40	46	480	71
Future Volume (vph)	103	106	29	54	88	90	55	884	40	46	480	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	35.0		30.0	75.0		0.0	105.0		70.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	30.0			35.0			35.0			35.0		
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	1.00
Ped Bike Factor	1.00	1.00		1.00		0.99	0.99	1.00		1.00		0.98
Frt		0.967				0.850		0.994				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	3227	0	1612	3406	1538	1703	3507	0	1770	3505	1568
Flt Permitted	0.692			0.659			0.459			0.264		
Satd. Flow (perm)	1250	3227	0	1113	3406	1516	818	3507	0	492	3505	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				98		9				77
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		250.0			209.3			381.6			258.2	
Travel Time (s)		18.0			15.1			27.5			18.6	
Confl. Peds. (#/hr)	3		7	7		3	17		1	1		17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	8%	7%	12%	6%	5%	6%	2%	8%	2%	3%	3%
Adj. Flow (vph)	112	115	32	59	96	98	60	961	43	50	522	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	147	0	59	96	98	60	1004	0	50	522	77
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												
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	38.0	38.0		38.0	38.0	38.0	43.0	43.0		43.0	43.0	43.0
Total Split (s)	28.0	28.0		28.0	28.0	28.0	52.0	52.0		52.0	52.0	52.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%	35.0%	65.0%	65.0%		65.0%	65.0%	65.0%
Maximum Green (s)	22.0	22.0		22.0	22.0	22.0	46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	25.0	30.0	30.0		30.0	30.0	30.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effct Green (s)	12.5	12.5		12.5	12.5	12.5	55.5	55.5		55.5	55.5	55.5
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.69	0.69		0.69	0.69	0.69
v/c Ratio	0.58	0.28		0.34	0.18	0.31	0.11	0.41		0.15	0.21	0.07
Control Delay	29.5	11.4		33.9	28.4	8.8	5.7	6.4		6.6	5.2	1.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	29.5	11.4		33.9	28.4	8.8	5.7	6.4		6.6	5.2	1.7
LOS	C	B		C	C	A	A	A		A	A	A
Approach Delay		19.2			22.1			6.3			4.9	
Approach LOS		B			C			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 75 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 75.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 7: Clarence Street South & Icomm Drive/Greenwich Street

Queues
7: Clarence Street South & Icomm Drive/Greenwich Street

Base Year: AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	147	59	96	98	60	1004	50	522	77
v/c Ratio	0.58	0.28	0.34	0.18	0.31	0.11	0.41	0.15	0.21	0.07
Control Delay	29.5	11.4	33.9	28.4	8.8	5.7	6.4	6.6	5.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	11.4	33.9	28.4	8.8	5.7	6.4	6.6	5.2	1.7
Queue Length 50th (m)	17.3	3.7	8.5	7.1	0.0	2.7	30.0	2.3	13.2	0.0
Queue Length 95th (m)	15.8	7.5	18.3	12.7	11.6	8.4	52.3	8.0	24.4	4.5
Internal Link Dist (m)		226.0		185.3			357.6		234.2	
Turn Bay Length (m)	75.0		35.0		30.0	75.0		105.0		70.0
Base Capacity (vph)	343	910	306	936	487	567	2436	341	2432	1086
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.16	0.19	0.10	0.20	0.11	0.41	0.15	0.21	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis
7: Clarence Street South & Icomm Drive/Greenwich Street

Base Year: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	106	29	54	88	90	55	884	40	46	480	71
Future Volume (vph)	103	106	29	54	88	90	55	884	40	46	480	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1716	3228		1605	3406	1516	1694	3506		1769	3505	1532
Flt Permitted	0.69	1.00		0.66	1.00	1.00	0.46	1.00		0.26	1.00	1.00
Satd. Flow (perm)	1249	3228		1113	3406	1516	818	3506		492	3505	1532
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	115	32	59	96	98	60	961	43	50	522	77
RTOR Reduction (vph)	0	27	0	0	0	83	0	3	0	0	0	24
Lane Group Flow (vph)	112	120	0	59	96	15	60	1001	0	50	522	53
Confl. Peds. (#/hr)	3		7	7		3	17		1	1		17
Heavy Vehicles (%)	5%	8%	7%	12%	6%	5%	6%	2%	8%	2%	3%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5	12.5	55.5	55.5		55.5	55.5	55.5
Effective Green, g (s)	12.5	12.5		12.5	12.5	12.5	55.5	55.5		55.5	55.5	55.5
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.69	0.69		0.69	0.69	0.69
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	195	504		173	532	236	567	2432		341	2431	1062
v/s Ratio Prot		0.04			0.03			c0.29			0.15	
v/s Ratio Perm	c0.09			0.05		0.01	0.07			0.10		0.03
v/c Ratio	0.57	0.24		0.34	0.18	0.06	0.11	0.41		0.15	0.21	0.05
Uniform Delay, d1	31.3	29.6		30.1	29.3	28.8	4.0	5.3		4.2	4.4	3.9
Progression Factor	0.58	0.46		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.0	0.2		1.2	0.2	0.1	0.4	0.5		0.9	0.2	0.1
Delay (s)	22.3	13.9		31.3	29.5	28.9	4.4	5.8		5.1	4.6	4.0
Level of Service	C	B		C	C	C	A	A		A	A	A
Approach Delay (s)		17.5			29.7			5.7			4.6	
Approach LOS		B			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	75.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	693	98	201	352	6	76	185	335	4	87	3
Future Volume (vph)	16	693	98	201	352	6	76	185	335	4	87	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	85.0		0.0	30.0		30.0	30.0		0.0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (m)	50.0			0.0			40.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00		1.00		0.99	1.00	1.00	
Frt			0.850		0.997				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	1495	1703	3366	0	1671	1863	1553	1805	1819	0
Flt Permitted	0.521			0.302			0.694			0.499		
Satd. Flow (perm)	989	3539	1495	541	3366	0	1220	1863	1531	947	1819	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			107		4				270		2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		353.8			381.6			274.8			143.3	
Travel Time (s)		25.5			27.5			19.8			10.3	
Confl. Peds. (#/hr)	1					1	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	8%	6%	7%	0%	8%	2%	4%	0%	4%	0%
Adj. Flow (vph)	17	753	107	218	383	7	83	201	364	4	95	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	753	107	218	390	0	83	201	364	4	98	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												
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	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	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	2.0	0.6		2.0	0.6	2.0	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	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	0.0	
Detector 1 Queue (s)	0.0	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	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	

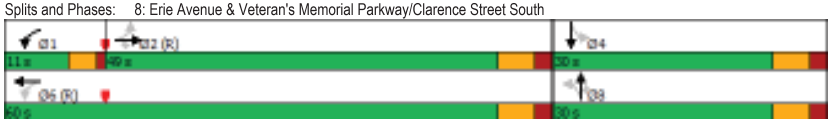
Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	33.0	33.0	33.0	11.0	33.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	49.0	49.0	49.0	11.0	60.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	54.4%	54.4%	54.4%	12.2%	66.7%		33.3%	33.3%	33.3%	33.3%	33.3%	
Maximum Green (s)	43.0	43.0	43.0	7.0	54.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	20.0	20.0	20.0		20.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0	0	0	0	
Act Effct Green (s)	49.8	49.8	49.8	64.2	62.2		15.8	15.8	15.8	15.8	15.8	
Actuated g/C Ratio	0.55	0.55	0.55	0.71	0.69		0.18	0.18	0.18	0.18	0.18	
v/c Ratio	0.03	0.38	0.12	0.44	0.17		0.39	0.61	0.74	0.02	0.31	
Control Delay	11.8	13.1	3.1	8.2	5.7		36.3	41.5	18.9	27.0	32.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	11.8	13.1	3.1	8.2	5.7		36.3	41.5	18.9	27.0	32.3	
LOS	B	B	A	A	A		D	D	B	C	C	
Approach Delay		11.8			6.6			28.1			32.1	
Approach LOS		B			A			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 66 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 61.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South



Queues
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	17	753	107	218	390	83	201	364	4	98
v/c Ratio	0.03	0.38	0.12	0.44	0.17	0.39	0.61	0.74	0.02	0.31
Control Delay	11.8	13.1	3.1	8.2	5.7	36.3	41.5	18.9	27.0	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	13.1	3.1	8.2	5.7	36.3	41.5	18.9	27.0	32.3
Queue Length 50th (m)	1.3	38.1	0.0	10.5	10.7	13.7	34.6	15.4	0.6	15.6
Queue Length 95th (m)	5.2	60.8	8.4	26.0	22.2	24.6	50.4	41.7	3.2	26.5
Internal Link Dist (m)		329.8			357.6		250.8			119.3
Turn Bay Length (m)	50.0		50.0	85.0		30.0		30.0	30.0	
Base Capacity (vph)	547	1958	875	493	2326	325	496	606	252	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.38	0.12	0.44	0.17	0.26	0.41	0.60	0.02	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	693	98	201	352	6	76	185	335	4	87	3
Future Volume (vph)	16	693	98	201	352	6	76	185	335	4	87	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1803	3539	1495	1703	3367		1670	1863	1531	1802	1820	
Flt Permitted	0.52	1.00	1.00	0.30	1.00		0.69	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	990	3539	1495	542	3367		1219	1863	1531	946	1820	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	753	107	218	383	7	83	201	364	4	95	3
RTOR Reduction (vph)	0	0	48	0	1	0	0	0	223	0	2	0
Lane Group Flow (vph)	17	753	59	218	389	0	83	201	141	4	96	0
Confl. Peds. (#/hr)	1					1	1		2	2		1
Heavy Vehicles (%)	0%	2%	8%	6%	7%	0%	8%	2%	4%	0%	4%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	49.8	49.8	49.8	62.2	62.2		15.8	15.8	15.8	15.8	15.8	
Effective Green, g (s)	49.8	49.8	49.8	62.2	62.2		15.8	15.8	15.8	15.8	15.8	
Actuated g/C Ratio	0.55	0.55	0.55	0.69	0.69		0.18	0.18	0.18	0.18	0.18	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	547	1958	827	482	2326		214	327	268	166	319	
v/s Ratio Prot		0.21		c0.04	0.12			c0.11			0.05	
v/s Ratio Perm	0.02		0.04	c0.27			0.07		0.09	0.00		
v/c Ratio	0.03	0.38	0.07	0.45	0.17		0.39	0.61	0.53	0.02	0.30	
Uniform Delay, d1	9.1	11.4	9.3	5.7	4.9		32.8	34.3	33.7	30.7	32.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.6	0.2	0.7	0.2		1.2	3.4	1.9	0.1	0.5	
Delay (s)	9.2	12.0	9.5	6.3	5.0		34.0	37.7	35.6	30.8	32.8	
Level of Service	A	B	A	A	A		C	D	D	C	C	
Approach Delay (s)		11.6			5.5			36.0			32.8	
Approach LOS		B			A			D			C	

Intersection Summary				
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	61.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	483	104	302	603	126	77	155	187	54	182	103
Future Volume (vph)	72	483	104	302	603	126	77	155	187	54	182	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	70.0			70.0			85.0			50.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor			0.98	1.00			0.99		0.98	0.99	0.99	
Frt			0.850			0.850			0.850		0.946	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3539	1599	1787	3574	1599	1736	3539	1583	1805	3359	0
Flt Permitted	0.340			0.457			0.464			0.646		
Satd. Flow (perm)	627	3539	1566	856	3574	1599	839	3539	1552	1220	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113			137			203		111	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		260.6			217.6			319.9			889.7	
Travel Time (s)		13.4			11.2			23.0			64.1	
Confl. Peds. (#/hr)			9	9			16		8	8		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	1%	1%	1%	1%	4%	2%	2%	0%	1%	0%
Adj. Flow (vph)	78	525	113	328	655	137	84	168	203	59	198	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	525	113	328	655	137	84	168	203	59	310	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												
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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	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	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	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	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	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	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	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	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	

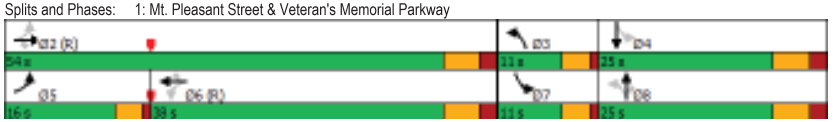
Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	6	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	11.0	34.0	34.0	34.0	34.0	34.0	11.0	33.0	33.0	11.0	33.0	
Total Split (s)	16.0	54.0	54.0	38.0	38.0	38.0	11.0	25.0	25.0	11.0	25.0	
Total Split (%)	17.8%	60.0%	60.0%	42.2%	42.2%	42.2%	12.2%	27.8%	27.8%	12.2%	27.8%	
Maximum Green (s)	12.0	48.0	48.0	32.0	32.0	32.0	7.0	19.0	19.0	7.0	19.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		21.0	21.0	21.0	21.0	21.0		20.0	20.0		20.0	
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	
Act Effct Green (s)	60.4	58.4	58.4	49.1	49.1	49.1	18.4	10.8	10.8	18.4	10.8	
Actuated g/C Ratio	0.67	0.65	0.65	0.55	0.55	0.55	0.20	0.12	0.12	0.20	0.12	
v/c Ratio	0.15	0.23	0.11	0.70	0.34	0.15	0.35	0.40	0.56	0.20	0.62	
Control Delay	7.3	7.7	1.9	29.7	14.1	3.2	29.1	38.6	11.6	34.0	38.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.3	7.7	1.9	29.7	14.1	3.2	29.1	38.6	11.6	34.0	38.6	
LOS	A	A	A	C	B	A	C	D	B	C	D	
Approach Delay		6.8			17.3			24.8			37.9	
Approach LOS		A			B			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 5 (6%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 18.6		Intersection LOS: B	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Mt. Pleasant Street & Veteran's Memorial Parkway



Queues
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	78	525	113	328	655	137	84	168	203	59	310
v/c Ratio	0.15	0.23	0.11	0.70	0.34	0.15	0.35	0.40	0.56	0.20	0.62
Control Delay	7.3	7.7	1.9	29.7	14.1	3.2	29.1	38.6	11.6	34.0	38.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	7.7	1.9	29.7	14.1	3.2	29.1	38.6	11.6	34.0	38.6
Queue Length 50th (m)	4.7	20.0	0.0	45.9	36.4	0.0	11.8	15.1	0.0	9.7	20.1
Queue Length 95th (m)	11.1	31.6	6.7	#105.6	56.2	10.1	22.2	23.9	18.8	m18.1	32.5
Internal Link Dist (m)		236.6			193.6			295.9			865.7
Turn Bay Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0	
Base Capacity (vph)	570	2295	1055	466	1949	934	241	747	487	295	796
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.11	0.70	0.34	0.15	0.35	0.22	0.42	0.20	0.39

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Base Year: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	483	104	302	603	126	77	155	187	54	182	103
Future Volume (vph)	72	483	104	302	603	126	77	155	187	54	182	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3539	1566	1780	3574	1599	1728	3539	1552	1798	3359	
Flt Permitted	0.34	1.00	1.00	0.46	1.00	1.00	0.46	1.00	1.00	0.65	1.00	
Satd. Flow (perm)	627	3539	1566	857	3574	1599	845	3539	1552	1222	3359	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	525	113	328	655	137	84	168	203	59	198	112
RTOR Reduction (vph)	0	0	41	0	0	65	0	0	179	0	98	0
Lane Group Flow (vph)	78	525	72	328	655	72	84	168	24	59	212	0
Confl. Peds. (#/hr)			9	9			16		8	8		16
Heavy Vehicles (%)	3%	2%	1%	1%	1%	1%	4%	2%	2%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	57.6	57.6	57.6	47.5	47.5	47.5	16.4	10.8	10.8	16.4	10.8	
Effective Green, g (s)	57.6	57.6	57.6	47.5	47.5	47.5	16.4	10.8	10.8	16.4	10.8	
Actuated g/C Ratio	0.64	0.64	0.64	0.53	0.53	0.53	0.18	0.12	0.12	0.18	0.12	
Clearance Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	477	2264	1002	452	1886	843	208	424	186	258	403	
v/s Ratio Prot	0.01	c0.15			0.18		c0.03	0.05		0.01	c0.06	
v/s Ratio Perm	0.09		0.05	c0.38		0.05	0.05		0.02	0.03		
v/c Ratio	0.16	0.23	0.07	0.73	0.35	0.09	0.40	0.40	0.13	0.23	0.53	
Uniform Delay, d1	6.5	6.8	6.1	16.3	12.3	10.5	31.7	36.6	35.4	31.1	37.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.34	1.42	
Incremental Delay, d2	0.2	0.2	0.1	9.8	0.5	0.2	1.3	0.6	0.3	0.4	1.2	
Delay (s)	6.7	7.1	6.3	26.0	12.8	10.7	32.9	37.2	35.7	42.2	54.1	
Level of Service	A	A	A	C	B	B	C	D	D	D	D	
Approach Delay (s)		6.9			16.4			35.8			52.2	
Approach LOS		A			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	78.8%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	653	7	210	693	1	31	3	207	1	4	1
Future Volume (vph)	1	653	7	210	693	1	31	3	207	1	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00		0.99	0.98			1.00	
Frt		0.998						0.852			0.977	
Flt Protected					0.989		0.950				0.992	
Satd. Flow (prot)	0	3498	0	0	3474	0	1752	1547	0	0	1836	0
Flt Permitted		0.954			0.648		0.754				0.558	
Satd. Flow (perm)	0	3337	0	0	2272	0	1381	1547	0	0	1032	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2						225			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		277.2			409.8			889.7			110.5	
Travel Time (s)		20.0			29.5			64.1			8.0	
Confl. Peds. (#/hr)	16		22	22		16	5		3	3		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	2%	3%	0%	3%	0%	3%	0%	0%	0%
Adj. Flow (vph)	1	710	8	228	753	1	34	3	225	1	4	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	719	0	0	982	0	34	228	0	0	6	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)		0.0			0.0			7.2			7.2	
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												
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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0		10.0	27.0		25.0	25.0		25.0	25.0	
Total Split (s)	52.0	52.0		10.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	57.8%	57.8%		11.1%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	46.0	46.0		6.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0			14.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		69.1			69.1		8.9	8.9			8.9	
Actuated g/C Ratio		0.77			0.77		0.10	0.10			0.10	
v/c Ratio		0.28			0.56		0.25	0.64			0.06	
Control Delay		3.6			1.1		39.5	22.3			33.7	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		3.6			1.1		39.5	22.3			33.7	
LOS		A			A		D	C			C	
Approach Delay		3.6			1.1			24.6			33.7	
Approach LOS		A			A			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 16 (18%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 5.2		Intersection LOS: A	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Mt. Pleasant Street/Plaza & Colborne Street West

Queues
2: Mt. Pleasant Street/Plaza & Colborne Street West

Base Year: PM Peak Hour

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	719	982	34	228	6
v/c Ratio	0.28	0.56	0.25	0.64	0.06
Control Delay	3.6	1.1	39.5	22.3	33.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	1.1	39.5	22.3	33.7
Queue Length 50th (m)	14.5	1.8	6.3	0.0	0.9
Queue Length 95th (m)	28.3	m2.0	15.8	34.0	4.3
Internal Link Dist (m)	253.2	385.8		865.7	86.5
Turn Bay Length (m)					
Base Capacity (vph)	2562	1744	337	548	253
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.56	0.10	0.42	0.02

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

HCM Signalized Intersection Capacity Analysis
2: Mt. Pleasant Street/Plaza & Colborne Street West

Base Year: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	653	7	210	693	1	31	3	207	1	4	1
Future Volume (vph)	1	653	7	210	693	1	31	3	207	1	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.98			1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00			1.00	
Frt		1.00			1.00		1.00	0.85			0.98	
Flt Protected		1.00			0.99		0.95	1.00			0.99	
Satd. Flow (prot)		3498			3463		1740	1547			1835	
Flt Permitted		0.95			0.65		0.75	1.00			0.56	
Satd. Flow (perm)		3339			2271		1381	1547			1033	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	710	8	228	753	1	34	3	225	1	4	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	203	0	0	1	0
Lane Group Flow (vph)	0	719	0	0	982	0	34	25	0	0	5	0
Confl. Peds. (#/hr)	16		22	22		16	5		3	3		5
Heavy Vehicles (%)	0%	3%	0%	2%	3%	0%	3%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		69.1			69.1		8.9	8.9			8.9	
Effective Green, g (s)		69.1			69.1		8.9	8.9			8.9	
Actuated g/C Ratio		0.77			0.77		0.10	0.10			0.10	
Clearance Time (s)		6.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2563			1743		136	152			102	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.22			c0.43		c0.02				0.00	
v/c Ratio		0.28			0.56		0.25	0.17			0.05	
Uniform Delay, d1		3.1			4.3		37.5	37.2			36.7	
Progression Factor		1.00			0.09		0.96	2.38			1.00	
Incremental Delay, d2		0.3			0.2		1.0	0.5			0.2	
Delay (s)		3.4			0.6		37.1	89.0			36.9	
Level of Service		A			A		D	F			D	
Approach Delay (s)		3.4			0.6			82.3			36.9	
Approach LOS		A			A			F			D	

Intersection Summary					
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.56				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	72.1%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
3: Gilkison Street & Colborne Street West

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	888	12	193	990	33	6	3	159	120	4	3
Future Volume (vph)	0	888	12	193	990	33	6	3	159	120	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00			0.98			0.99	
Frt		0.998			0.996			0.872			0.997	
Flt Protected					0.992			0.998			0.955	
Satd. Flow (prot)	0	3531	0	0	3523	0	0	1447	0	0	1612	0
Flt Permitted					0.555			0.987			0.504	
Satd. Flow (perm)	0	3531	0	0	1969	0	0	1430	0	0	846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			6			173			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			139.0			106.4			116.6	
Travel Time (s)		29.5			10.0			7.7			8.4	
Confl. Peds. (#/hr)	13		15	15		13	5		8	8		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	0%	1%	1%	0%	0%
Parking (#/hr)								0			0	
Adj. Flow (vph)	0	965	13	210	1076	36	7	3	173	130	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	978	0	0	1322	0	0	183	0	0	137	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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.14	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type		NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	

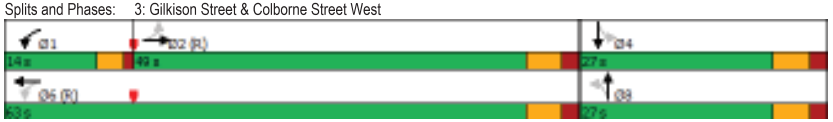
Lanes, Volumes, Timings
3: Gilkison Street & Colborne Street West

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		10.0	31.0		33.0	33.0		33.0	33.0	
Total Split (s)	49.0	49.0		14.0	63.0		27.0	27.0		27.0	27.0	
Total Split (%)	54.4%	54.4%		15.6%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	43.0	43.0		10.0	57.0		21.0	21.0		21.0	21.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		Max	C-Max		None	None		None	None	
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0			15.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		43.0			60.8			17.2			17.2	
Actuated g/C Ratio		0.48			0.68			0.19			0.19	
v/c Ratio		0.58			0.86			0.44			0.85	
Control Delay		19.6			15.4			9.2			73.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		19.6			15.4			9.2			73.8	
LOS		B			B			A			E	
Approach Delay		19.6			15.4			9.2			73.8	
Approach LOS		B			B			A			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 76 (84%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 102.2%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 3: Gilkison Street & Colborne Street West



Queues
3: Gilkison Street & Colborne Street West

Base Year: PM Peak Hour

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	978	1322	183	137
v/c Ratio	0.58	0.86	0.44	0.85
Control Delay	19.6	15.4	9.2	73.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.6	15.4	9.2	73.8
Queue Length 50th (m)	59.1	57.3	1.5	23.5
Queue Length 95th (m)	98.0	#102.2	18.2	#51.4
Internal Link Dist (m)	385.8	115.0	82.4	92.6
Turn Bay Length (m)				
Base Capacity (vph)	1688	1534	466	198
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.86	0.39	0.69

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

HCM Signalized Intersection Capacity Analysis
3: Gilkison Street & Colborne Street West

Base Year: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	888	12	193	990	33	6	3	159	120	4	3
Future Volume (vph)	0	888	12	193	990	33	6	3	159	120	4	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.98			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		1.00			1.00			0.87			1.00	
Flt Protected		1.00			0.99			1.00			0.95	
Satd. Flow (prot)		3531			3522			1447			1603	
Flt Permitted		1.00			0.56			0.99			0.50	
Satd. Flow (perm)		3531			1971			1431			846	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	965	13	210	1076	36	7	3	173	130	4	3
RTOR Reduction (vph)	0	1	0	0	2	0	0	140	0	0	1	0
Lane Group Flow (vph)	0	977	0	0	1320	0	0	43	0	0	136	0
Confl. Peds. (#/hr)	13		15	15		13	5		8	8		5
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	0%	1%	1%	0%	0%
Parking (#/hr)								0			0	
Turn Type		NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		43.0			60.8			17.2			17.2	
Effective Green, g (s)		43.0			60.8			17.2			17.2	
Actuated g/C Ratio		0.48			0.68			0.19			0.19	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1687			1569			273			161	
v/s Ratio Prot		0.28			c0.13							
v/s Ratio Perm					c0.44			0.03			c0.16	
v/c Ratio		0.58			0.84			0.16			0.85	
Uniform Delay, d1		17.0			11.0			30.4			35.1	
Progression Factor		1.06			0.91			1.00			1.00	
Incremental Delay, d2		1.4			3.4			0.3			31.4	
Delay (s)		19.4			13.4			30.6			66.5	
Level of Service		B			B			C			E	
Approach Delay (s)		19.4			13.4			30.6			66.5	
Approach LOS		B			B			C			E	

Intersection Summary					
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.88				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	102.2%	ICU Level of Service		G	
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
4: Colborne Street West & Ballantyne Drive

Base Year: PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1168	1216	106	0	0
Future Volume (vph)	0	1168	1216	106	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.988			
Flt Protected						
Satd. Flow (prot)	0	3610	3567	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	3610	3567	0	0	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		139.0	290.1		218.0	
Travel Time (s)		10.0	20.9		15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1270	1322	115	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1270	1437	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Colborne Street West & Ballantyne Drive

Base Year: PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1168	1216	106	0	0
Future Volume (Veh/h)	0	1168	1216	106	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1270	1322	115	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		139	290			
pX, platoon unblocked					0.80	
vC, conflicting volume	1437				2014	718
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1437				1766	718
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	479				61	376

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	635	635	881	556
Volume Left	0	0	0	0
Volume Right	0	0	0	115
cSH	1700	1700	1700	1700
Volume to Capacity	0.37	0.37	0.52	0.33
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

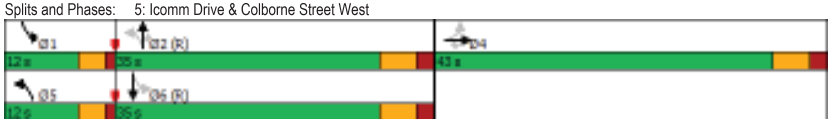
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	712	346	110	0	0	0	111	346	51	138	392	1211
Future Volume (vph)	712	346	110	0	0	0	111	346	51	138	392	1211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	200.0		5.0	0.0		0.0	115.0		215.0	25.0		0.0
Storage Lanes	1		1	0		0	1		1	1		1
Taper Length (m)	25.0			7.5			25.0			25.0		
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00
Ped Bike Factor	0.98	0.99	0.96				1.00		0.96		1.00	0.99
Frt			0.850						0.850			0.850
Flt Protected	0.950	0.975					0.950				0.987	
Satd. Flow (prot)	1610	3305	1583	0	0	0	1770	3505	1583	0	3563	1599
Flt Permitted	0.950	0.975					0.300				0.745	
Satd. Flow (perm)	1582	3276	1528	0	0	0	556	3505	1522	0	2679	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			85						85			933
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		290.1			441.2			487.2			182.2	
Travel Time (s)		20.9			31.8			35.1			13.1	
Confl. Peds. (#/hr)	21		28	28		21	10		25	25		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	3%	2%	0%	0%	1%
Adj. Flow (vph)	774	376	120	0	0	0	121	376	55	150	426	1316
Shared Lane Traffic (%)	50%											
Lane Group Flow (vph)	387	763	120	0	0	0	121	376	55	0	576	1316
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												
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				1	2	1	1	2	1
Detector Template	Left	Thru	Right				Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0	2.0				2.0	10.0	2.0	2.0	10.0	2.0
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				2.0	0.6	2.0	2.0	0.6	2.0
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	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm				pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4				2		2	6		Free
Detector Phase	4	4	4				5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0				7.0	10.0	10.0	7.0	10.0	
Minimum Split (s)	38.0	38.0	38.0				11.0	31.0	31.0	11.0	31.0	
Total Split (s)	43.0	43.0	43.0				12.0	35.0	35.0	12.0	35.0	
Total Split (%)	47.8%	47.8%	47.8%				13.3%	38.9%	38.9%	13.3%	38.9%	
Maximum Green (s)	37.0	37.0	37.0				8.0	29.0	29.0	8.0	29.0	
Yellow Time (s)	4.0	4.0	4.0				3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0				1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0				0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0	6.0				4.0	6.0	6.0		6.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0	3.0	3.0	3.0	
Recall Mode	Max	Max	Max				None	C-Max	C-Max	None	C-Max	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	25.0	25.0	25.0					18.0	18.0		18.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	37.0	37.0	37.0				43.0	41.0	41.0		29.2	90.0
Actuated g/C Ratio	0.41	0.41	0.41				0.48	0.46	0.46		0.32	1.00
v/c Ratio	0.60	0.57	0.18				0.33	0.24	0.07		0.66	0.84
Control Delay	16.8	14.1	2.4				22.6	22.4	7.2		30.6	5.7
Queue Delay	0.0	0.0	0.0				0.0	0.0	0.0		0.0	0.0
Total Delay	16.8	14.1	2.4				22.6	22.4	7.2		30.6	5.7
LOS	B	B	A				C	C	A		C	A
Approach Delay		13.8						20.9			13.3	
Approach LOS		B						C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 83.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Icomm Drive & Colborne Street West



Queues
5: Icomm Drive & Colborne Street West

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	387	763	120	121	376	55	576	1316
v/c Ratio	0.60	0.57	0.18	0.33	0.24	0.07	0.66	0.84
Control Delay	16.8	14.1	2.4	22.6	22.4	7.2	30.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	14.1	2.4	22.6	22.4	7.2	30.6	5.7
Queue Length 50th (m)	59.7	58.6	1.5	18.1	30.2	1.7	47.2	0.0
Queue Length 95th (m)	106.9	76.3	m2.9	26.3	43.6	m6.0	66.2	0.0
Internal Link Dist (m)		266.1			463.2		158.2	
Turn Bay Length (m)	200.0		5.0	115.0		215.0		
Base Capacity (vph)	650	1346	678	373	1596	739	870	1575
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.57	0.18	0.32	0.24	0.07	0.66	0.84

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

HCM Signalized Intersection Capacity Analysis
5: Icomm Drive & Colborne Street West

Base Year: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	712	346	110	0	0	0	111	346	51	138	392	1211
Future Volume (vph)	712	346	110	0	0	0	111	346	51	138	392	1211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0				4.0	6.0	6.0		6.0	4.0
Lane Util. Factor	0.91	0.91	1.00				1.00	0.95	1.00		0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96				1.00	1.00	0.96		1.00	0.99
Flpb, ped/bikes	0.98	0.99	1.00				1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85				1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	0.98	1.00				0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1582	3277	1528				1768	3505	1522		3549	1575
Flt Permitted	0.95	0.98	1.00				0.30	1.00	1.00		0.74	1.00
Satd. Flow (perm)	1582	3277	1528				558	3505	1522		2678	1575
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	774	376	120	0	0	0	121	376	55	150	426	1316
RTOR Reduction (vph)	0	0	50	0	0	0	0	0	30	0	0	0
Lane Group Flow (vph)	387	763	70	0	0	0	121	376	25	0	576	1316
Confl. Peds. (#/hr)	21		28	28		21	10		25	25		10
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	3%	2%	0%	0%	1%
Turn Type	Perm	NA	Perm				pm+pt	NA	Perm	pm+pt	NA	Free
Protected Phases		4					5	2		1	6	
Permitted Phases	4		4				2		2	6		Free
Actuated Green, G (s)	37.0	37.0	37.0				41.0	41.0	41.0		29.2	90.0
Effective Green, g (s)	37.0	37.0	37.0				41.0	41.0	41.0		29.2	90.0
Actuated g/C Ratio	0.41	0.41	0.41				0.46	0.46	0.46		0.32	1.00
Clearance Time (s)	6.0	6.0	6.0				4.0	6.0	6.0		6.0	
Vehicle Extension (s)	3.0	3.0	3.0				3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	650	1347	628				359	1596	693		868	1575
v/s Ratio Prot							0.03	0.11				
v/s Ratio Perm	0.24	0.23	0.05				0.12		0.02		0.22	c0.84
v/c Ratio	0.60	0.57	0.11				0.34	0.24	0.04		0.66	0.84
Uniform Delay, d1	20.7	20.3	16.4				15.0	14.9	13.6		26.2	0.0
Progression Factor	0.63	0.61	0.30				1.52	1.46	4.81		1.00	1.00
Incremental Delay, d2	3.3	1.4	0.3				0.5	0.3	0.1		1.9	5.4
Delay (s)	16.4	13.9	5.2				23.3	22.1	65.3		28.1	5.4
Level of Service	B	B	A				C	C	E		C	A
Approach Delay (s)		13.9			0.0			26.7			12.3	
Approach LOS		B			A			C			B	

Intersection Summary					
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	1.02				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	83.3%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	171	352	87	189	4	271	4	62	15	9	30
Future Volume (vph)	2	171	352	87	189	4	271	4	62	15	9	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		60.0	125.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	35.0			25.0			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	0.99		0.96	0.98	1.00		0.97	0.92			0.96	
Frt			0.850		0.997			0.858			0.916	
Flt Protected	0.950			0.950			0.950				0.987	
Satd. Flow (prot)	1805	3505	1615	1805	3562	0	1787	1476	0	0	3191	0
Flt Permitted	0.621			0.579			0.717				0.892	
Satd. Flow (perm)	1166	3505	1558	1082	3562	0	1313	1476	0	0	2833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			383		3			67			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		487.2			250.0			115.0			104.0	
Travel Time (s)		35.1			18.0			8.3			7.5	
Confl. Peds. (#/hr)	6		15	15		6	18		45	45		18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	1%	0%	2%	0%	0%	0%
Adj. Flow (vph)	2	186	383	95	205	4	295	4	67	16	10	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	186	383	95	209	0	295	71	0	0	59	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												
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	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		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	2.0	0.6		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	

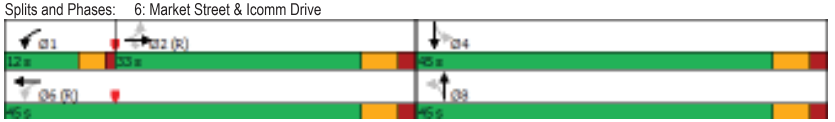
Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0	23.0	11.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	33.0	33.0	33.0	12.0	45.0		45.0	45.0		45.0	45.0	
Total Split (%)	36.7%	36.7%	36.7%	13.3%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.0	27.0	27.0	8.0	39.0		39.0	39.0		39.0	39.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0	10.0		10.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)	42.1	42.1	42.1	54.0	52.0		26.0	26.0			26.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.60	0.58		0.29	0.29			0.29	
v/c Ratio	0.00	0.11	0.41	0.13	0.10		0.78	0.15			0.07	
Control Delay	11.0	8.7	7.5	9.2	9.0		42.8	6.3			10.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	11.0	8.7	7.5	9.2	9.0		42.8	6.3			10.7	
LOS	B	A	A	A	A		D	A			B	
Approach Delay		7.9			9.1			35.7			10.7	
Approach LOS		A			A			D			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 49 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 59.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Market Street & Icomm Drive



Queues
6: Market Street & Icomm Drive

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	2	186	383	95	209	295	71	59
v/c Ratio	0.00	0.11	0.41	0.13	0.10	0.78	0.15	0.07
Control Delay	11.0	8.7	7.5	9.2	9.0	42.8	6.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	8.7	7.5	9.2	9.0	42.8	6.3	10.7
Queue Length 50th (m)	0.2	6.7	41.5	6.6	8.0	48.9	0.5	1.7
Queue Length 95th (m)	m0.5	m22.1	66.3	15.4	15.0	68.4	8.7	5.4
Internal Link Dist (m)		463.2			226.0		91.0	80.0
Turn Bay Length (m)	65.0		60.0	125.0				
Base Capacity (vph)	545	1640	932	717	2058	568	677	1246
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.11	0.41	0.13	0.10	0.52	0.10	0.05

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
6: Market Street & Icomm Drive

Base Year: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	171	352	87	189	4	271	4	62	15	9	30
Future Volume (vph)	2	171	352	87	189	4	271	4	62	15	9	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00			0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.92			0.98	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		0.97	1.00			0.98	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1784	3505	1558	1789	3562		1740	1477			3134	
Flt Permitted	0.62	1.00	1.00	0.58	1.00		0.72	1.00			0.89	
Satd. Flow (perm)	1165	3505	1558	1089	3562		1312	1477			2834	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	186	383	95	205	4	295	4	67	16	10	33
RTOR Reduction (vph)	0	0	207	0	1	0	0	48	0	0	23	0
Lane Group Flow (vph)	2	186	176	95	208	0	295	23	0	0	36	0
Confl. Peds. (#/hr)	6		15	15		6	18		45	45		18
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	1%	0%	2%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	41.3	41.3	41.3	52.0	52.0		26.0	26.0			26.0	
Effective Green, g (s)	41.3	41.3	41.3	52.0	52.0		26.0	26.0			26.0	
Actuated g/C Ratio	0.46	0.46	0.46	0.58	0.58		0.29	0.29			0.29	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	534	1608	714	681	2058		379	426			818	
v/s Ratio Prot		0.05		c0.01	0.06			0.02				
v/s Ratio Perm	0.00		c0.11	0.07			c0.22				0.01	
v/c Ratio	0.00	0.12	0.25	0.14	0.10		0.78	0.05			0.04	
Uniform Delay, d1	13.2	13.9	14.9	8.6	8.5		29.4	23.1			23.0	
Progression Factor	0.56	0.51	2.40	0.91	0.90		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.7	0.1	0.1		9.7	0.1			0.0	
Delay (s)	7.4	7.2	36.3	7.9	7.7		39.1	23.2			23.1	
Level of Service	A	A	D	A	A		D	C			C	
Approach Delay (s)		26.8			7.8			36.0			23.1	
Approach LOS		C			A			D			C	

Intersection Summary				
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	59.2%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
7: Clarence Street South & Icomm Drive/Greenwich Street

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	164	89	175	126	51	64	678	43	98	1012	88
Future Volume (vph)	180	164	89	175	126	51	64	678	43	98	1012	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	35.0		30.0	75.0		0.0	105.0		70.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	30.0			35.0			35.0			35.0		
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	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00					0.96
Frt		0.947				0.850		0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3347	0	1805	3574	1583	1770	3473	0	1787	3574	1615
Flt Permitted	0.546			0.583			0.183			0.306		
Satd. Flow (perm)	1012	3347	0	1092	3574	1554	339	3473	0	576	3574	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51				85		11				96
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		250.0			209.3			381.6			258.2	
Travel Time (s)		18.0			15.1			27.5			18.6	
Confl. Peds. (#/hr)	8		24	24		8	35					35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	0%	1%	2%	2%	3%	3%	1%	1%	0%
Adj. Flow (vph)	196	178	97	190	137	55	70	737	47	107	1100	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	275	0	190	137	55	70	784	0	107	1100	96
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												
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	

Lanes, Volumes, Timings
7: Clarence Street South & Icomm Drive/Greenwich Street

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	7	4		8	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	38.0		38.0	38.0	38.0	43.0	43.0		43.0	43.0	43.0
Total Split (s)	12.0	38.0		26.0	26.0	26.0	52.0	52.0		52.0	52.0	52.0
Total Split (%)	13.3%	42.2%		28.9%	28.9%	28.9%	57.8%	57.8%		57.8%	57.8%	57.8%
Maximum Green (s)	8.0	32.0		20.0	20.0	20.0	46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	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	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		25.0		25.0	25.0	25.0	30.0	30.0		30.0	30.0	30.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	32.3	30.3		18.3	18.3	18.3	47.7	47.7		47.7	47.7	47.7
Actuated g/C Ratio	0.36	0.34		0.20	0.20	0.20	0.53	0.53		0.53	0.53	0.53
v/c Ratio	0.46	0.24		0.86	0.19	0.14	0.39	0.42		0.35	0.58	0.11
Control Delay	24.5	18.3		68.1	29.7	3.8	29.6	22.0		17.2	16.3	2.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	24.5	18.3		68.1	29.7	3.8	29.6	22.0		17.2	16.3	2.9
LOS	C	B		E	C	A	C	C		B	B	A
Approach Delay		20.9			45.0			22.6			15.4	
Approach LOS		C			D			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 72 (80%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 22.1		Intersection LOS: C	
Intersection Capacity Utilization 87.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 7: Clarence Street South & Icomm Drive/Greenwich Street

Queues
7: Clarence Street South & Icomm Drive/Greenwich Street

Base Year: PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	196	275	190	137	55	70	784	107	1100	96
v/c Ratio	0.46	0.24	0.86	0.19	0.14	0.39	0.42	0.35	0.58	0.11
Control Delay	24.5	18.3	68.1	29.7	3.8	29.6	22.0	17.2	16.3	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	18.3	68.1	29.7	3.8	29.6	22.0	17.2	16.3	2.9
Queue Length 50th (m)	17.4	9.8	32.8	10.6	0.0	11.8	69.4	11.1	70.6	0.0
Queue Length 95th (m)	47.2	30.7	#68.3	18.6	5.0	m25.4	79.5	24.7	90.9	7.3
Internal Link Dist (m)		226.0		185.3			357.6		234.2	
Turn Bay Length (m)	75.0		35.0		30.0	75.0		105.0		70.0
Base Capacity (vph)	430	1222	242	794	411	179	1845	305	1893	868
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.23	0.79	0.17	0.13	0.39	0.42	0.35	0.58	0.11

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
7: Clarence Street South & Icomm Drive/Greenwich Street

Base Year: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	164	89	175	126	51	64	678	43	98	1012	88
Future Volume (vph)	180	164	89	175	126	51	64	678	43	98	1012	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1765	3347		1780	3574	1554	1762	3473		1787	3574	1555
Flt Permitted	0.55	1.00		0.58	1.00	1.00	0.18	1.00		0.31	1.00	1.00
Satd. Flow (perm)	1014	3347		1092	3574	1554	339	3473		576	3574	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	178	97	190	137	55	70	737	47	107	1100	96
RTOR Reduction (vph)	0	34	0	0	0	44	0	5	0	0	0	45
Lane Group Flow (vph)	196	241	0	190	137	11	70	779	0	107	1100	51
Confl. Peds. (#/hr)	8		24	24		8	35					35
Heavy Vehicles (%)	2%	1%	1%	0%	1%	2%	2%	3%	3%	1%	1%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	30.3	30.3		18.3	18.3	18.3	47.7	47.7		47.7	47.7	47.7
Effective Green, g (s)	30.3	30.3		18.3	18.3	18.3	47.7	47.7		47.7	47.7	47.7
Actuated g/C Ratio	0.34	0.34		0.20	0.20	0.20	0.53	0.53		0.53	0.53	0.53
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	408	1126		222	726	315	179	1840		305	1894	824
v/s Ratio Prot	c0.04	0.07			0.04			0.22			c0.31	
v/s Ratio Perm	0.12			c0.17		0.01	0.21			0.19		0.03
v/c Ratio	0.48	0.21		0.86	0.19	0.04	0.39	0.42		0.35	0.58	0.06
Uniform Delay, d1	22.4	21.3		34.6	29.7	28.8	12.5	12.8		12.2	14.4	10.3
Progression Factor	1.02	1.05		1.00	1.00	1.00	1.53	1.62		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1		26.1	0.1	0.0	5.9	0.7		3.2	1.3	0.1
Delay (s)	23.7	22.4		60.7	29.8	28.8	25.1	21.4		15.4	15.7	10.4
Level of Service	C	C		E	C	C	C	C		B	B	B
Approach Delay (s)		23.0			45.0			21.7			15.3	
Approach LOS		C			D			C			B	

Intersection Summary					
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.64				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	87.2%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	521	100	426	790	10	119	157	328	6	126	1
Future Volume (vph)	10	521	100	426	790	10	119	157	328	6	126	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	85.0		0.0	30.0		30.0	30.0		0.0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (m)	50.0			0.0			40.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97	1.00			0.99		0.97	0.99	1.00	
Frt			0.850		0.998				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	1615	1752	3568	0	1752	1845	1599	1805	1879	0
Flt Permitted	0.326			0.378			0.660			0.571		
Satd. Flow (perm)	619	3539	1564	694	3568	0	1208	1845	1553	1070	1879	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		3				357			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		353.8			381.6			274.8			143.3	
Travel Time (s)		25.5			27.5			19.8			10.3	
Confl. Peds. (#/hr)			7	7			9		16	16		9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	3%	1%	0%	3%	3%	1%	0%	1%	0%
Adj. Flow (vph)	11	566	109	463	859	11	129	171	357	7	137	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	566	109	463	870	0	129	171	357	7	138	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												
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	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	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	2.0	0.6		2.0	0.6	2.0	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	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	0.0	
Detector 1 Queue (s)	0.0	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	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	

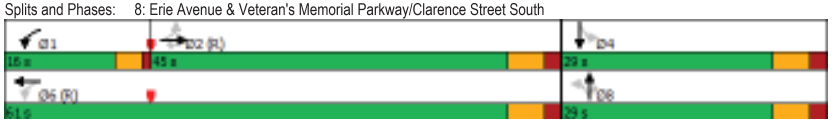
Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	33.0	33.0	33.0	11.0	33.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	45.0	45.0	45.0	16.0	61.0		29.0	29.0	29.0	29.0	29.0	
Total Split (%)	50.0%	50.0%	50.0%	17.8%	67.8%		32.2%	32.2%	32.2%	32.2%	32.2%	
Maximum Green (s)	39.0	39.0	39.0	12.0	55.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	20.0	20.0	20.0		20.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0	0	0	0	
Act Effct Green (s)	45.2	45.2	45.2	64.7	62.7		15.3	15.3	15.3	15.3	15.3	
Actuated g/C Ratio	0.50	0.50	0.50	0.72	0.70		0.17	0.17	0.17	0.17	0.17	
v/c Ratio	0.04	0.32	0.13	0.70	0.35		0.63	0.55	0.64	0.04	0.43	
Control Delay	15.0	15.1	3.7	15.4	1.9		47.3	39.6	9.0	28.0	36.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	15.0	15.1	3.7	15.4	1.9		47.3	39.6	9.0	28.0	36.3	
LOS	B	B	A	B	A		D	D	A	C	D	
Approach Delay		13.3			6.6			24.5			35.9	
Approach LOS		B			A			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South



Queues
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	566	109	463	870	129	171	357	7	138
v/c Ratio	0.04	0.32	0.13	0.70	0.35	0.63	0.55	0.64	0.04	0.43
Control Delay	15.0	15.1	3.7	15.4	1.9	47.3	39.6	9.0	28.0	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	15.1	3.7	15.4	1.9	47.3	39.6	9.0	28.0	36.3
Queue Length 50th (m)	1.0	31.7	0.0	21.5	6.4	22.3	29.0	0.0	1.1	22.9
Queue Length 95th (m)	4.4	48.6	9.2	m#52.3	18.6	37.0	44.2	21.5	4.5	36.4
Internal Link Dist (m)		329.8			357.6		250.8			119.3
Turn Bay Length (m)	50.0		50.0	85.0		30.0		30.0	30.0	
Base Capacity (vph)	310	1776	839	662	2488	308	471	662	273	480
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.32	0.13	0.70	0.35	0.42	0.36	0.54	0.03	0.29

Intersection Summary

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

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

HCM Signalized Intersection Capacity Analysis
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Base Year: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	521	100	426	790	10	119	157	328	6	126	1
Future Volume (vph)	10	521	100	426	790	10	119	157	328	6	126	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3539	1564	1750	3568		1738	1845	1553	1781	1879	
Flt Permitted	0.33	1.00	1.00	0.38	1.00		0.66	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	619	3539	1564	696	3568		1208	1845	1553	1071	1879	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	566	109	463	859	11	129	171	357	7	137	1
RTOR Reduction (vph)	0	0	54	0	1	0	0	0	296	0	0	0
Lane Group Flow (vph)	11	566	55	463	869	0	129	171	61	7	138	0
Confl. Peds. (#/hr)			7	7			9		16	16		9
Heavy Vehicles (%)	0%	2%	0%	3%	1%	0%	3%	3%	1%	0%	1%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	45.1	45.1	45.1	62.7	62.7		15.3	15.3	15.3	15.3	15.3	
Effective Green, g (s)	45.1	45.1	45.1	62.7	62.7		15.3	15.3	15.3	15.3	15.3	
Actuated g/C Ratio	0.50	0.50	0.50	0.70	0.70		0.17	0.17	0.17	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	310	1773	783	644	2485		205	313	264	182	319	
v/s Ratio Prot		0.16		c0.11	0.24			0.09			0.07	
v/s Ratio Perm	0.02		0.03	c0.39			c0.11		0.04	0.01		
v/c Ratio	0.04	0.32	0.07	0.72	0.35		0.63	0.55	0.23	0.04	0.43	
Uniform Delay, d1	11.4	13.3	11.6	6.2	5.5		34.7	34.2	32.3	31.2	33.5	
Progression Factor	1.00	1.00	1.00	1.50	0.26		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.5	0.2	3.2	0.3		5.9	1.9	0.4	0.1	0.9	
Delay (s)	11.6	13.8	11.8	12.5	1.7		40.6	36.1	32.7	31.3	34.4	
Level of Service	B	B	B	B	A		D	D	C	C	C	
Approach Delay (s)		13.5			5.5			35.2			34.3	
Approach LOS		B			A			D			C	

Intersection Summary

HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Appendix C

Intersection Collision Data

Collision Details Report

From: January 1, 2015 **To:** December 31, 2019

Location ..... MOUNT PLEASANT ST @ VETERANS MEM PKWY **Municipality.....** BRANTFORD

Traffic Control.... Traffic signal **Total Collisions....** 52

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
019556	2017-May-29, Mon,00:21	Clear	SMV other	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control	
Comments:						Dry					
023133	2017-Jun-21, Wed,17:30	Clear	Rear end		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North						
023250	2017-Jun-21, Wed,21:30	Clear	SMV other		East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:											
15-003426	2016-Feb-03, Wed,18:05	Snow	Turning movement	Non-fatal injury	West	Slush	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					East	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-007443	2015-Mar-13, Fri,22:15	Clear	Rear end		South	Dry	Overtaking	Pick-up truck	Other motor vehicle	Other	
Comments:					South	Dry	Stopped	Delivery van	Other motor vehicle	Driving properly	
15-00974	2015-Jan-10, Sat,11:00	Clear	Rear end		East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East						
15-011831	2015-Apr-21, Tue,08:00	Clear	Rear end		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other	
Comments:					North	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly	
15-012295	2015-Apr-25, Sat,15:08	Clear	SMV other	P.D. only	North	Dry	Slowing or stopping	Automobile, station wagon	Ran off road	Lost control	
Comments:						Dry					
15-016387	2015-May-27, Wed,14:00	Clear	SMV other	P.D. only	East	Dry	Turning left	Pick-up truck	Curb	Improper turn	
Comments:						Dry					
15-024514	2015-Jul-28, Tue,21:31	Clear	Sideswipe		East	Dry	Merging	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

15-032882	2015-Sep-29, Tue,16:00	Rain	Turning movement	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
15-03426	2015-Feb-03, Tue,18:05	Snow	Turning movement	Non-fatal injury	West	Slush	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-038267	2015-Nov-10, Tue,17:55	Rain	SMV other	P.D. only	East	Wet	Going ahead	Automobile, station wagon	Skidding/sliding	Driving properly
Comments:						Wet				
15-041788	2015-Dec-07, Mon,17:54	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Disobeyed traffic control
16-001788	2016-Jan-16, Sat,04:40	Rain	SMV other	Non-reportable	West	Ice	Turning right	Automobile, station wagon	Skidding/sliding	Driving properly
Comments:						Ice				
16-009935	2016-Mar-22, Tue,05:55	Clear	SMV other		East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:										
16-015764	2016-May-06, Fri,19:50	Clear	Rear end		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-017451	2016-May-20, Fri,15:31	Clear	Rear end	P.D. only	East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-027846	2016-Jul-31, Sun,20:00	Clear	Turning movement		East	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-035571	2016-Sep-22, Thu,16:25	Clear	Sideswipe	Non-fatal injury	East	Dry	Changing lanes	Truck-other	Other motor vehicle	Improper lane change
Comments:					East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
16-044605	2016-Nov-26, Sat,05:10	Clear	SMV other	P.D. only	East	Wet	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Wet				
17-002567	2017-Jan-22, Sun,14:33	Fog, mist, smoke, dust	SMV other	P.D. only	West	Wet	Turning right	Automobile, station wagon	Ran off road	Speed too fast for condition
Comments:						Wet				

17-003381	2017-Jan-28, Sat,22:43	Snow	SMV other	P.D. only	East	Loose snow	Merging	Automobile, station wagon		Driving properly
Comments:						Loose snow				
17-024160	2017-Jun-29, Thu,16:00	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-025953	2017-Jul-11, Tue,21:20	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-035680	2017-Sep-16, Sat,00:45	Clear	Rear end		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-47896	2017-Dec-15, Fri,14:15	Snow	Angle	Non-fatal injury	East	Loose snow	Slowing or stopping	Passenger van	Other motor vehicle	Speed too fast for condition
Comments:					South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-48886	2017-Dec-23, Sat,08:00	Snow	SMV other		West	Ice	Turning right	Automobile, station wagon	Curb	Driving properly
Comments:										
18-016970	2018-May-07, Mon,15:30	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon		Driving properly
18-020828	2018-Jun-01, Fri,19:40	Clear	Rear end		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-023377	2018-Jun-18, Mon,12:49	Rain	SMV other	Non-fatal injury	East	Wet		Automobile, station wagon	Tree, shrub, stump	Lost control
Comments:										
18-026598	2018-Jul-10, Tue,07:52	Clear	Rear end		East	Dry	Overtaking	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-028609	2018-Jul-24, Tue,10:00	Clear	Rear end		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

18-028701	2018-Jul-24, Tue,22:53	Clear	Turning movement	P.D. only	South	Dry	Turning left	Pick-up truck	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-029104	2018-Jul-25, Wed,15:30	Clear	Sideswipe		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
18-03511	2018-Jan-27, Sat,00:14	Clear	Rear end	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West		Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
18-040330	2018-Oct-12, Fri,07:50	Clear	Angle		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
18-040502	2018-Oct-13, Sat,10:45	Clear	Sideswipe		West	Dry	Going ahead	Passenger van	Other motor vehicle	Other
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-07636	2018-Feb-27, Tue,06:28	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-10187	2018-Mar-17, Sat,17:30	Clear	Rear end		North	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-001467	2019-Jan-11, Fri,16:28	Clear	Rear end		West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-002705	2019-Jan-21, Mon,06:30	Clear	Rear end		North	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-004201	2019-Feb-01, Fri,08:50	Clear	Rear end		East	Dry	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Following too close
Comments:					East	Dry	Stopped	Passenger van	Other motor vehicle	Driving properly
19-10201	2019-Mar-21, Thu,15:50	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

19-11925	2019-Apr-02, Tue,13:30	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon		Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-25025	2019-Jul-03, Wed,12:45	Clear	Rear end	P.D. only	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:	Two vehicles involved, second page missing				North			Unknown		
19-32262	2019-Aug-21, Wed,06:15	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-36945	2019-Sep-20, Fri,18:00	Clear	Approaching	P.D. only	West	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
Comments:					East	Dry		Unknown	Other motor vehicle	
19-37668	2019-Sep-28, Sat,10:30	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-48365	2019-Dec-20, Fri,09:55	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-48545	2019-Dec-19, Thu,18:18	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Delivery van	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
19-48635	2019-Dec-20, Fri,09:55	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2015 **To:** December 31, 2019

Location ..... COLBORNE ST W @ MOUNT PLEASANT ST **Municipality.....** BRANTFORD

Traffic Control.... Traffic signal **Total Collisions....** 32

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
004453	2017-Feb-06, Mon,08:30	Clear	Sideswipe		East	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
013659	2017-Apr-16, Sun,17:40	Clear	Rear end		North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North						
016939	2017-May-11, Thu,15:20	Clear	Rear end	P.D. only	West	Dry	Going ahead	Truck - closed	Other motor vehicle	Following too close	
Comments:					West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
017327	2017-May-14, Sun,06:45	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Pole (utility, power)	Lost control	
Comments:											
15-017635	2015-Jun-05, Fri,21:30	Clear	Turning movement	Non-fatal injury	North	Dry	Turning right	Automobile, station wagon	Cyclist	Failed to yield right-of-way	
Comments:					West	Dry	Going ahead	Bicycle	Other motor vehicle	Failed to yield right-of-way	
15-018323	2015-Jun-11, Thu,17:23	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Improper turn	
15-021147	2015-Jul-03, Fri,16:34	Clear	SMV other	Non-fatal injury	North	Dry	Turning right	Automobile, station wagon	Pedestrian	Improper turn	
Comments:						Dry					
15-021155	2015-Jul-03, Fri,17:25	Clear	Rear end		West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
15-033986	2015-Oct-08, Thu,07:48	Clear	Sideswipe		East	Dry	Changing lanes	Passenger van	Other motor vehicle	Driving properly	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

16-007711	2016-Mar-04, Fri,21:17	Clear	Turning movement	P.D. only	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Following too close
Comments:					South		Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
16-010707	2016-Mar-29, Tue,05:00	Clear	SMV unattended vehicle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Unattended vehicle	Lost control
Comments:					North	Dry	Parked	Automobile, station wagon	Other motor vehicle	
16-019069	2016-May-31, Tue,15:04	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				
16-036118	2016-Sep-26, Mon,14:00	Rain	SMV other	Non-fatal injury	West	Wet	Going ahead	Automobile, station wagon	Pedestrian	Driving properly
Comments:						Wet				
16-043298	2016-Nov-16, Wed,10:12	Clear	Sideswipe	Non-fatal injury	North	Wet	Changing lanes	Passenger van	Other motor vehicle	Improper lane change
Comments:					North	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-048790	2016-Dec-29, Thu,13:52	Snow	Angle	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-005857	2017-Feb-17, Fri,13:59	Clear	SMV other	P.D. only	South	Dry	Turning left	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				
17-029752	2017-Aug-04, Fri,13:00	Clear	Rear end		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-034699	2017-Sep-09, Sat,12:22	Clear	Turning movement	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Turning right	Passenger van	Other motor vehicle	Driving properly
17-44392	2017-Nov-17, Fri,07:10	Clear	Rear end		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-45082	2017-Nov-23, Thu,16:00	Clear	SMV other	Non-reportable	West	Dry	Turning left	Automobile, station wagon	Pedestrian	
Comments:						Dry				
18-017656	2018-May-11, Fri,18:30	Clear	Sideswipe		East	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

18-022915	2018-Jun-15, Fri,07:00	Clear	Angle		West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-025898	2018-Jul-05, Thu,14:15	Clear	SMV other		North	Dry	Turning right	Automobile, station wagon	Pedestrian	Driving properly
Comments:						Dry		Other		
18-030875	2018-Aug-08, Wed,18:00	Clear	Rear end		West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-049365	2018-Dec-13, Thu,19:30	Fog, mist, smoke, dust	Turning movement		North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-05627	2018-Feb-11, Sun,17:05	Snow	Rear end		West	Ice	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Driving properly
Comments:					West	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-11540	2018-Mar-28, Wed,17:30	Clear	Turning movement		East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-001232	2019-Jan-09, Wed,19:10	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
19-001949	2019-Jan-15, Tue,14:16	Clear	SMV other	P.D. only	South	Dry	Turning left	Automobile, station wagon	Pedestrian	Failed to yield right-of-way
Comments:						Dry				
19-12084	2019-Apr-03, Wed,07:40	Clear	Rear end	P.D. only	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:	Vehicle 2 info missing from report					Dry		Automobile, station wagon		
19-46282	2019-Dec-02, Mon,08:00	Snow	Rear end	P.D. only	West	Wet	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close
Comments:					West	Wet	Stopped	Automobile, station wagon	Other motor vehicle	
BR-18049098	2018-Dec-12, Wed,18:00	Clear	Turning movement	P.D. only	South	Dry	Turning left	Pick-up truck		Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2015 **To:** December 31, 2019

Location ..... COLBORNE ST W @ GILKISON ST **Municipality.....** BRANTFORD

Traffic Control.... Traffic signal **Total Collisions....** 42

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
022568	2017-Jun-18, Sun,14:55	Clear	Turning movement	P.D. only	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-012155	2015-Apr-24, Fri,16:13	Clear	Sideswipe	P.D. only	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					North	Dry	Stopped	Municipal transit bus	Other motor vehicle	Driving properly	
15-014287	2015-May-09, Sat,21:15	Clear	Rear end		West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
15-016493	2015-May-28, Thu,11:40	Clear	Angle		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-017031	2015-May-08, Fri,14:00	Rain	Rear end		West	Wet	Slowing or stopping	Passenger van	Skidding/sliding	Following too close	
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
15-01803	2015-Jan-18, Sun,18:47	Snow	Turning movement	P.D. only	West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-018270	2015-Jun-11, Thu,08:50	Clear	Rear end		West	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Other	
Comments:					West	Dry	Stopped	Passenger van	Other motor vehicle	Driving properly	
15-021552	2015-Jul-06, Mon,14:50	Clear	Rear end		East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close	
15-023912	2015-Jul-24, Fri,15:20	Clear	Turning movement		West	Dry	Turning left	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

15-029238	2015-Sep-02, Wed,12:15	Clear	Sideswipe	Non-fatal injury	West	Dry	Changing lanes	Pick-up truck	Other motor vehicle	Improper lane change
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-030221	2015-Sep-09, Wed,16:15	Clear	Rear end	P.D. only	West	Dry	Changing lanes	Passenger van	Other motor vehicle	Following too close
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-036778	2015-Oct-28, Wed,17:00	Rain	Rear end		West	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West					
15-04815	2015-Feb-17, Tue,12:55	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
16-005568	2016-Feb-16, Tue,08:26	Snow	Rear end	P.D. only	South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					South	Packed snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-005584	2016-Feb-16, Tue,08:45	Snow	Rear end		West	Slush	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West					
16-008518	2016-Mar-11, Fri,07:50	Clear	Turning movement	Non-fatal injury	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-011362	2016-Apr-02, Sat,13:15	Snow	Rear end		West	Wet	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Driving properly
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-012422	2016-Apr-10, Sun,18:15	Snow	Rear end	P.D. only	West	Slush	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close
Comments:					West	Slush	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-014618	2016-Apr-27, Wed,19:10	Clear	Sideswipe	P.D. only	West	Dry	Changing lanes	Pick-up truck	Other motor vehicle	Improper lane change
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-024567	2016-Jul-08, Fri,18:09	Clear	Turning movement	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly

16-024568	2016-Jul-08, Fri,18:19	Clear	Turning movement	P.D. only	West	Dry	Going ahead	Unknown	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
16-029188	2016-Aug-09, Tue,18:10	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-029276	2016-Aug-08, Mon,21:30	Clear	Rear end		East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East					
16-029849	2016-Aug-14, Sun,00:46	Clear	Angle	P.D. only	West	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-031172	2016-Aug-22, Mon,12:31	Clear	Rear end	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-42051	2016-Nov-07, Mon,22:42	Clear	Turning movement	Fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-001760	2017-Jan-15, Sun,13:35	Clear	Rear end	P.D. only	West	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-019598	2017-May-28, Sun,12:45	Clear	Sideswipe		West	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-029622	2017-Aug-03, Thu,18:10	Clear	Turning movement		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
17-034959	2017-Aug-28, Mon,14:30	Clear	Rear end		East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East					
17-035434	2017-Sep-14, Thu,21:35	Clear	Turning movement	Non-fatal injury	West	Dry	Going ahead	Bicycle	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Turning right	Pick-up truck	Cyclist	Driving properly

17-45645	2017-Nov-27, Mon,17:30	Clear	Turning movement		East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Other
Comments:					West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
17-47031	2017-Dec-08, Fri,13:52	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-48905	2017-Dec-23, Sat,11:15	Snow	Angle		South	Slush	Turning left	Automobile, station wagon	Skidding/sliding	Speed too fast for condition
Comments:					West	Slush	Stopped	Pick-up truck	Other motor vehicle	Driving properly
18-016320	2018-May-03, Thu,13:06	Clear	Turning movement	P.D. only	West	Dry	Turning left	Delivery van	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-017625	2018-May-11, Fri,14:50	Clear	Angle	Non-fatal injury	East	Dry	Stopped	Pick-up truck	Other motor vehicle	Following too close
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-05024	2018-Feb-07, Wed,10:25	Snow	Rear end		West	Slush	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Lost control
Comments:					West	Loose snow	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly
18-05311	2018-Feb-09, Fri,15:20	Drifting Snow	Rear end	P.D. only	West	Slush		Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					West	Slush	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-09900	2019-Mar-19, Tue,15:00	Clear	SMV other	P.D. only	North	Dry	Turning right	Automobile, station wagon	Pedestrian	Driving properly
Comments:										
19-20765	2019-Jun-04, Tue,18:20	Clear	Rear end	P.D. only	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:	Two vehicles in this collision, second page missing				West	Dry		Unknown		
19-31556	2019-Aug-16, Fri,16:45	Rain	Rear end	P.D. only	East	Wet	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Lost control
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-36235	2019-Sep-18, Wed,22:12	Clear	Turning movement	Non-fatal injury	South	Dry	Going ahead	Bicycle	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Turning left	Automobile, station wagon	Cyclist	Driving properly

Collision Details Report

From: January 1, 2015 **To:** December 31, 2019

Location ..... COLBORNE ST W @ ICOMM DR **Municipality.....** BRANTFORD

Traffic Control.... Traffic signal **Total Collisions....** 72

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
008454	2017-Mar-09, Thu,18:43	Clear	Sideswipe	P.D. only	South	Dry	Changing lanes	Delivery van	Other motor vehicle	Failed to yield right-of-way	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
010738	2017-Mar-27, Mon,20:55	Fog, mist, smoke, dust	Rear end		East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
015538	2017-May-01, Mon,20:00	Rain	Rear end		South	Wet	Slowing or stopping	Truck - tractor	Other motor vehicle	Following too close	
Comments:					South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
024309	2017-Jun-30, Fri,15:15	Clear	Sideswipe		South	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-000579	2015-Jan-06, Tue,18:03	Clear	Rear end	Non-reportable	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle		
Comments:					South	Wet	Stopped	Passenger van	Other motor vehicle	Driving properly	
15-002161	2015-Jan-22, Thu,10:16	Clear	Other	Non-reportable	East	Dry	Turning right		Other motor vehicle	Improper turn	
Comments:					East	Dry	Turning left	Truck - open	Other motor vehicle	Driving properly	
15-010215	2015-Apr-07, Tue,13:45	Clear	Sideswipe		East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Turning left	Truck - closed	Other motor vehicle	Driving properly	
15-016278	2015-May-26, Tue,15:58	Clear	SMV other	Non-reportable	South	Dry	Turning right	Truck - tractor	Ran off road	Improper turn	
Comments:						Dry					
15-01666	2015-Jan-16, Fri,17:20	Clear	Rear end		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other	
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	

15-018468	2015-Jun-12, Fri,21:20	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Passenger van	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
15-018955	2015-Jun-16, Tue,16:00	Clear	Rear end		East	Dry	Going ahead	Passenger van	Other motor vehicle	Other
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-020729	2015-Jun-30, Tue,15:55	Clear	Turning movement		East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
15-027786	2015-Aug-21, Fri,00:00	Clear	Sideswipe	P.D. only	South	Dry	Going ahead	Truck - closed	Other motor vehicle	Improper lane change
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-034269	2015-Oct-10, Sat,08:50	Clear	Turning movement		North	Dry	Turning left	Passenger van	Other motor vehicle	Other
Comments:							Going ahead			
15-035041	2015-Oct-16, Fri,12:15	Clear	Rear end		North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-039346	2015-Nov-18, Wed,21:15	Rain	Sideswipe	P.D. only	South	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					South	Wet	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
15-043630	2015-Dec-23, Wed,14:18	Clear	Sideswipe	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					South	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
15-08749	2015-Mar-25, Wed,06:49	Clear	Other	P.D. only	North	Dry	Turning left	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				
16-002897	2016-Jan-25, Mon,09:00	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-017665	2016-May-21, Sat,20:27	Clear	SMV other	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Concrete guide rail	Lost control
Comments:						Dry				

16-022373	2016-Jun-23, Thu,14:30	Rain	Rear end		South	Wet	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly
Comments:					South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-022572	2016-Jun-23, Thu,14:30	Clear			South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:										
16-025098	2016-Jul-12, Tue,17:11	Clear	SMV other	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other	Driving properly
Comments:						Dry				
16-034201	2016-Sep-13, Tue,11:10	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-036014	2016-Sep-25, Sun,17:55	Clear	Sideswipe	Non-fatal injury	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:					South	Wet	Going ahead	Motorcycle	Other motor vehicle	Driving properly
16-040551	2016-Oct-27, Thu,13:10	Rain	Rear end		North	Wet	Slowing or stopping	Pick-up truck	Other motor vehicle	Speed too fast for condition
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-044268	2016-Nov-23, Wed,17:40	Clear	Rear end		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-048900	2016-Dec-30, Fri,10:50	Clear	Rear end		North	Dry	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Following too close
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Following too close
17-003680	2017-Jan-31, Tue,08:45	Snow	Rear end		South	Slush	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Speed too fast for condition
Comments:					South	Slush	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-008270	2017-Mar-07, Tue,14:30	Clear	Other		East	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Wet	Reversing	Tow truck	Other motor vehicle	Driving properly
17-008290	2017-Mar-07, Tue,14:20	Clear	Sideswipe		East	Wet	Stopped	Pick-up truck	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly

17-008454	2017-Mar-09, Thu,06:43	Clear	Sideswipe	P.D. only	South	Dry	Changing lanes	Delivery van	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
17-014720	2017-Apr-25, Tue,08:10	Rain	Turning movement		North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-020139	2017-May-31, Wed,21:51	Clear	Sideswipe		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-024229	2017-Jun-30, Fri,04:02	Rain	Angle	Non-fatal injury	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					East	Wet	Going ahead	Pick-up truck	Other motor vehicle	Speed too fast for condition
17-028382	2017-Jul-27, Thu,00:00	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Passenger van	Pedestrian	Driving properly
Comments:						Dry				
17-032515	2017-Aug-24, Thu,12:15	Clear	Sideswipe		West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-033123	2017-Aug-28, Mon,14:10	Clear	Rear end		South	Dry	Going ahead	Passenger van	Other motor vehicle	Following too close
Comments:					South					
17-035371	2017-Sep-14, Thu,15:20	Clear	SMV other	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other	Other
Comments:					West	Dry	Turning left	Automobile, station wagon	Curb	Other
17-036978	2017-Sep-25, Mon,16:16	Clear	Rear end	P.D. only	East	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Passenger van	Other motor vehicle	Driving properly
17-038219	2017-Oct-03, Tue,20:00	Clear	Sideswipe		South	Dry	Going ahead	Motorcycle	Other motor vehicle	Improper lane change
Comments:					South	Dry	Stopped	Automobile, station wagon		Driving properly
17-038274	2017-Oct-03, Tue,15:30	Clear	Rear end		South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South					
17-039940	2017-Oct-14, Sat,15:55	Clear	Rear end		South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South					

17-040562	2017-Oct-20, Fri,16:00	Clear	Rear end		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-45990	2017-Nov-30, Thu,16:13	Clear	Sideswipe	P.D. only	East	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-47898	2017-Dec-15, Fri,14:30	Snow	Rear end		South	Slush	Going ahead	Automobile, station wagon	Skidding/sliding	Speed too fast for condition
Comments:					South	Loose snow	Stopped	Truck-other	Other motor vehicle	Driving properly
17-49568	2017-Dec-29, Fri,14:45	Clear	Sideswipe	P.D. only	South	Wet	Changing lanes	Truck - closed	Other motor vehicle	Improper lane change
Comments:					South	Wet	Going ahead	Truck - closed	Other motor vehicle	Driving properly
18-019273	2018-May-22, Tue,15:35	Clear	SMV other	Non-fatal injury	South	Dry	Turning right	Truck - closed		Driving properly
Comments:						Dry	Overtaking			
18-033785	2018-Aug-29, Wed,12:05	Clear	Turning movement	P.D. only	North	Dry	Turning left	Pick-up truck	Other motor vehicle	Improper turn
Comments:					South	Dry	Going ahead	Truck - dump	Other motor vehicle	Driving properly
18-03880	2018-Jan-29, Mon,15:36	Snow	Rear end		South	Ice	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Following too close
Comments:					South	Ice	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-040099	2018-Oct-10, Wed,18:30	Clear	Turning movement	Non-fatal injury	West	Dry	Turning right	Automobile, station wagon	Cyclist	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Bicycle	Other motor vehicle	Other
18-044078	2018-Nov-06, Tue,11:42	Clear			South	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
Comments:										
18-04774	2018-Feb-05, Mon,06:20	Clear	Rear end	Non-fatal injury	East	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Ice	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-04794	2018-Feb-05, Mon,08:40	Clear	Rear end		South	Ice	Slowing or stopping	Pick-up truck	Skidding/sliding	Speed too fast for condition
Comments:					South	Ice	Stopped	Passenger van	Other motor vehicle	Driving properly
18-049236	2018-Dec-13, Thu,23:30	Clear	Rear end		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South					

18-10196	2018-Mar-18, Sun,16:30	Clear	Sideswipe		South	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-001563	2019-Jan-11, Fri,19:00	Clear	Rear end		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-002482	2019-Jan-19, Sat,19:24	Snow	Rear end	P.D. only	South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					South	Loose snow	Stopped	Pick-up truck	Other motor vehicle	Driving properly
19-003490	2019-Jan-19, Sat,16:45	Snow	Rear end		South	Loose snow	Slowing or stopping	Pick-up truck	Skidding/sliding	Speed too fast for condition
Comments:					South	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-003515	2019-Jan-26, Sat,19:30	Clear	Sideswipe		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-004059	2019-Feb-01, Fri,06:30	Clear	SMV other		East	Ice	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Driving properly
Comments:										
19-11230	2019-Mar-29, Fri,08:45	Clear	Rear end	P.D. only	South	Dry	Going ahead	Passenger van	Other motor vehicle	Following too close
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-15369	2019-Apr-29, Mon,15:00	Rain	Rear end	P.D. only	North	Wet	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Following too close
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-19902	2019-May-25, Sat,14:00	Clear	Turning movement	P.D. only	East	Dry	Turning left	Delivery van	Other motor vehicle	Driving properly
Comments:					East	Dry	Turning left	Passenger van	Other motor vehicle	Driving properly
19-22151	2019-Jun-14, Fri,09:40	Clear	Sideswipe	P.D. only	West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
19-22812	2019-Jun-18, Tue,19:40	Clear	Sideswipe	P.D. only	South	Dry	Changing lanes	Passenger van	Other motor vehicle	Improper lane change
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

19-34993	2019-Sep-10, Tue,16:10	Clear	Sideswipe	P.D. only	East	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-40450	2019-Oct-17, Thu,19:18	Clear	Rear end	P.D. only	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry				
19-44755	2019-Nov-20, Wed,13:45	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Stopped		Other motor vehicle	
19-44994	2019-Nov-21, Thu,08:30	Clear	Rear end	P.D. only	East	Wet	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close
Comments:					East	Wet	Stopped		Other motor vehicle	
19-47373	2019-Dec-10, Tue,14:40	Clear	Sideswipe	P.D. only	South	Dry	Changing lanes	Pick-up truck	Other motor vehicle	Improper lane change
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-49785	2019-Dec-30, Mon,00:17	Rain	Angle	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:	D1 HTA 200(1)(A) PART3, D1 HTA 144(18) PART 3				East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2015 **To:** December 31, 2019

Location ..... ICOMM DR @ MARKET ST S **Municipality.....** BRANTFORD

Traffic Control.... Traffic signal **Total Collisions....** 42

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
008646	2017-Mar-10, Fri,16:28	Drifting Snow	Rear end	P.D. only	North	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Lost control	
Comments:					North	Loose snow	Stopped	Municipal transit bus	Other motor vehicle	Driving properly	
026188	2017-Jul-13, Thu,12:59	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-002178	2015-Jan-22, Thu,12:10	Clear	Sideswipe		West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					West						
15-012286	2015-Apr-25, Sat,10:25	Clear	Turning movement		East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly	
15-019271	2015-Jun-18, Thu,18:30	Clear	Rear end	P.D. only	North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
15-02178	2015-Jan-22, Thu,12:10	Clear	Sideswipe		East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					East						
15-021915	2015-Jul-09, Thu,12:48	Clear	SMV other	Non-fatal injury	West	Dry	Turning right	Automobile, station wagon	Pedestrian	Failed to yield right-of-way	
Comments:						Dry					
15-025567	2015-Aug-05, Wed,10:25	Clear	Turning movement		North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Other	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-035078	2015-Oct-16, Fri,16:00	Clear	Rear end		North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North						

15-035541	2015-Oct-20, Tue,15:10	Clear	Sideswipe		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-040511	2015-Nov-27, Fri,17:30	Rain	Turning movement		North	Wet	Turning left	Pick-up truck	Other motor vehicle	Driving properly
Comments:							Going ahead			
15-041394	2015-Dec-04, Fri,15:57	Clear	Turning movement	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
15-042613	2015-Dec-14, Mon,15:20	Rain	Sideswipe		East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	
Comments:					East					
15-06750	2015-Mar-06, Fri,22:25	Clear	Other	P.D. only	East	Dry	Turning right	Unknown	Other motor vehicle	Improper turn
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
15-07076	2015-Mar-08, Sun,13:30	Clear	Other		West	Dry	Making "U" turn	Automobile, station wagon	Other motor vehicle	Other
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-07104	2015-Mar-10, Tue,14:12	Clear	SMV other	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				
16-008170	2016-Mar-08, Tue,00:15	Clear	Rear end		East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-008454	2016-Mar-08, Tue,17:30	Clear	Rear end		North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-029297	2016-Aug-10, Wed,13:03	Clear	SMV other	Non-fatal injury	South	Dry	Turning right	Automobile, station wagon	Pedestrian	Failed to yield right-of-way
Comments:						Dry				
16-038832	2016-Oct-15, Sat,12:30	Clear	Turning movement		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					West	Dry	Turning left	Pick-up truck	Other motor vehicle	Driving properly
16-041196	2016-Nov-01, Tue,03:16	Clear	SMV unattended vehicle	P.D. only	West	Dry	Turning right	Automobile, station wagon	Unattended vehicle	Improper turn
Comments:						Dry	Parked	Automobile, station wagon	Other motor vehicle	

16-047924	2016-Dec-31, Sat,23:55	Snow	Turning movement	P.D. only	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Turning left	Passenger van	Other motor vehicle	Failed to yield right-of-way
17-001767	2017-Jan-15, Sun,11:35	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Passenger van	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Pick-up truck		Driving properly
17-004731	2017-Feb-08, Wed,14:00	Clear	SMV other	P.D. only	South	Dry	Turning right	Truck - tractor	Pole (utility, power)	Improper turn
Comments:						Dry				
17-008646	2017-Mar-10, Fri,16:28	Drifting Snow	Rear end	P.D. only	North	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					North	Loose snow	Stopped	Municipal transit bus	Other motor vehicle	Driving properly
17-40586	2017-Oct-20, Fri,20:08	Clear	Turning movement	Non-reportable	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-40804	2017-Oct-22, Sun,00:00	Clear	Sideswipe	Non-reportable	North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					North		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-44921	2017-Nov-18, Sat,19:01	Rain			North	Wet	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-45696	2017-Oct-28, Sat,17:30	Clear	Sideswipe	P.D. only	East	Dry	Going ahead	Passenger van	Other motor vehicle	Improper lane change
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-46058	2017-Dec-01, Fri,08:43	Clear	SMV other	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Pedestrian	Improper turn
Comments:						Dry				
18-00966	2018-Jan-08, Mon,18:58	Snow	SMV other	P.D. only	South	Slush	Turning right	Truck - tractor	Pole (utility, power)	Improper turn
Comments:						Slush				
18-019147	2018-May-21, Mon,17:41	Clear	SMV other	Non-fatal injury	East	Dry	Turning right	Passenger van	Curb	Exceeding speed limit
Comments:						Dry				
18-031191	2018-Aug-11, Sat,16:40	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

18-045537	2018-Nov-15, Thu,16:20	Snow	Turning movement		South	Slush	Turning right	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					North	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-11383	2018-Mar-26, Mon,17:30	Clear	Rear end		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-01240	2019-Jan-09, Wed,19:56	Clear	Turning movement	P.D. only	South	Dry	Turning left	Pick-up truck	Other motor vehicle	Improper turn
Comments:	D1 HTA 154(1)(A) 9104953Z				South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-36000	2019-Sep-16, Mon,15:30	Clear	Rear end	P.D. only	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry		Unknown	Other motor vehicle	
19-40062	2019-Oct-15, Tue,19:40	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
19-45745	2019-Nov-27, Wed,20:50	Clear	Turning movement	P.D. only	East	Dry	Turning left	Pick-up truck	Other motor vehicle	
Comments:					East	Dry	Going ahead		Other motor vehicle	
19-47220	2019-Dec-09, Mon,11:55	Clear	Turning movement	P.D. only	East	Dry	Turning right	Pick-up truck	Other motor vehicle	Disobeyed traffic control
Comments:	D1 HTA 130(1)				South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
BR-18048553	2018-Dec-07, Fri,17:15	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
BR-18048830	2018-Dec-10, Mon,17:20	Clear	Turning movement	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Improper turn

Collision Details Report

From: January 1, 2015 **To:** December 31, 2019

Location ..... CLARENCE ST S @ ICOMM DR **Municipality.....** BRANTFORD

Traffic Control.... Traffic signal **Total Collisions....** 72

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
015162	2017-Apr-28, Fri,15:48	Clear	Rear end	P.D. only	North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Other	
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
016897	2017-May-11, Thu,10:25	Clear	SMV unattended vehicle	P.D. only	East	Dry	Turning right	Pick-up truck	Unattended vehicle	Improper turn	
Comments:					East	Dry	Parked	Automobile, station wagon	Other motor vehicle		
019668	2017-May-29, Mon,00:00	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-016342	2015-May-27, Wed,05:32	Clear	SMV other	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other	Improper turn	
Comments:						Dry					
15-017946	2015-Jun-08, Mon,11:00	Rain	Rear end		South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South						
15-020700	2015-Jun-30, Tue,10:42	Clear	Turning movement		North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-022195	2015-Jul-11, Sat,15:50	Clear	Turning movement	Non-fatal injury	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					North	Dry	Turning left	Passenger van	Other motor vehicle	Improper turn	
15-022828	2015-Jul-16, Thu,19:08	Clear	Approaching	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-029926	2015-Sep-07, Mon,10:18	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

15-035079	2015-Oct-16, Fri,17:00	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-036527	2015-Oct-27, Tue,11:00	Clear	Turning movement		East	Dry	Turning right	Passenger van	Other motor vehicle	Driving properly
Comments:							Going ahead			
15-03713	2015-Feb-06, Fri,12:40	Clear	Angle		South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Disobeyed traffic control
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-038105	2015-Nov-09, Mon,09:04	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-039624	2015-Nov-20, Fri,19:42	Clear	Angle	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
15-040161	2015-Nov-25, Wed,08:30	Clear	Turning movement		South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
15-042830	2015-Dec-16, Wed,19:28	Clear	Turning movement	Non-fatal injury	East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					West	Wet	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
15-05189	2015-Feb-20, Fri,15:42	Clear	Sideswipe		South	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					South	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly
15-05913	2015-Feb-27, Fri,10:20	Clear	Rear end	P.D. only	East	Dry	Going ahead	Truck - closed	Other motor vehicle	Following too close
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-007180	2016-Feb-27, Sat,21:30	Clear	Rear end		East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East					
16-009328	2016-Mar-17, Thu,21:42	Clear	Turning movement	Non-fatal injury	South	Dry	Going ahead	Passenger van	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Turning left	Automobile, station wagon		Driving properly

16-009666	2016-Mar-20, Sun,13:10	Clear	Other	Non-reportable	East	Dry	Reversing	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-010163	2016-Mar-24, Thu,14:10	Rain	Rear end	Non-fatal injury	North	Wet	Going ahead	Pick-up truck	Other motor vehicle	Disobeyed traffic control
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-014582	2016-Apr-21, Thu,14:45	Rain	SMV other		South	Wet	Going ahead	Automobile, station wagon	Other	Driving properly
Comments:										
16-016312	2016-May-11, Wed,11:30	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Following too close
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-019639	2016-Jun-03, Fri,19:00	Clear	Rear end		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-019641	2016-Jun-04, Sat,14:35	Clear	Sideswipe		North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
16-021082	2016-Jun-14, Tue,17:57	Clear	Sideswipe		South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-023758	2016-Jul-02, Sat,20:29	Clear	Angle	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
16-027022	2016-Jul-26, Tue,12:30	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-027513	2016-Jul-29, Fri,13:00	Clear	Sideswipe	P.D. only	South	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper passing
Comments:					South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
16-028515	2016-Aug-05, Fri,08:59	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

16-030856	2016-Aug-19, Fri,20:30	Clear	Rear end		East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East					
16-031812	2016-Aug-26, Fri,22:06	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Bicycle	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Automobile, station wagon	Cyclist	Driving properly
16-035987	2016-Sep-25, Sun,14:00	Clear	Sideswipe		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-047144	2016-Dec-15, Thu,13:30	Clear	Sideswipe		South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-047147	2016-Dec-15, Thu,14:32	Clear	Turning movement		North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:							Going ahead			
16-048890	2016-Dec-29, Thu,20:00	Snow	Rear end		South	Ice	Slowing or stopping	Automobile, station wagon	Skidding/sliding	Driving properly
Comments:					South	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-001081	2017-Jan-09, Mon,19:45	Clear	Turning movement	Non-fatal injury	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-010262	2017-Mar-23, Thu,15:40	Clear	Turning movement	Non-fatal injury	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-011056	2017-Mar-29, Wed,12:45	Clear	Sideswipe	P.D. only	West	Dry	Going ahead	Truck - closed	Other motor vehicle	Improper passing
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-027033	2017-Jul-18, Tue,17:00	Clear	Rear end		North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-038541	2017-Oct-06, Fri,15:36	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

17-42362	2017-Nov-02, Thu,13:00	Rain	Angle	Non-fatal injury	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-43182	2017-Nov-08, Wed,22:14	Clear				Dry		Automobile, station wagon		Improper turn
Comments:						Dry		Automobile, station wagon		Driving properly
17-43288	2017-Nov-09, Thu,17:55	Rain	Rear end	Non-fatal injury	South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Wet	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
17-47889	2017-Dec-14, Thu,23:00	Clear	Rear end		East	Slush	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Slush	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
18-00551	2018-Jan-05, Fri,09:00	Clear	Sideswipe		South	Dry	Changing lanes	Passenger van	Other motor vehicle	Following too close
Comments:					South	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
18-016926	2018-May-07, Mon,10:45	Clear	Sideswipe		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South					
18017472	2018-May-10, Thu,13:15	Clear	Sideswipe		South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-017472	2018-May-10, Thu,13:15	Clear	Sideswipe		South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-01931	2018-Jan-14, Sun,09:00	Clear	Rear end		East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East					
18-026025	2018-Jul-06, Fri,13:15	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-027705	2018-Jul-16, Mon,11:00	Clear	Rear end		North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North					
18-033983	2018-Aug-30, Thu,15:00	Clear	SMV other	Non-fatal injury	West	Dry	Slowing or stopping	Automobile, station wagon	Pedestrian	Disobeyed traffic control
Comments:						Dry				

18-037929	2018-Sep-25, Tue,20:41	Rain	Rear end	P.D. only	North	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-044246	2018-Nov-07, Wed,19:22	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-046476	2018-Nov-23, Fri,07:50	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Pick-up truck	Other motor vehicle	Improper turn
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-047621	2018-Dec-01, Sat,19:05	Rain	Turning movement	Non-fatal injury	South	Wet	Turning left	Passenger van	Other motor vehicle	Failed to yield right-of-way
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-050550	2018-Dec-23, Sun,13:00	Clear	Rear end		East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-003543	2019-Jan-27, Sun,23:30	Snow	Other		East	Loose snow	Reversing	Pick-up truck	Other motor vehicle	Driving properly
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-04438	2019-Feb-03, Sun,14:15	Clear	Turning movement	P.D. only	North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:	vehicle 2 info missing from collision report					Dry				
19-06795	2019-Feb-21, Thu,17:45	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-13146	2019-Apr-12, Fri,21:21	Clear	Sideswipe	P.D. only	West	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	
19-15648	2019-May-01, Wed,15:20	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-18702	2019-May-22, Wed,16:50	Rain	Rear end	P.D. only	South	Wet	Going ahead	Pick-up truck	Other motor vehicle	Following too close
Comments:	This was a three vehicle collision				South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly

19-27615	2019-Jul-21, Sun,18:00	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:	D1 HTA 144(18) 9017419Z				East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-33030	2019-Aug-27, Tue,23:35	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
19-33579	2019-Aug-31, Sat,17:12	Clear	Turning movement	Non-fatal injury	East	Dry	Turning left	Bicycle	Other motor vehicle	Improper turn
Comments:					West	Dry	Going ahead	Pick-up truck	Cyclist	Driving properly
19-40261	2019-Oct-16, Wed,20:00	Rain	Rear end	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-44655	2019-Nov-19, Tue,17:25	Clear	Turning movement	P.D. only	West	Dry	Turning left	Passenger van	Other motor vehicle	
Comments:					East		Going ahead		Other motor vehicle	
19-46087	2019-Nov-30, Sat,13:40	Clear	Rear end	P.D. only	North	Dry	Going ahead	Passenger van	Other motor vehicle	
Comments:					North	Dry	Stopped	Pick-up truck	Other motor vehicle	
19-48982	2019-Dec-22, Sun,19:51	Clear	Turning movement	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Appendix D

Detour Traffic Operations Reports

Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	801	78	158	350	73	67	130	370	134	140	50
Future Volume (vph)	90	801	78	158	350	73	67	130	370	134	140	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	70.0			70.0			85.0			50.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor			0.99	1.00			1.00		0.98	0.99	1.00	
Frt			0.850			0.850			0.850		0.961	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1671	3505	1553	1671	3406	1583	1626	3471	1568	1736	3355	0
Flt Permitted	0.464			0.326			0.623			0.620		
Satd. Flow (perm)	816	3505	1533	573	3406	1583	1062	3471	1534	1123	3355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			85			133			162		54	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		260.6			217.6			319.9			889.7	
Travel Time (s)		13.4			11.2			23.0			64.1	
Confl. Peds. (#/hr)			1	1			5		10	10		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	3%	4%	8%	6%	2%	11%	4%	3%	4%	4%	0%
Adj. Flow (vph)	98	871	85	172	380	79	73	141	402	146	152	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	871	85	172	380	79	73	141	402	146	206	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												
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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	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	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	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	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	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	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	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	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	

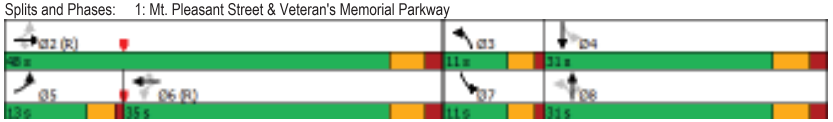
Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	6	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	11.0	34.0	34.0	34.0	34.0	34.0	11.0	33.0	33.0	11.0	33.0	
Total Split (s)	13.0	48.0	48.0	35.0	35.0	35.0	11.0	31.0	31.0	11.0	31.0	
Total Split (%)	14.4%	53.3%	53.3%	38.9%	38.9%	38.9%	12.2%	34.4%	34.4%	12.2%	34.4%	
Maximum Green (s)	9.0	42.0	42.0	29.0	29.0	29.0	7.0	25.0	25.0	7.0	25.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		21.0	21.0	21.0	21.0	21.0		20.0	20.0		20.0	
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	
Act Effct Green (s)	49.3	47.3	47.3	37.5	37.5	37.5	28.7	19.7	19.7	29.5	21.9	
Actuated g/C Ratio	0.55	0.53	0.53	0.42	0.42	0.42	0.32	0.22	0.22	0.33	0.24	
v/c Ratio	0.19	0.47	0.10	0.72	0.27	0.11	0.19	0.19	0.87	0.35	0.24	
Control Delay	12.4	15.5	3.6	47.3	20.3	1.2	18.5	27.5	39.3	21.3	20.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	12.4	15.5	3.6	47.3	20.3	1.2	18.5	27.5	39.3	21.3	20.3	
LOS	B	B	A	D	C	A	B	C	D	C	C	
Approach Delay		14.3			25.3			34.1			20.7	
Approach LOS		B			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 40 (44%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 22.4		Intersection LOS: C	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Mt. Pleasant Street & Veteran's Memorial Parkway



Queues
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	98	871	85	172	380	79	73	141	402	146	206
v/c Ratio	0.19	0.47	0.10	0.72	0.27	0.11	0.19	0.19	0.87	0.35	0.24
Control Delay	12.4	15.5	3.6	47.3	20.3	1.2	18.5	27.5	39.3	21.3	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	15.5	3.6	47.3	20.3	1.2	18.5	27.5	39.3	21.3	20.3
Queue Length 50th (m)	8.3	51.6	0.0	27.4	25.1	0.0	8.5	10.8	42.7	17.7	11.7
Queue Length 95th (m)	18.0	74.6	7.7	#70.7	39.9	2.6	16.4	17.7	#78.2	29.2	19.9
Internal Link Dist (m)		236.6			193.6			295.9			865.7
Turn Bay Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0	
Base Capacity (vph)	532	1843	846	238	1419	737	382	964	543	415	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.47	0.10	0.72	0.27	0.11	0.19	0.15	0.74	0.35	0.21

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	801	78	158	350	73	67	130	370	134	140	50
Future Volume (vph)	90	801	78	158	350	73	67	130	370	134	140	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1671	3505	1533	1671	3406	1583	1622	3471	1534	1727	3354	
Flt Permitted	0.46	1.00	1.00	0.33	1.00	1.00	0.62	1.00	1.00	0.62	1.00	
Satd. Flow (perm)	816	3505	1533	573	3406	1583	1063	3471	1534	1128	3354	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	871	85	172	380	79	73	141	402	146	152	54
RTOR Reduction (vph)	0	0	41	0	0	47	0	0	125	0	41	0
Lane Group Flow (vph)	98	871	44	172	380	32	73	141	277	146	165	0
Confl. Peds. (#/hr)			1	1			5		10	10		5
Heavy Vehicles (%)	8%	3%	4%	8%	6%	2%	11%	4%	3%	4%	4%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	46.5	46.5	46.5	35.9	35.9	35.9	26.1	20.5	20.5	28.9	21.9	
Effective Green, g (s)	46.5	46.5	46.5	35.9	35.9	35.9	26.1	20.5	20.5	28.9	21.9	
Actuated g/C Ratio	0.52	0.52	0.52	0.40	0.40	0.40	0.29	0.23	0.23	0.32	0.24	
Clearance Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	484	1810	792	228	1358	631	343	790	349	408	816	
v/s Ratio Prot	0.01	c0.25			0.11		0.01	0.04		c0.03	0.05	
v/s Ratio Perm	0.09		0.03	c0.30		0.02	0.05		c0.18	0.09		
v/c Ratio	0.20	0.48	0.06	0.75	0.28	0.05	0.21	0.18	0.79	0.36	0.20	
Uniform Delay, d1	11.3	14.0	10.8	23.3	18.3	16.6	23.8	28.0	32.8	22.7	27.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.9	0.1	20.5	0.5	0.1	0.3	0.1	11.7	0.5	0.1	
Delay (s)	11.5	14.9	11.0	43.7	18.8	16.7	24.1	28.1	44.5	23.2	27.2	
Level of Service	B	B	B	D	B	B	C	C	D	C	C	
Approach Delay (s)		14.3			25.3			38.3			25.6	
Approach LOS		B			C			D			C	

Intersection Summary					
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.71				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	68.4%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	448	7	219	378	0	12	3	174	2	1	5
Future Volume (vph)	2	448	7	219	378	0	12	3	174	2	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00		1.00	0.98			0.99	
Frt		0.998						0.852			0.916	
Flt Protected					0.982		0.950				0.988	
Satd. Flow (prot)	0	3458	0	0	3379	0	1656	1519	0	0	1704	0
Flt Permitted		0.954			0.655		0.752				0.766	
Satd. Flow (perm)	0	3299	0	0	2250	0	1308	1519	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3						189			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		277.2			409.8			889.7			110.5	
Travel Time (s)		20.0			29.5			64.1			8.0	
Confl. Peds. (#/hr)	4		10	10		4	2		3	3		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	14%	3%	6%	0%	9%	0%	5%	0%	0%	0%
Adj. Flow (vph)	2	487	8	238	411	0	13	3	189	2	1	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	497	0	0	649	0	13	192	0	0	8	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)		0.0			0.0			7.2			7.2	
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												
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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0		10.0	27.0		25.0	25.0		25.0	25.0	
Total Split (s)	48.0	48.0		10.0	58.0		22.0	22.0		22.0	22.0	
Total Split (%)	60.0%	60.0%		12.5%	72.5%		27.5%	27.5%		27.5%	27.5%	
Maximum Green (s)	42.0	42.0		6.0	52.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0			14.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		59.6			59.6		8.4	8.4			8.4	
Actuated g/C Ratio		0.74			0.74		0.10	0.10			0.10	
v/c Ratio		0.20			0.39		0.09	0.59			0.06	
Control Delay		3.5			3.6		32.5	13.3			23.3	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		3.5			3.6		32.5	13.3			23.3	
LOS		A			A		C	B			C	
Approach Delay		3.5			3.6			14.5			23.3	
Approach LOS		A			A			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 35 (44%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 5.3		Intersection LOS: A	
Intersection Capacity Utilization 61.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Mt. Pleasant Street/Plaza & Colborne Street West

Queues
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: AM Peak Hour

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	497	649	13	192	8
v/c Ratio	0.20	0.39	0.09	0.59	0.06
Control Delay	3.5	3.6	32.5	13.3	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	3.6	32.5	13.3	23.3
Queue Length 50th (m)	8.8	4.7	2.0	0.5	0.5
Queue Length 95th (m)	18.1	8.5	6.8	18.2	4.2
Internal Link Dist (m)	253.2	385.8		865.7	86.5
Turn Bay Length (m)					
Base Capacity (vph)	2458	1676	261	455	268
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.39	0.05	0.42	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	448	7	219	378	0	12	3	174	2	1	5
Future Volume (vph)	2	448	7	219	378	0	12	3	174	2	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.98			0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	
Frt		1.00			1.00		1.00	0.85			0.92	
Flt Protected		1.00			0.98		0.95	1.00			0.99	
Satd. Flow (prot)		3456			3372		1652	1520			1702	
Flt Permitted		0.95			0.66		0.75	1.00			0.77	
Satd. Flow (perm)		3296			2251		1308	1520			1320	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	487	8	238	411	0	13	3	189	2	1	5
RTOR Reduction (vph)	0	1	0	0	0	0	0	169	0	0	4	0
Lane Group Flow (vph)	0	496	0	0	649	0	13	23	0	0	4	0
Confl. Peds. (#/hr)	4		10	10		4	2		3	3		2
Heavy Vehicles (%)	0%	4%	14%	3%	6%	0%	9%	0%	5%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		59.6			59.6		8.4	8.4			8.4	
Effective Green, g (s)		59.6			59.6		8.4	8.4			8.4	
Actuated g/C Ratio		0.75			0.75		0.11	0.11			0.11	
Clearance Time (s)		6.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2455			1676		137	159			138	
v/s Ratio Prot								c0.02				
v/s Ratio Perm		0.15			c0.29		0.01				0.00	
v/c Ratio		0.20			0.39		0.09	0.14			0.03	
Uniform Delay, d1		3.1			3.7		32.4	32.5			32.1	
Progression Factor		1.00			0.73		1.00	1.00			1.00	
Incremental Delay, d2		0.2			0.1		0.3	0.4			0.1	
Delay (s)		3.2			2.8		32.7	32.9			32.2	
Level of Service		A			A		C	C			C	
Approach Delay (s)		3.2			2.8			32.9			32.2	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.38				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	61.1%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
3: Gilkison Street & Colborne Street West

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	634	7	76	563	41	68	9	123	45	2	24
Future Volume (vph)	6	634	7	76	563	41	68	9	123	45	2	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00			0.99			0.99	
Frt		0.998			0.991			0.917			0.954	
Flt Protected					0.994			0.983			0.969	
Satd. Flow (prot)	0	3446	0	0	3377	0	0	1470	0	0	1524	0
Flt Permitted		0.948			0.798			0.863			0.601	
Satd. Flow (perm)	0	3267	0	0	2709	0	0	1289	0	0	943	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			16			93			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			139.0			106.4			116.6	
Travel Time (s)		29.5			10.0			7.7			8.4	
Confl. Peds. (#/hr)	16		15	15		16	4		7	7		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	50%	5%	5%	5%	0%	13%	5%	3%	50%	0%
Parking (#/hr)								0			0	
Adj. Flow (vph)	7	689	8	83	612	45	74	10	134	49	2	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	704	0	0	740	0	0	218	0	0	77	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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.14	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	

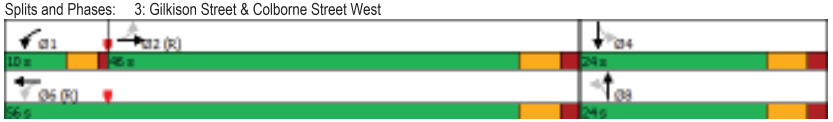
Lanes, Volumes, Timings
3: Gilkison Street & Colborne Street West

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		10.0	31.0		33.0	33.0		33.0	33.0	
Total Split (s)	46.0	46.0		10.0	56.0		24.0	24.0		24.0	24.0	
Total Split (%)	57.5%	57.5%		12.5%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	40.0	40.0		6.0	50.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		Max	C-Max		None	None		None	None	
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0			15.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		40.0			54.8			13.2			13.2	
Actuated g/C Ratio		0.50			0.68			0.16			0.16	
v/c Ratio		0.43			0.38			0.75			0.44	
Control Delay		17.7			4.9			34.0			28.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.7			4.9			34.0			28.1	
LOS		B			A			C			C	
Approach Delay		17.7			4.9			34.0			28.1	
Approach LOS		B			A			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 14.8		Intersection LOS: B	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Gilkison Street & Colborne Street West



Queues
3: Gilkison Street & Colborne Street West

Detour: AM Peak Hour

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	704	740	218	77
v/c Ratio	0.43	0.38	0.75	0.44
Control Delay	17.7	4.9	34.0	28.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.7	4.9	34.0	28.1
Queue Length 50th (m)	45.2	19.6	18.7	7.2
Queue Length 95th (m)	56.0	24.3	40.7	19.2
Internal Link Dist (m)	385.8	115.0	82.4	92.6
Turn Bay Length (m)				
Base Capacity (vph)	1634	1935	362	232
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.43	0.38	0.60	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Gilkison Street & Colborne Street West

Detour: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	634	7	76	563	41	68	9	123	45	2	24
Future Volume (vph)	6	634	7	76	563	41	68	9	123	45	2	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.92			0.95	
Flt Protected		1.00			0.99			0.98			0.97	
Satd. Flow (prot)		3445			3376			1469			1521	
Flt Permitted		0.95			0.80			0.86			0.60	
Satd. Flow (perm)		3267			2711			1289			943	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	689	8	83	612	45	74	10	134	49	2	26
RTOR Reduction (vph)	0	1	0	0	5	0	0	78	0	0	22	0
Lane Group Flow (vph)	0	703	0	0	735	0	0	140	0	0	55	0
Confl. Peds. (#/hr)	16		15	15		16	4		7	7		4
Heavy Vehicles (%)	0%	4%	50%	5%	5%	5%	0%	13%	5%	3%	50%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		40.0			54.8			13.2			13.2	
Effective Green, g (s)		40.0			54.8			13.2			13.2	
Actuated g/C Ratio		0.50			0.68			0.16			0.16	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1633			1946			212			155	
v/s Ratio Prot					c0.05							
v/s Ratio Perm		c0.22			0.21			c0.11			0.06	
v/c Ratio		0.43			0.38			0.66			0.36	
Uniform Delay, d1		12.7			5.4			31.3			29.6	
Progression Factor		1.31			0.80			1.00			1.00	
Incremental Delay, d2		0.8			0.4			7.5			1.4	
Delay (s)		17.4			4.6			38.9			31.0	
Level of Service		B			A			D			C	
Approach Delay (s)		17.4			4.6			38.9			31.0	
Approach LOS		B			A			D			C	

Intersection Summary					
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.48				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	800	680	120	0	0
Future Volume (vph)	0	800	680	120	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00
Frt			0.980			
Flt Protected						
Satd. Flow (prot)	0	3610	1862	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	3610	1862	0	0	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		139.0	290.1		218.0	
Travel Time (s)		10.0	20.9		15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	870	739	130	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	870	869	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	800	680	120	0	0
Future Volume (Veh/h)	0	800	680	120	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	870	739	130	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		139	290			
pX, platoon unblocked					0.88	
vC, conflicting volume	869				1239	804
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	869				1000	804
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	784				214	330

Direction, Lane #	EB 1	EB 2	WB 1
Volume Total	435	435	869
Volume Left	0	0	0
Volume Right	0	0	130
cSH	1700	1700	1700
Volume to Capacity	0.26	0.26	0.51
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

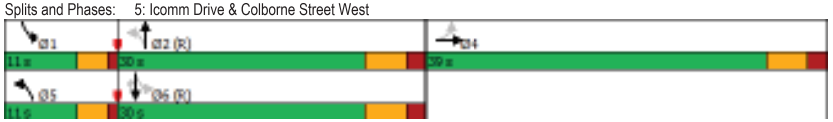
Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		46.4%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	591	177	32	0	0	0	44	467	22	118	322	756
Future Volume (vph)	591	177	32	0	0	0	44	467	22	118	322	756
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	200.0		5.0	0.0		0.0	115.0		215.0	25.0		0.0
Storage Lanes	1		0	0		0	1		0	0		1
Taper Length (m)	25.0			7.5			25.0			25.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.99	1.00					0.99	1.00			1.00	0.96
Frt		0.977						0.993				0.850
Flt Protected	0.950						0.950				0.987	
Satd. Flow (prot)	1736	1760	0	0	0	0	1612	3385	0	0	3275	1568
Flt Permitted	0.950						0.375				0.697	
Satd. Flow (perm)	1724	1760	0	0	0	0	631	3385	0	0	2309	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14						6				822
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		290.1			441.2			487.2			182.2	
Travel Time (s)		20.9			31.8			35.1			13.1	
Confl. Peds. (#/hr)	9		17	17		9	10		9	9		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	11%	0%	0%	0%	12%	6%	0%	11%	8%	3%
Adj. Flow (vph)	642	192	35	0	0	0	48	508	24	128	350	822
Shared Lane Traffic (%)												
Lane Group Flow (vph)	642	227	0	0	0	0	48	532	0	0	478	822
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												
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	2	1
Detector Template	Left	Thru					Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0					2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	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
Detector 1 Size(m)	2.0	0.6					2.0	0.6		2.0	0.6	2.0
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA					pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4						2			6		6
Detector Phase	4	4					5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0					7.0	10.0		7.0	10.0	10.0
Minimum Split (s)	38.0	38.0					11.0	31.0		11.0	31.0	31.0
Total Split (s)	39.0	39.0					11.0	30.0		11.0	30.0	30.0
Total Split (%)	48.8%	48.8%					13.8%	37.5%		13.8%	37.5%	37.5%
Maximum Green (s)	33.0	33.0					7.0	24.0		7.0	24.0	24.0
Yellow Time (s)	4.0	4.0					3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0					1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0					0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0					4.0	6.0			6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0					3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max					None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0						7.0			7.0	7.0
Flash Dont Walk (s)	25.0	25.0						18.0			18.0	18.0
Pedestrian Calls (#/hr)	0	0						0			0	0
Act Effct Green (s)	33.0	33.0					37.0	35.0			28.4	28.4
Actuated g/C Ratio	0.41	0.41					0.46	0.44			0.36	0.36
v/c Ratio	0.90	0.31					0.13	0.36			0.58	0.77
Control Delay	40.6	14.0					8.2	11.1			25.9	7.9
Queue Delay	0.0	0.0					0.0	0.0			0.0	0.0
Total Delay	40.6	14.0					8.2	11.1			25.9	7.9
LOS	D	B					A	B			C	A
Approach Delay		33.7						10.9			14.6	
Approach LOS		C						B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 60 (75%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 89.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Icomm Drive & Colborne Street West



Queues
5: Icomm Drive & Colborne Street West

Detour: AM Peak Hour

Lane Group	EBL	EBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	642	227	48	532	478	822
v/c Ratio	0.90	0.31	0.13	0.36	0.58	0.77
Control Delay	40.6	14.0	8.2	11.1	25.9	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	14.0	8.2	11.1	25.9	7.9
Queue Length 50th (m)	66.7	14.9	3.7	31.5	35.2	0.0
Queue Length 95th (m)	#148.7	33.3	m5.8	30.9	52.6	35.9
Internal Link Dist (m)		266.1		463.2	158.2	
Turn Bay Length (m)	200.0		115.0			
Base Capacity (vph)	711	734	377	1484	819	1067
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.31	0.13	0.36	0.58	0.77

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Icomm Drive & Colborne Street West

Detour: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	591	177	32	0	0	0	44	467	22	118	322	756
Future Volume (vph)	591	177	32	0	0	0	44	467	22	118	322	756
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0					4.0	6.0			6.0	6.0
Lane Util. Factor	1.00	1.00					1.00	0.95			0.95	1.00
Frpb, ped/bikes	1.00	1.00					1.00	1.00			1.00	0.96
Flpb, ped/bikes	0.99	1.00					1.00	1.00			1.00	1.00
Frt	1.00	0.98					1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			0.99	1.00
Satd. Flow (prot)	1724	1760					1608	3386			3268	1512
Flt Permitted	0.95	1.00					0.38	1.00			0.70	1.00
Satd. Flow (perm)	1724	1760					635	3386			2309	1512
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	642	192	35	0	0	0	48	508	24	128	350	822
RTOR Reduction (vph)	0	8	0	0	0	0	0	3	0	0	0	547
Lane Group Flow (vph)	642	219	0	0	0	0	48	529	0	0	478	275
Confl. Peds. (#/hr)	9		17	17		9	10		9	9		10
Heavy Vehicles (%)	4%	4%	11%	0%	0%	0%	12%	6%	0%	11%	8%	3%
Turn Type	Perm	NA					pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4						2			6		6
Actuated Green, G (s)	33.0	33.0					35.0	35.0			26.8	26.8
Effective Green, g (s)	33.0	33.0					35.0	35.0			26.8	26.8
Actuated g/C Ratio	0.41	0.41					0.44	0.44			0.34	0.34
Clearance Time (s)	6.0	6.0					4.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	711	726					328	1481			773	506
v/s Ratio Prot		0.12					0.01	c0.16				
v/s Ratio Perm	c0.37						0.06				c0.21	0.18
v/c Ratio	0.90	0.30					0.15	0.36			0.62	0.54
Uniform Delay, d1	22.0	15.8					13.3	15.0			22.3	21.6
Progression Factor	1.05	0.86					0.62	0.70			1.00	1.00
Incremental Delay, d2	15.7	1.0					0.2	0.6			1.5	4.2
Delay (s)	38.8	14.6					8.5	11.1			23.8	25.8
Level of Service	D	B					A	B			C	C
Approach Delay (s)		32.5			0.0			10.9			25.1	
Approach LOS		C			A			B			C	

Intersection Summary					
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	89.4%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	103	232	47	227	24	314	5	45	1	3	4
Future Volume (vph)	13	103	232	47	227	24	314	5	45	1	3	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		60.0	125.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	35.0			25.0			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor			0.99	1.00			0.99	0.96			0.99	
Frt			0.850		0.986			0.864			0.925	
Flt Protected	0.950			0.950			0.950				0.994	
Satd. Flow (prot)	1805	3223	1495	1805	3319	0	1736	1514	0	0	3281	0
Flt Permitted	0.584			0.681			0.752				0.941	
Satd. Flow (perm)	1110	3223	1473	1291	3319	0	1359	1514	0	0	3096	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			252		17			49			517	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		487.2			250.0			115.0			104.0	
Travel Time (s)		35.1			18.0			8.3			7.5	
Confl. Peds. (#/hr)			2	2			8		20	20		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	12%	8%	0%	8%	0%	4%	0%	5%	0%	0%	0%
Adj. Flow (vph)	14	112	252	51	247	26	341	5	49	1	3	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	112	252	51	273	0	341	54	0	0	8	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												
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	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		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	2.0	0.6		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	

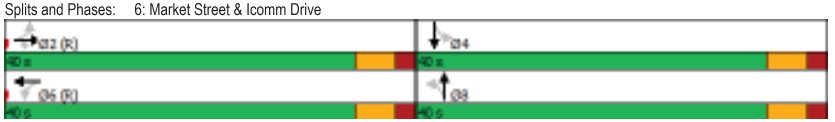
Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	34.0	34.0	34.0	34.0	34.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)	42.5	42.5	42.5	42.5	42.5		25.5	25.5			25.5	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.32	0.32			0.32	
v/c Ratio	0.02	0.07	0.28	0.07	0.15		0.79	0.10			0.01	
Control Delay	12.6	12.8	11.9	11.3	10.0		37.5	5.9			0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	12.6	12.8	11.9	11.3	10.0		37.5	5.9			0.0	
LOS	B	B	B	B	B		D	A			A	
Approach Delay		12.2			10.2			33.2				
Approach LOS		B			B			C				

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 40 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Market Street & Icomm Drive



Queues
6: Market Street & Icomm Drive

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	14	112	252	51	273	341	54	8
v/c Ratio	0.02	0.07	0.28	0.07	0.15	0.79	0.10	0.01
Control Delay	12.6	12.8	11.9	11.3	10.0	37.5	5.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	12.8	11.9	11.3	10.0	37.5	5.9	0.0
Queue Length 50th (m)	1.6	7.5	29.4	3.6	9.7	48.8	0.5	0.0
Queue Length 95th (m)	m3.8	m16.6	50.1	11.1	20.0	68.6	6.8	0.0
Internal Link Dist (m)		463.2			226.0		91.0	80.0
Turn Bay Length (m)	65.0		60.0	125.0				
Base Capacity (vph)	590	1713	901	686	1772	577	671	1613
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.28	0.07	0.15	0.59	0.08	0.00

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
6: Market Street & Icomm Drive

Detour: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	103	232	47	227	24	314	5	45	1	3	4
Future Volume (vph)	13	103	232	47	227	24	314	5	45	1	3	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00			0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.96			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.86			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1805	3223	1473	1801	3318		1716	1514			3269	
Flt Permitted	0.58	1.00	1.00	0.68	1.00		0.75	1.00			0.94	
Satd. Flow (perm)	1109	3223	1473	1291	3318		1359	1514			3094	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	112	252	51	247	26	341	5	49	1	3	4
RTOR Reduction (vph)	0	0	118	0	8	0	0	33	0	0	5	0
Lane Group Flow (vph)	14	112	134	51	265	0	341	21	0	0	3	0
Confl. Peds. (#/hr)			2	2			8		20	20		8
Heavy Vehicles (%)	0%	12%	8%	0%	8%	0%	4%	0%	5%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	42.5	42.5	42.5	42.5	42.5		25.5	25.5			25.5	
Effective Green, g (s)	42.5	42.5	42.5	42.5	42.5		25.5	25.5			25.5	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.32	0.32			0.32	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	589	1712	782	685	1762		433	482			986	
v/s Ratio Prot		0.03			0.08			0.01				
v/s Ratio Perm	0.01		c0.09	0.04			c0.25				0.00	
v/c Ratio	0.02	0.07	0.17	0.07	0.15		0.79	0.04			0.00	
Uniform Delay, d1	8.9	9.1	9.7	9.2	9.6		24.8	18.8			18.6	
Progression Factor	1.04	1.14	5.34	0.94	0.94		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.1	0.4	0.2	0.2		9.2	0.0			0.0	
Delay (s)	9.3	10.5	52.1	8.8	9.2		34.0	18.9			18.6	
Level of Service	A	B	D	A	A		C	B			B	
Approach Delay (s)		38.2			9.1			31.9			18.6	
Approach LOS		D			A			C			B	

Intersection Summary					
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.40				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	91	29	54	88	90	145	1065	55	46	480	71
Future Volume (vph)	103	91	29	54	88	90	145	1065	55	46	480	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	35.0		30.0	75.0		0.0	105.0		70.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	30.0			35.0			35.0			35.0		
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	1.00
Ped Bike Factor	1.00	1.00		1.00		0.99	0.99	1.00		1.00		0.98
Frt		0.963				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	3213	0	1612	3406	1538	1703	3502	0	1770	3505	1568
Flt Permitted	0.692			0.669			0.459			0.199		
Satd. Flow (perm)	1250	3213	0	1130	3406	1516	818	3502	0	371	3505	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32				74		11				77
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		250.0			209.3			381.6			258.2	
Travel Time (s)		18.0			15.1			27.5			18.6	
Confl. Peds. (#/hr)	3		7	7		3	17		1	1		17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	8%	7%	12%	6%	5%	6%	2%	8%	2%	3%	3%
Adj. Flow (vph)	112	99	32	59	96	98	158	1158	60	50	522	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	131	0	59	96	98	158	1218	0	50	522	77
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												
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	38.0	38.0		38.0	38.0	38.0	43.0	43.0		43.0	43.0	43.0
Total Split (s)	28.0	28.0		28.0	28.0	28.0	52.0	52.0		52.0	52.0	52.0
Total Split (%)	35.0%	35.0%		35.0%	35.0%	35.0%	65.0%	65.0%		65.0%	65.0%	65.0%
Maximum Green (s)	22.0	22.0		22.0	22.0	22.0	46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	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	C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	25.0	25.0		25.0	25.0	25.0	30.0	30.0		30.0	30.0	30.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effct Green (s)	12.5	12.5		12.5	12.5	12.5	55.5	55.5		55.5	55.5	55.5
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.69	0.69		0.69	0.69	0.69
v/c Ratio	0.58	0.25		0.34	0.18	0.33	0.28	0.50		0.19	0.21	0.07
Control Delay	29.5	11.2		33.6	28.4	13.4	7.2	7.1		7.9	5.2	1.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	29.5	11.2		33.6	28.4	13.4	7.2	7.1		7.9	5.2	1.7
LOS	C	B		C	C	B	A	A		A	A	A
Approach Delay		19.6			23.8			7.1			5.0	
Approach LOS		B			C			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 75 (94%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 69.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 7: Clarence Street South & Icomm Drive/Greenwich Street

Queues
7: Clarence Street South & Icomm Drive/Greenwich Street

Detour: AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	112	131	59	96	98	158	1218	50	522	77
v/c Ratio	0.58	0.25	0.34	0.18	0.33	0.28	0.50	0.19	0.21	0.07
Control Delay	29.5	11.2	33.6	28.4	13.4	7.2	7.1	7.9	5.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	11.2	33.6	28.4	13.4	7.2	7.1	7.9	5.2	1.7
Queue Length 50th (m)	9.4	3.2	8.5	7.1	3.4	8.0	39.7	2.4	13.2	0.0
Queue Length 95th (m)	17.3	7.3	18.3	12.7	15.1	21.2	68.5	8.9	24.4	4.5
Internal Link Dist (m)		226.0		185.3			357.6		234.2	
Turn Bay Length (m)	75.0		35.0		30.0	75.0		105.0		70.0
Base Capacity (vph)	343	906	310	936	470	567	2433	257	2432	1086
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.14	0.19	0.10	0.21	0.28	0.50	0.19	0.21	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis
7: Clarence Street South & Icomm Drive/Greenwich Street

Detour: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	91	29	54	88	90	145	1065	55	46	480	71
Future Volume (vph)	103	91	29	54	88	90	145	1065	55	46	480	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1716	3214		1605	3406	1516	1694	3501		1769	3505	1532
Flt Permitted	0.69	1.00		0.67	1.00	1.00	0.46	1.00		0.20	1.00	1.00
Satd. Flow (perm)	1249	3214		1130	3406	1516	818	3501		371	3505	1532
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	99	32	59	96	98	158	1158	60	50	522	77
RTOR Reduction (vph)	0	27	0	0	0	62	0	3	0	0	0	24
Lane Group Flow (vph)	112	104	0	59	96	36	158	1215	0	50	522	53
Confl. Peds. (#/hr)	3		7	7		3	17		1	1		17
Heavy Vehicles (%)	5%	8%	7%	12%	6%	5%	6%	2%	8%	2%	3%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5	12.5	55.5	55.5		55.5	55.5	55.5
Effective Green, g (s)	12.5	12.5		12.5	12.5	12.5	55.5	55.5		55.5	55.5	55.5
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16	0.69	0.69		0.69	0.69	0.69
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	195	502		176	532	236	567	2428		257	2431	1062
v/s Ratio Prot		0.03			0.03			c0.35			0.15	
v/s Ratio Perm	c0.09			0.05		0.02	0.19			0.13		0.03
v/c Ratio	0.57	0.21		0.34	0.18	0.15	0.28	0.50		0.19	0.21	0.05
Uniform Delay, d1	31.3	29.4		30.1	29.3	29.2	4.7	5.7		4.3	4.4	3.9
Progression Factor	0.58	0.48		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.0	0.2		1.1	0.2	0.3	1.2	0.7		1.7	0.2	0.1
Delay (s)	22.3	14.4		31.2	29.5	29.5	5.9	6.5		6.0	4.6	4.0
Level of Service	C	B		C	C	C	A	A		A	A	A
Approach Delay (s)		18.1			29.9			6.4			4.6	
Approach LOS		B			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	69.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	979	98	201	352	6	76	185	335	4	87	3
Future Volume (vph)	16	979	98	201	352	6	76	185	335	4	87	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	85.0		0.0	30.0		30.0	30.0		0.0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (m)	50.0			0.0			40.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00		1.00		0.99	1.00	1.00	
Frt			0.850		0.997				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	1495	1703	3366	0	1671	1863	1553	1805	1819	0
Flt Permitted	0.521			0.184			0.694			0.511		
Satd. Flow (perm)	989	3539	1495	330	3366	0	1220	1863	1531	969	1819	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			106		4				200		2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		353.8			381.6			274.8			143.3	
Travel Time (s)		25.5			27.5			19.8			10.3	
Confl. Peds. (#/hr)	1					1	1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	8%	6%	7%	0%	8%	2%	4%	0%	4%	0%
Adj. Flow (vph)	17	1064	107	218	383	7	83	201	364	4	95	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	1064	107	218	390	0	83	201	364	4	98	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												
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	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	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	2.0	0.6		2.0	0.6	2.0	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	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	0.0	
Detector 1 Queue (s)	0.0	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	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	

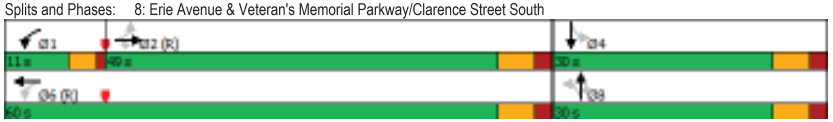
Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	33.0	33.0	33.0	11.0	33.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	49.0	49.0	49.0	11.0	60.0		30.0	30.0	30.0	30.0	30.0	
Total Split (%)	54.4%	54.4%	54.4%	12.2%	66.7%		33.3%	33.3%	33.3%	33.3%	33.3%	
Maximum Green (s)	43.0	43.0	43.0	7.0	54.0		24.0	24.0	24.0	24.0	24.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	20.0	20.0	20.0		20.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0	0	0	0	
Act Effct Green (s)	48.7	48.7	48.7	63.2	61.2		16.8	16.8	16.8	16.8	16.8	
Actuated g/C Ratio	0.54	0.54	0.54	0.70	0.68		0.19	0.19	0.19	0.19	0.19	
v/c Ratio	0.03	0.56	0.12	0.60	0.17		0.37	0.58	0.81	0.02	0.29	
Control Delay	12.3	16.0	3.2	14.3	6.1		34.6	39.1	29.7	26.0	31.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	12.3	16.0	3.2	14.3	6.1		34.6	39.1	29.7	26.0	31.0	
LOS	B	B	A	B	A		C	D	C	C	C	
Approach Delay		14.8			9.0			33.2			30.8	
Approach LOS		B			A			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 66 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 18.8		Intersection LOS: B	
Intersection Capacity Utilization 68.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South



Queues

8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	17	1064	107	218	390	83	201	364	4	98
v/c Ratio	0.03	0.56	0.12	0.60	0.17	0.37	0.58	0.81	0.02	0.29
Control Delay	12.3	16.0	3.2	14.3	6.1	34.6	39.1	29.7	26.0	31.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	16.0	3.2	14.3	6.1	34.6	39.1	29.7	26.0	31.0
Queue Length 50th (m)	1.4	64.8	0.1	11.3	11.3	13.4	33.9	28.9	0.6	15.3
Queue Length 95th (m)	5.2	94.1	8.5	#30.7	22.2	24.6	50.4	57.1	3.2	26.5
Internal Link Dist (m)		329.8			357.6		250.8			119.3
Turn Bay Length (m)	50.0		50.0	85.0		30.0		30.0	30.0	
Base Capacity (vph)	534	1913	856	362	2291	325	496	554	258	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.56	0.13	0.60	0.17	0.26	0.41	0.66	0.02	0.20

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	979	98	201	352	6	76	185	335	4	87	3
Future Volume (vph)	16	979	98	201	352	6	76	185	335	4	87	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1803	3539	1495	1703	3367		1670	1863	1531	1802	1820	
Flt Permitted	0.52	1.00	1.00	0.18	1.00		0.69	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	990	3539	1495	329	3367		1219	1863	1531	970	1820	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	1064	107	218	383	7	83	201	364	4	95	3
RTOR Reduction (vph)	0	0	49	0	1	0	0	0	163	0	2	0
Lane Group Flow (vph)	17	1064	58	218	389	0	83	201	201	4	96	0
Confl. Peds. (#/hr)	1					1	1		2	2		1
Heavy Vehicles (%)	0%	2%	8%	6%	7%	0%	8%	2%	4%	0%	4%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	48.6	48.6	48.6	61.2	61.2		16.8	16.8	16.8	16.8	16.8	
Effective Green, g (s)	48.6	48.6	48.6	61.2	61.2		16.8	16.8	16.8	16.8	16.8	
Actuated g/C Ratio	0.54	0.54	0.54	0.68	0.68		0.19	0.19	0.19	0.19	0.19	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	534	1911	807	355	2289		227	347	285	181	339	
v/s Ratio Prot		0.30		c0.06	0.12			0.11			0.05	
v/s Ratio Perm	0.02		0.04	c0.36			0.07		c0.13	0.00		
v/c Ratio	0.03	0.56	0.07	0.61	0.17		0.37	0.58	0.71	0.02	0.28	
Uniform Delay, d1	9.7	13.6	9.9	8.1	5.2		31.9	33.4	34.3	29.9	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.2	0.2	3.1	0.2		1.0	2.3	7.8	0.0	0.5	
Delay (s)	9.8	14.8	10.1	11.3	5.4		33.0	35.7	42.0	29.9	31.9	
Level of Service	A	B	B	B	A		C	D	D	C	C	
Approach Delay (s)		14.3			7.5			38.9			31.8	
Approach LOS		B			A			D			C	

Intersection Summary					
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.66				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	68.9%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Future Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	70.0			70.0			85.0			50.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor			0.98	1.00			0.99		0.98	0.99	0.98	
Frt			0.850			0.850			0.850		0.917	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3539	1599	1787	3574	1599	1736	3539	1583	1805	3245	0
Flt Permitted	0.185			0.366			0.625			0.620		
Satd. Flow (perm)	341	3539	1566	686	3574	1599	1128	3539	1552	1170	3245	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			187			202		112	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		260.6			217.6			319.9			889.7	
Travel Time (s)		13.4			11.2			23.0			64.1	
Confl. Peds. (#/hr)			9	9			16		8	8		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	1%	1%	1%	1%	4%	2%	2%	0%	1%	0%
Adj. Flow (vph)	78	754	113	436	1010	242	84	96	276	157	90	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	754	113	436	1010	242	84	96	276	157	202	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												
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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	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	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	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	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	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	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	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	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	

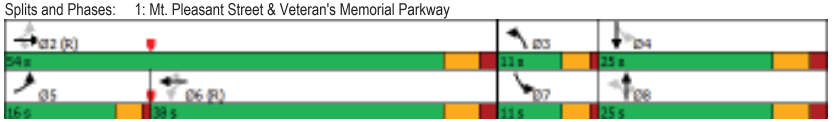
Lanes, Volumes, Timings
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	6	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	11.0	34.0	34.0	34.0	34.0	34.0	11.0	33.0	33.0	11.0	33.0	
Total Split (s)	16.0	54.0	54.0	38.0	38.0	38.0	11.0	25.0	25.0	11.0	25.0	
Total Split (%)	17.8%	60.0%	60.0%	42.2%	42.2%	42.2%	12.2%	27.8%	27.8%	12.2%	27.8%	
Maximum Green (s)	12.0	48.0	48.0	32.0	32.0	32.0	7.0	19.0	19.0	7.0	19.0	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		21.0	21.0	21.0	21.0	21.0		20.0	20.0		20.0	
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	
Act Effct Green (s)	57.7	55.7	55.7	46.4	46.4	46.4	20.3	11.3	11.3	21.1	13.5	
Actuated g/C Ratio	0.64	0.62	0.62	0.52	0.52	0.52	0.23	0.13	0.13	0.23	0.15	
v/c Ratio	0.23	0.34	0.11	1.24	0.55	0.26	0.28	0.22	0.74	0.49	0.35	
Control Delay	9.0	9.5	2.8	153.8	18.0	5.3	26.2	34.8	23.7	30.5	18.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.0	9.5	2.8	153.8	18.0	5.3	26.2	34.8	23.7	30.5	18.7	
LOS	A	A	A	F	B	A	C	C	C	C	B	
Approach Delay		8.7			51.3			26.5			23.9	
Approach LOS		A			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 5 (6%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.24			
Intersection Signal Delay: 33.5		Intersection LOS: C	
Intersection Capacity Utilization 82.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Mt. Pleasant Street & Veteran's Memorial Parkway



Queues
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	78	754	113	436	1010	242	84	96	276	157	202
v/c Ratio	0.23	0.34	0.11	1.24	0.55	0.26	0.28	0.22	0.74	0.49	0.35
Control Delay	9.0	9.5	2.8	153.8	18.0	5.3	26.2	34.8	23.7	30.5	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	9.5	2.8	153.8	18.0	5.3	26.2	34.8	23.7	30.5	18.7
Queue Length 50th (m)	4.5	30.3	0.7	~99.7	62.6	4.8	12.0	8.5	12.8	20.5	6.3
Queue Length 95th (m)	12.5	53.1	8.6	#173.7	104.2	21.7	20.6	14.3	36.0	33.4	14.6
Internal Link Dist (m)		236.6			193.6			295.9			865.7
Turn Bay Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0	
Base Capacity (vph)	407	2191	1008	353	1840	914	301	747	487	323	773
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.34	0.11	1.24	0.55	0.26	0.28	0.13	0.57	0.49	0.26

Intersection Summary

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

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

HCM Signalized Intersection Capacity Analysis
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Future Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3539	1566	1782	3574	1599	1723	3539	1552	1798	3245	
Flt Permitted	0.18	1.00	1.00	0.37	1.00	1.00	0.62	1.00	1.00	0.62	1.00	
Satd. Flow (perm)	341	3539	1566	686	3574	1599	1133	3539	1552	1173	3245	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	754	113	436	1010	242	84	96	276	157	90	112
RTOR Reduction (vph)	0	0	39	0	0	94	0	0	175	0	95	0
Lane Group Flow (vph)	78	754	74	436	1010	148	84	96	101	157	107	0
Confl. Peds. (#/hr)			9	9			16		8	8		16
Heavy Vehicles (%)	3%	2%	1%	1%	1%	1%	4%	2%	2%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2			6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	54.9	54.9	54.9	44.7	44.7	44.7	17.7	12.1	12.1	20.5	13.5	
Effective Green, g (s)	54.9	54.9	54.9	44.7	44.7	44.7	17.7	12.1	12.1	20.5	13.5	
Actuated g/C Ratio	0.61	0.61	0.61	0.50	0.50	0.50	0.20	0.13	0.13	0.23	0.15	
Clearance Time (s)	4.0	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	305	2158	955	340	1775	794	259	475	208	315	486	
v/s Ratio Prot	0.02	c0.21			0.28		0.02	0.03		c0.04	0.03	
v/s Ratio Perm	0.14		0.05	c0.64		0.09	0.04		0.07	c0.07		
v/c Ratio	0.26	0.35	0.08	1.28	0.57	0.19	0.32	0.20	0.49	0.50	0.22	
Uniform Delay, d1	9.0	8.7	7.2	22.6	15.9	12.6	30.5	34.7	36.1	29.4	33.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.09	
Incremental Delay, d2	0.4	0.4	0.2	147.7	1.3	0.5	0.7	0.2	1.8	1.2	0.2	
Delay (s)	9.5	9.1	7.3	170.4	17.2	13.1	31.3	34.9	37.9	30.1	36.9	
Level of Service	A	A	A	F	B	B	C	C	D	C	D	
Approach Delay (s)		9.0			56.2			36.0			33.9	
Approach LOS		A			E			D			C	

Intersection Summary					
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	1.00				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0		
Intersection Capacity Utilization	82.8%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	442	7	201	367	1	31	3	237	1	4	1
Future Volume (vph)	1	442	7	201	367	1	31	3	237	1	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00		0.99	0.98			1.00	
Frt		0.998						0.852			0.977	
Flt Protected					0.983		0.950				0.992	
Satd. Flow (prot)	0	3497	0	0	3457	0	1752	1547	0	0	1836	0
Flt Permitted		0.954			0.661		0.754				0.393	
Satd. Flow (perm)	0	3336	0	0	2314	0	1381	1547	0	0	727	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3						258			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		277.2			409.8			889.7			110.5	
Travel Time (s)		20.0			29.5			64.1			8.0	
Confl. Peds. (#/hr)	16		22	22		16	5		3	3		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	2%	3%	0%	3%	0%	3%	0%	0%	0%
Adj. Flow (vph)	1	480	8	218	399	1	34	3	258	1	4	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	489	0	0	618	0	34	261	0	0	6	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)		0.0			0.0			7.2			7.2	
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												
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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	27.0	27.0		10.0	27.0		25.0	25.0		25.0	25.0	
Total Split (s)	52.0	52.0		10.0	62.0		28.0	28.0		28.0	28.0	
Total Split (%)	57.8%	57.8%		11.1%	68.9%		31.1%	31.1%		31.1%	31.1%	
Maximum Green (s)	46.0	46.0		6.0	56.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0			14.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		68.9			68.9		9.1	9.1			9.1	
Actuated g/C Ratio		0.77			0.77		0.10	0.10			0.10	
v/c Ratio		0.19			0.35		0.24	0.67			0.08	
Control Delay		3.3			2.4		36.4	15.9			34.5	
Queue Delay		0.0			0.0		0.0	0.0			0.0	
Total Delay		3.3			2.4		36.4	15.9			34.5	
LOS		A			A		D	B			C	
Approach Delay		3.3			2.4			18.3			34.5	
Approach LOS		A			A			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 16 (18%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 6.2		Intersection LOS: A	
Intersection Capacity Utilization 64.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Mt. Pleasant Street/Plaza & Colborne Street West

Queues
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: PM Peak Hour

Lane Group	EBT	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	489	618	34	261	6
v/c Ratio	0.19	0.35	0.24	0.67	0.08
Control Delay	3.3	2.4	36.4	15.9	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	2.4	36.4	15.9	34.5
Queue Length 50th (m)	9.0	6.7	6.1	0.0	0.9
Queue Length 95th (m)	19.2	10.4	11.7	1.2	4.3
Internal Link Dist (m)	253.2	385.8		865.7	86.5
Turn Bay Length (m)					
Base Capacity (vph)	2554	1771	337	573	178
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.35	0.10	0.46	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Mt. Pleasant Street/Plaza & Colborne Street West

Detour: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	442	7	201	367	1	31	3	237	1	4	1
Future Volume (vph)	1	442	7	201	367	1	31	3	237	1	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95		1.00	1.00			1.00	
Frpb, ped/bikes		1.00			1.00		1.00	0.98			1.00	
Flpb, ped/bikes		1.00			0.99		0.99	1.00			1.00	
Frt		1.00			1.00		1.00	0.85			0.98	
Flt Protected		1.00			0.98		0.95	1.00			0.99	
Satd. Flow (prot)		3495			3437		1740	1547			1835	
Flt Permitted		0.95			0.66		0.75	1.00			0.39	
Satd. Flow (perm)		3337			2312		1381	1547			728	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	480	8	218	399	1	34	3	258	1	4	1
RTOR Reduction (vph)	0	1	0	0	0	0	0	232	0	0	1	0
Lane Group Flow (vph)	0	488	0	0	618	0	34	29	0	0	5	0
Confl. Peds. (#/hr)	16		22	22		16	5		3	3		5
Heavy Vehicles (%)	0%	3%	0%	2%	3%	0%	3%	0%	3%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		68.9			68.9		9.1	9.1			9.1	
Effective Green, g (s)		68.9			68.9		9.1	9.1			9.1	
Actuated g/C Ratio		0.77			0.77		0.10	0.10			0.10	
Clearance Time (s)		6.0			6.0		6.0	6.0			6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		2554			1769		139	156			73	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.15			c0.27		c0.02				0.01	
v/c Ratio		0.19			0.35		0.24	0.19			0.07	
Uniform Delay, d1		2.9			3.4		37.3	37.1			36.6	
Progression Factor		1.00			0.51		0.89	1.32			1.00	
Incremental Delay, d2		0.2			0.1		0.9	0.6			0.4	
Delay (s)		3.1			1.8		34.3	49.4			37.0	
Level of Service		A			A		C	D			D	
Approach Delay (s)		3.1			1.8			47.7			37.0	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.36				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	64.3%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
3: Gilkison Street & Colborne Street West

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	610	95	110	565	19	57	3	108	81	4	42
Future Volume (vph)	14	610	95	110	565	19	57	3	108	81	4	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			0.99			0.99	
Frt		0.980			0.996			0.913			0.955	
Flt Protected		0.999			0.992			0.983			0.969	
Satd. Flow (prot)	0	3454	0	0	3523	0	0	1505	0	0	1564	0
Flt Permitted		0.934			0.657			0.846			0.631	
Satd. Flow (perm)	0	3229	0	0	2330	0	0	1294	0	0	1015	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			6			94			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		409.8			139.0			106.4			116.6	
Travel Time (s)		29.5			10.0			7.7			8.4	
Confl. Peds. (#/hr)	13		15	15		13	5		8	8		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	0%	1%	1%	0%	0%
Parking (#/hr)								0			0	
Adj. Flow (vph)	15	663	103	120	614	21	62	3	117	88	4	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	781	0	0	755	0	0	182	0	0	138	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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.14	1.00	1.00	1.14	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		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	
Detector 1 Position(m)	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	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	
Detector 1 Channel												
Detector 1 Extend (s)	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	
Detector 1 Delay (s)	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	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	

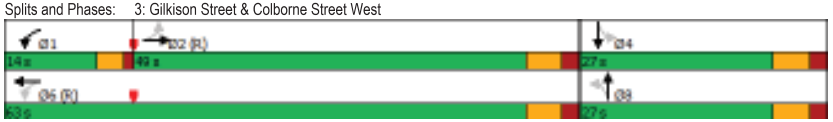
Lanes, Volumes, Timings
3: Gilkison Street & Colborne Street West

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		6.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	31.0	31.0		10.0	31.0		33.0	33.0		33.0	33.0	
Total Split (s)	49.0	49.0		14.0	63.0		27.0	27.0		27.0	27.0	
Total Split (%)	54.4%	54.4%		15.6%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	43.0	43.0		10.0	57.0		21.0	21.0		21.0	21.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		Max	C-Max		None	None		None	None	
Walk Time (s)	10.0	10.0			10.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0			15.0		17.0	17.0		17.0	17.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		43.0			63.5			14.5			14.5	
Actuated g/C Ratio		0.48			0.71			0.16			0.16	
v/c Ratio		0.50			0.41			0.63			0.75	
Control Delay		17.6			6.5			26.8			52.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		17.6			6.5			26.8			52.1	
LOS		B			A			C			D	
Approach Delay		17.6			6.5			26.8			52.1	
Approach LOS		B			A			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 76 (84%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Gilkison Street & Colborne Street West



Queues
3: Gilkison Street & Colborne Street West

Detour: PM Peak Hour

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	781	755	182	138
v/c Ratio	0.50	0.41	0.63	0.75
Control Delay	17.6	6.5	26.8	52.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.6	6.5	26.8	52.1
Queue Length 50th (m)	42.9	22.1	14.5	19.6
Queue Length 95th (m)	73.7	44.7	33.8	37.4
Internal Link Dist (m)	385.8	115.0	82.4	92.6
Turn Bay Length (m)				
Base Capacity (vph)	1556	1839	374	256
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.41	0.49	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Gilkison Street & Colborne Street West

Detour: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	610	95	110	565	19	57	3	108	81	4	42
Future Volume (vph)	14	610	95	110	565	19	57	3	108	81	4	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.91			0.95	
Flt Protected		1.00			0.99			0.98			0.97	
Satd. Flow (prot)		3454			3520			1504			1558	
Flt Permitted		0.93			0.66			0.85			0.63	
Satd. Flow (perm)		3231			2333			1295			1015	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	663	103	120	614	21	62	3	117	88	4	46
RTOR Reduction (vph)	0	14	0	0	2	0	0	79	0	0	22	0
Lane Group Flow (vph)	0	767	0	0	753	0	0	103	0	0	116	0
Confl. Peds. (#/hr)	13		15	15		13	5		8	8		5
Heavy Vehicles (%)	0%	2%	0%	2%	1%	0%	0%	0%	1%	1%	0%	0%
Parking (#/hr)								0			0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		43.0			63.5			14.5			14.5	
Effective Green, g (s)		43.0			63.5			14.5			14.5	
Actuated g/C Ratio		0.48			0.71			0.16			0.16	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1543			1863			208			163	
v/s Ratio Prot					c0.07							
v/s Ratio Perm		c0.24			0.21			0.08			c0.11	
v/c Ratio		0.50			0.40			0.50			0.71	
Uniform Delay, d1		16.1			5.5			34.4			35.8	
Progression Factor		1.04			1.06			1.00			1.00	
Incremental Delay, d2		1.1			0.5			1.9			13.7	
Delay (s)		17.9			6.3			36.3			49.5	
Level of Service		B			A			D			D	
Approach Delay (s)		17.9			6.3			36.3			49.5	
Approach LOS		B			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	71.3%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					

Lanes, Volumes, Timings
4: Colborne Street West & Ballantyne Drive

Detour: PM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	800	694	106	0	0
Future Volume (vph)	0	800	694	106	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00
Frt			0.982			
Flt Protected						
Satd. Flow (prot)	0	3610	1866	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	3610	1866	0	0	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		139.0	290.1		218.0	
Travel Time (s)		10.0	20.9		15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	870	754	115	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	870	869	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Colborne Street West & Ballantyne Drive

Detour: PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	800	694	106	0	0
Future Volume (Veh/h)	0	800	694	106	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	870	754	115	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		139	290			
pX, platoon unblocked					0.87	
vC, conflicting volume	869				1246	812
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	869				982	812
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	784				217	326

Direction, Lane #	EB 1	EB 2	WB 1
Volume Total	435	435	869
Volume Left	0	0	0
Volume Right	0	0	115
cSH	1700	1700	1700
Volume to Capacity	0.26	0.26	0.51
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			
Approach Delay (s)	0.0		0.0
Approach LOS			

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		46.3%	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)	488	237	75	0	0	0	67	512	51	138	870	733
Future Volume (vph)	488	237	75	0	0	0	67	512	51	138	870	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	200.0		5.0	0.0		0.0	115.0		215.0	25.0		0.0
Storage Lanes	1		0	0		0	1		0	0		1
Taper Length (m)	25.0			7.5			25.0			25.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.98	0.99					1.00	0.99			1.00	0.96
Frt		0.972						0.987				0.850
Flt Protected	0.950	0.989					0.950				0.993	
Satd. Flow (prot)	1681	1690	0	0	0	0	1770	3442	0	0	3585	1599
Flt Permitted	0.950	0.989					0.110				0.752	
Satd. Flow (perm)	1651	1683	0	0	0	0	204	3442	0	0	2708	1539
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14						13				797
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		290.1			441.2			487.2			182.2	
Travel Time (s)		20.9			31.8			35.1			13.1	
Confl. Peds. (#/hr)	21		28	28		21	10		25	25		10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	3%	2%	0%	0%	1%
Adj. Flow (vph)	530	258	82	0	0	0	73	557	55	150	946	797
Shared Lane Traffic (%)	18%											
Lane Group Flow (vph)	435	435	0	0	0	0	73	612	0	0	1096	797
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												
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	2	1
Detector Template	Left	Thru					Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0					2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	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
Detector 1 Size(m)	2.0	0.6					2.0	0.6		2.0	0.6	2.0
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)		9.4						9.4			9.4	
Detector 2 Size(m)		0.6						0.6			0.6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA					pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4						2			6		6
Detector Phase	4	4					5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0					7.0	10.0		7.0	10.0	10.0
Minimum Split (s)	38.0	38.0					11.0	31.0		11.0	31.0	31.0
Total Split (s)	38.0	38.0					11.0	41.0		11.0	41.0	41.0
Total Split (%)	42.2%	42.2%					12.2%	45.6%		12.2%	45.6%	45.6%
Maximum Green (s)	32.0	32.0					7.0	35.0		7.0	35.0	35.0
Yellow Time (s)	4.0	4.0					3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0					1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0					0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0					4.0	6.0			6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0					3.0	3.0		3.0	3.0	3.0
Recall Mode	Max	Max					None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0						7.0			7.0	7.0
Flash Dont Walk (s)	25.0	25.0						18.0			18.0	18.0
Pedestrian Calls (#/hr)	0	0						0			0	0
Act Effct Green (s)	32.0	32.0					48.0	46.0			37.2	37.2
Actuated g/C Ratio	0.36	0.36					0.53	0.51			0.41	0.41
v/c Ratio	0.74	0.72					0.32	0.35			0.98	0.72
Control Delay	28.2	25.8					21.0	22.9			50.8	6.0
Queue Delay	0.0	0.0					0.0	0.0			0.0	0.0
Total Delay	28.2	25.8					21.0	22.9			50.8	6.0
LOS	C	C					C	C			D	A
Approach Delay		27.0						22.7			31.9	
Approach LOS		C						C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 28.9		Intersection LOS: C	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Icomm Drive & Colborne Street West

Queues
5: Icomm Drive & Colborne Street West

Detour: PM Peak Hour

Lane Group	EBL	EBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	435	435	73	612	1096	797
v/c Ratio	0.74	0.72	0.32	0.35	0.98	0.72
Control Delay	28.2	25.8	21.0	22.9	50.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	25.8	21.0	22.9	50.8	6.0
Queue Length 50th (m)	72.9	70.7	0.3	52.3	~114.6	0.0
Queue Length 95th (m)	#119.0	116.6	m0.0	69.3	#154.8	26.7
Internal Link Dist (m)		266.1		463.2	158.2	
Turn Bay Length (m)	200.0		115.0			
Base Capacity (vph)	587	607	230	1765	1119	1103
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.72	0.32	0.35	0.98	0.72

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
5: Icomm Drive & Colborne Street West

Detour: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	488	237	75	0	0	0	67	512	51	138	870	733
Future Volume (vph)	488	237	75	0	0	0	67	512	51	138	870	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0					4.0	6.0			6.0	6.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frpb, ped/bikes	1.00	0.99					1.00	0.99			1.00	0.96
Flpb, ped/bikes	0.98	1.00					1.00	1.00			1.00	1.00
Frt	1.00	0.97					1.00	0.99			1.00	0.85
Flt Protected	0.95	0.99					0.95	1.00			0.99	1.00
Satd. Flow (prot)	1651	1683					1769	3441			3576	1539
Flt Permitted	0.95	0.99					0.11	1.00			0.75	1.00
Satd. Flow (perm)	1651	1683					206	3441			2708	1539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	530	258	82	0	0	0	73	557	55	150	946	797
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	475
Lane Group Flow (vph)	435	426	0	0	0	0	73	606	0	0	1096	322
Confl. Peds. (#/hr)	21		28	28		21	10		25	25		10
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	3%	2%	0%	0%	1%
Turn Type	Perm	NA					pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4						2			6		6
Actuated Green, G (s)	32.0	32.0					46.0	46.0			36.4	36.4
Effective Green, g (s)	32.0	32.0					46.0	46.0			36.4	36.4
Actuated g/C Ratio	0.36	0.36					0.51	0.51			0.40	0.40
Clearance Time (s)	6.0	6.0					4.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	587	598					202	1758			1095	622
v/s Ratio Prot							0.02	c0.18				
v/s Ratio Perm	c0.26	0.25					0.16				c0.40	0.21
v/c Ratio	0.74	0.71					0.36	0.34			1.00	0.52
Uniform Delay, d1	25.4	25.0					14.8	13.1			26.8	20.2
Progression Factor	0.79	0.78					1.70	1.74			1.00	1.00
Incremental Delay, d2	7.2	6.2					1.0	0.5			27.4	3.1
Delay (s)	27.3	25.8					26.2	23.2			54.2	23.3
Level of Service	C	C					C	C			D	C
Approach Delay (s)		26.6			0.0			23.5			41.2	
Approach LOS		C			A			C			D	

Intersection Summary					
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	92.8%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	136	830	131	228	4	354	4	62	15	9	30
Future Volume (vph)	2	136	830	131	228	4	354	4	62	15	9	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		60.0	125.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	35.0			25.0			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor	0.99		0.96	0.98	1.00		0.97	0.92			0.96	
Frt			0.850		0.998			0.858			0.916	
Flt Protected	0.950			0.950			0.950				0.987	
Satd. Flow (prot)	1805	3505	1615	1805	3566	0	1787	1476	0	0	3191	0
Flt Permitted	0.596			0.589			0.717				0.896	
Satd. Flow (perm)	1120	3505	1558	1100	3566	0	1313	1476	0	0	2846	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			894		2			67			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		487.2			250.0			115.0			104.0	
Travel Time (s)		35.1			18.0			8.3			7.5	
Confl. Peds. (#/hr)	6		15	15		6	18		45	45		18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	1%	0%	2%	0%	0%	0%
Adj. Flow (vph)	2	148	902	142	248	4	385	4	67	16	10	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	148	902	142	252	0	385	71	0	0	59	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												
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	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		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	2.0	0.6		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	

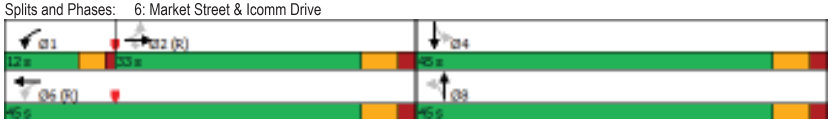
Lanes, Volumes, Timings
6: Market Street & Icomm Drive

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0	23.0	11.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	33.0	33.0	33.0	12.0	45.0		45.0	45.0		45.0	45.0	
Total Split (%)	36.7%	36.7%	36.7%	13.3%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	27.0	27.0	27.0	8.0	39.0		39.0	39.0		39.0	39.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0	10.0		10.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)	34.2	34.2	34.2	48.6	46.6		31.4	31.4			31.4	
Actuated g/C Ratio	0.38	0.38	0.38	0.54	0.52		0.35	0.35			0.35	
v/c Ratio	0.00	0.11	0.79	0.21	0.14		0.84	0.13			0.06	
Control Delay	11.0	9.7	17.4	11.7	11.1		43.3	5.2			9.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	11.0	9.7	17.4	11.7	11.1		43.3	5.2			9.0	
LOS	B	A	B	B	B		D	A			A	
Approach Delay		16.3			11.3			37.4			9.0	
Approach LOS		B			B			D			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 49 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 20.0		Intersection LOS: B	
Intersection Capacity Utilization 83.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 6: Market Street & Icomm Drive



Queues
6: Market Street & Icomm Drive

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	2	148	902	142	252	385	71	59
v/c Ratio	0.00	0.11	0.79	0.21	0.14	0.84	0.13	0.06
Control Delay	11.0	9.7	17.4	11.7	11.1	43.3	5.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	9.7	17.4	11.7	11.1	43.3	5.2	9.0
Queue Length 50th (m)	0.2	6.4	134.5	11.2	10.6	62.4	0.5	1.5
Queue Length 95th (m)	m0.2	m9.8	m130.7	m21.6	m18.3	89.0	8.0	5.0
Internal Link Dist (m)		463.2			226.0		91.0	80.0
Turn Bay Length (m)	65.0		60.0	125.0				
Base Capacity (vph)	425	1330	1145	663	1848	568	677	1251
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.11	0.79	0.21	0.14	0.68	0.10	0.05

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
6: Market Street & Icomm Drive

Detour: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	136	830	131	228	4	354	4	62	15	9	30
Future Volume (vph)	2	136	830	131	228	4	354	4	62	15	9	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00			0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.92			0.98	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		0.97	1.00			0.98	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1785	3505	1558	1787	3564		1740	1477			3134	
Flt Permitted	0.60	1.00	1.00	0.59	1.00		0.72	1.00			0.90	
Satd. Flow (perm)	1119	3505	1558	1108	3564		1312	1477			2846	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	148	902	142	248	4	385	4	67	16	10	33
RTOR Reduction (vph)	0	0	555	0	1	0	0	44	0	0	21	0
Lane Group Flow (vph)	2	148	347	142	251	0	385	27	0	0	38	0
Confl. Peds. (#/hr)	6		15	15		6	18		45	45		18
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	1%	0%	2%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	34.1	34.1	34.1	46.6	46.6		31.4	31.4			31.4	
Effective Green, g (s)	34.1	34.1	34.1	46.6	46.6		31.4	31.4			31.4	
Actuated g/C Ratio	0.38	0.38	0.38	0.52	0.52		0.35	0.35			0.35	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	423	1328	590	637	1845		457	515			992	
v/s Ratio Prot		0.04		c0.02	0.07			0.02				
v/s Ratio Perm	0.00		c0.22	0.09			c0.29				0.01	
v/c Ratio	0.00	0.11	0.59	0.22	0.14		0.84	0.05			0.04	
Uniform Delay, d1	17.4	18.1	22.3	11.5	11.3		27.0	19.4			19.3	
Progression Factor	0.51	0.47	7.18	0.89	0.87		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.1	1.5	0.2	0.1		13.2	0.0			0.0	
Delay (s)	8.9	8.5	161.9	10.4	9.9		40.2	19.5			19.3	
Level of Service	A	A	F	B	A		D	B			B	
Approach Delay (s)		140.0			10.1			37.0			19.3	
Approach LOS		F			B			D			B	

Intersection Summary				
HCM 2000 Control Delay	86.3	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	83.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
7: Clarence Street South & Icomm Drive/Greenwich Street

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	129	89	175	126	51	147	845	78	98	1012	88
Future Volume (vph)	180	129	89	175	126	51	147	845	78	98	1012	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	35.0		30.0	75.0		0.0	105.0		70.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	30.0			35.0			35.0			35.0		
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	1.00
Ped Bike Factor	0.99	0.99		0.99		0.98	1.00					0.96
Frt		0.939				0.850		0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3312	0	1805	3574	1583	1770	3459	0	1787	3574	1615
Flt Permitted	0.544			0.604			0.184			0.218		
Satd. Flow (perm)	1008	3312	0	1131	3574	1554	341	3459	0	410	3574	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51				85		16				96
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		250.0			209.3			381.6			258.2	
Travel Time (s)		18.0			15.1			27.5			18.6	
Confl. Peds. (#/hr)	8		24	24		8	35					35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	0%	1%	2%	2%	3%	3%	1%	1%	0%
Adj. Flow (vph)	196	140	97	190	137	55	160	918	85	107	1100	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	237	0	190	137	55	160	1003	0	107	1100	96
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												
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	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	

Lanes, Volumes, Timings
7: Clarence Street South & Icomm Drive/Greenwich Street

Detour: PM Peak Hour

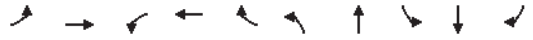
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	7	4		8	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	38.0		38.0	38.0	38.0	43.0	43.0		43.0	43.0	43.0
Total Split (s)	12.0	38.0		26.0	26.0	26.0	52.0	52.0		52.0	52.0	52.0
Total Split (%)	13.3%	42.2%		28.9%	28.9%	28.9%	57.8%	57.8%		57.8%	57.8%	57.8%
Maximum Green (s)	8.0	32.0		20.0	20.0	20.0	46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	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	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		25.0		25.0	25.0	25.0	30.0	30.0		30.0	30.0	30.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0		0	0	0
Act Effct Green (s)	32.0	30.0		18.0	18.0	18.0	48.0	48.0		48.0	48.0	48.0
Actuated g/C Ratio	0.36	0.33		0.20	0.20	0.20	0.53	0.53		0.53	0.53	0.53
v/c Ratio	0.46	0.21		0.84	0.19	0.15	0.88	0.54		0.49	0.58	0.11
Control Delay	30.1	23.0		65.1	29.8	3.8	69.5	22.5		24.0	16.1	2.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	30.1	23.0		65.1	29.8	3.8	69.5	22.5		24.0	16.1	2.9
LOS	C	C		E	C	A	E	C		C	B	A
Approach Delay		26.2			43.6			29.0			15.8	
Approach LOS		C			D			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 72 (80%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 25.1		Intersection LOS: C	
Intersection Capacity Utilization 86.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 7: Clarence Street South & Icomm Drive/Greenwich Street

Queues
7: Clarence Street South & Icomm Drive/Greenwich Street

Detour: PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	196	237	190	137	55	160	1003	107	1100	96
v/c Ratio	0.46	0.21	0.84	0.19	0.15	0.88	0.54	0.49	0.58	0.11
Control Delay	30.1	23.0	65.1	29.8	3.8	69.5	22.5	24.0	16.1	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	23.0	65.1	29.8	3.8	69.5	22.5	24.0	16.1	2.9
Queue Length 50th (m)	20.1	9.8	32.5	10.6	0.0	31.0	92.8	12.2	70.6	0.0
Queue Length 95th (m)	48.8	26.3	#66.7	18.6	5.0	#69.8	109.5	31.1	90.9	7.3
Internal Link Dist (m)		226.0		185.3			357.6		234.2	
Turn Bay Length (m)	75.0		35.0		30.0	75.0		105.0		70.0
Base Capacity (vph)	426	1210	251	794	411	181	1851	218	1905	873
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.20	0.76	0.17	0.13	0.88	0.54	0.49	0.58	0.11

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
7: Clarence Street South & Icomm Drive/Greenwich Street

Detour: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	129	89	175	126	51	147	845	78	98	1012	88
Future Volume (vph)	180	129	89	175	126	51	147	845	78	98	1012	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1765	3311		1779	3574	1554	1762	3460		1787	3574	1555
Flt Permitted	0.54	1.00		0.60	1.00	1.00	0.18	1.00		0.22	1.00	1.00
Satd. Flow (perm)	1011	3311		1131	3574	1554	342	3460		410	3574	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	140	97	190	137	55	160	918	85	107	1100	96
RTOR Reduction (vph)	0	34	0	0	0	44	0	7	0	0	0	45
Lane Group Flow (vph)	196	203	0	190	137	11	160	996	0	107	1100	51
Confl. Peds. (#/hr)	8		24	24		8	35					35
Heavy Vehicles (%)	2%	1%	1%	0%	1%	2%	2%	3%	3%	1%	1%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	30.0	30.0		18.0	18.0	18.0	48.0	48.0		48.0	48.0	48.0
Effective Green, g (s)	30.0	30.0		18.0	18.0	18.0	48.0	48.0		48.0	48.0	48.0
Actuated g/C Ratio	0.33	0.33		0.20	0.20	0.20	0.53	0.53		0.53	0.53	0.53
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	404	1103		226	714	310	182	1845		218	1906	829
v/s Ratio Prot	c0.04	0.06			0.04			0.29			0.31	
v/s Ratio Perm	0.12			c0.17		0.01	c0.47			0.26		0.03
v/c Ratio	0.49	0.18		0.84	0.19	0.04	0.88	0.54		0.49	0.58	0.06
Uniform Delay, d1	22.6	21.3		34.6	29.9	29.0	18.5	13.8		13.3	14.2	10.1
Progression Factor	1.27	1.39		1.00	1.00	1.00	1.48	1.52		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1		23.5	0.1	0.0	36.0	0.9		7.7	1.3	0.1
Delay (s)	29.7	29.7		58.2	30.1	29.1	63.3	21.8		21.0	15.4	10.3
Level of Service	C	C		E	C	C	E	C		C	B	B
Approach Delay (s)		29.7			43.9			27.5			15.5	
Approach LOS		C			D			C			B	

Intersection Summary				
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	86.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	806	100	426	790	10	119	157	328	6	126	1
Future Volume (vph)	10	806	100	426	790	10	119	157	328	6	126	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	85.0		0.0	30.0		30.0	30.0		0.0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (m)	50.0			0.0			40.0			55.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97	1.00			0.99		0.97	0.99	1.00	
Frt			0.850		0.998				0.850		0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3539	1615	1752	3568	0	1752	1845	1599	1805	1879	0
Flt Permitted	0.326			0.207			0.660			0.571		
Satd. Flow (perm)	619	3539	1564	381	3568	0	1208	1845	1553	1070	1879	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		3				311			
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		353.8			381.6			274.8			143.3	
Travel Time (s)		25.5			27.5			19.8			10.3	
Confl. Peds. (#/hr)			7	7			9		16	16		9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	3%	1%	0%	3%	3%	1%	0%	1%	0%
Adj. Flow (vph)	11	876	109	463	859	11	129	171	357	7	137	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	876	109	463	870	0	129	171	357	7	138	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												
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	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	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	2.0	0.6		2.0	0.6	2.0	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	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	0.0	
Detector 1 Queue (s)	0.0	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	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	

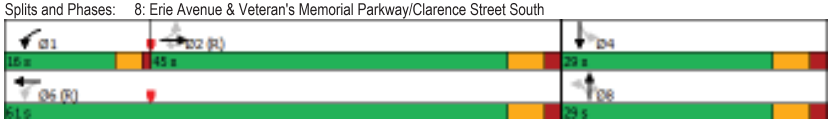
Lanes, Volumes, Timings
8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	33.0	33.0	33.0	11.0	33.0		31.0	31.0	31.0	31.0	31.0	
Total Split (s)	45.0	45.0	45.0	16.0	61.0		29.0	29.0	29.0	29.0	29.0	
Total Split (%)	50.0%	50.0%	50.0%	17.8%	67.8%		32.2%	32.2%	32.2%	32.2%	32.2%	
Maximum Green (s)	39.0	39.0	39.0	12.0	55.0		23.0	23.0	23.0	23.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	20.0	20.0	20.0		20.0		18.0	18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0	0	0	0	
Act Effct Green (s)	39.0	39.0	39.0	64.7	62.7		15.3	15.3	15.3	15.3	15.3	
Actuated g/C Ratio	0.43	0.43	0.43	0.72	0.70		0.17	0.17	0.17	0.17	0.17	
v/c Ratio	0.04	0.57	0.15	0.81	0.35		0.63	0.55	0.69	0.04	0.43	
Control Delay	15.4	21.0	3.8	33.8	2.1		47.3	39.6	13.2	28.0	36.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	15.4	21.0	3.8	33.8	2.1		47.3	39.6	13.2	28.0	36.3	
LOS	B	C	A	C	A		D	D	B	C	D	
Approach Delay		19.1			13.1			26.8			35.9	
Approach LOS		B			B			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 16 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 18.9		Intersection LOS: B	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South



Queues

8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	876	109	463	870	129	171	357	7	138
v/c Ratio	0.04	0.57	0.15	0.81	0.35	0.63	0.55	0.69	0.04	0.43
Control Delay	15.4	21.0	3.8	33.8	2.1	47.3	39.6	13.2	28.0	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	21.0	3.8	33.8	2.1	47.3	39.6	13.2	28.0	36.3
Queue Length 50th (m)	1.1	61.3	0.0	44.9	7.0	22.3	29.0	7.3	1.1	22.9
Queue Length 95th (m)	4.4	80.2	9.2	m#76.3	18.6	37.0	44.2	31.6	4.5	36.4
Internal Link Dist (m)		329.8			357.6		250.8			119.3
Turn Bay Length (m)	50.0		50.0	85.0		30.0		30.0	30.0	
Base Capacity (vph)	268	1533	739	574	2488	308	471	628	273	480
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.57	0.15	0.81	0.35	0.42	0.36	0.57	0.03	0.29

Intersection Summary

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

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

HCM Signalized Intersection Capacity Analysis

8: Erie Avenue & Veteran's Memorial Parkway/Clarence Street South

Detour: PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	806	100	426	790	10	119	157	328	6	126	1
Future Volume (vph)	10	806	100	426	790	10	119	157	328	6	126	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3539	1564	1752	3568		1738	1845	1553	1781	1879	
Flt Permitted	0.33	1.00	1.00	0.21	1.00		0.66	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	619	3539	1564	381	3568		1208	1845	1553	1071	1879	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	876	109	463	859	11	129	171	357	7	137	1
RTOR Reduction (vph)	0	0	62	0	1	0	0	0	258	0	0	0
Lane Group Flow (vph)	11	876	47	463	869	0	129	171	99	7	138	0
Confl. Peds. (#/hr)			7	7			9		16	16		9
Heavy Vehicles (%)	0%	2%	0%	3%	1%	0%	3%	3%	1%	0%	1%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6			8		8	4		
Actuated Green, G (s)	39.0	39.0	39.0	62.7	62.7		15.3	15.3	15.3	15.3	15.3	
Effective Green, g (s)	39.0	39.0	39.0	62.7	62.7		15.3	15.3	15.3	15.3	15.3	
Actuated g/C Ratio	0.43	0.43	0.43	0.70	0.70		0.17	0.17	0.17	0.17	0.17	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	268	1533	677	565	2485		205	313	264	182	319	
v/s Ratio Prot		0.25		c0.18	0.24			0.09			0.07	
v/s Ratio Perm	0.02		0.03	c0.39			c0.11		0.06	0.01		
v/c Ratio	0.04	0.57	0.07	0.82	0.35		0.63	0.55	0.37	0.04	0.43	
Uniform Delay, d1	14.7	19.2	14.9	13.7	5.5		34.7	34.2	33.1	31.2	33.5	
Progression Factor	1.00	1.00	1.00	2.18	0.28		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	1.6	0.2	7.6	0.3		5.9	1.9	0.9	0.1	0.9	
Delay (s)	15.0	20.8	15.1	37.5	1.9		40.6	36.1	34.0	31.3	34.4	
Level of Service	B	C	B	D	A		D	D	C	C	C	
Approach Delay (s)		20.1			14.2			35.9			34.3	
Approach LOS		C			B			D			C	

Intersection Summary				
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	83.7%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Appendix E

Protected-Permissive Left Turn Warrant

Protected-Permissive Left-Turn Phase Warrant (pm+pt)

Project: Three Grand River Crossings Municipal Class EA Transportation Study

Project Number: 190487

Intersection: Veteran's Memorial Parkway at Mt. Pleasant Street

Direction: Westbound

$$c = 1400\left(\frac{G}{C}\right) - f v_0 + L_{ta}$$

Variable	Value
G (green time)	32 seconds
C (cycle length)	90 seconds
f	0.5
v_o (opposing volume)	798 vehicles
L_{ta} = 7200/cycle length	80
c (Estimated Capacity)	179 vehicles
Forecast Left-Turn Volume	401 vehicles

Is *"Forecast Left-Turn Volume"* greater than *"Estimated Capacity"*? YES

Therefore, a protected-permissive left-turn phase is recommended.

Appendix F

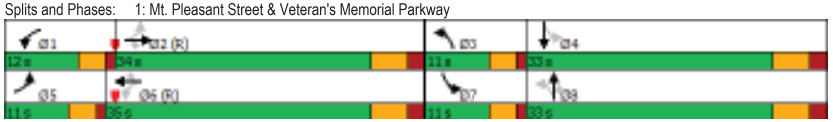
Detour Traffic Operations Reports - Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Future Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	70.0			70.0			85.0			50.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor			0.98	1.00			0.99		0.98	0.99	0.98	
Frt			0.850			0.850			0.850		0.917	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3539	1599	1787	3574	1599	1736	3539	1583	1805	3245	0
Flt Permitted	0.284			0.181			0.625			0.607		
Satd. Flow (perm)	524	3539	1566	340	3574	1599	1128	3539	1552	1145	3245	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			133			178			276		112	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		260.6			217.6			319.9			889.7	
Travel Time (s)		13.4			11.2			23.0			64.1	
Confl. Peds. (#/hr)			9	9			16		8	8		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	1%	1%	1%	1%	4%	2%	2%	0%	1%	0%
Adj. Flow (vph)	78	754	113	436	1010	242	84	96	276	157	90	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	754	113	436	1010	242	84	96	276	157	202	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												
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	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	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	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	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	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	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	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	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	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	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	11.0	34.0	34.0	11.0	34.0	34.0	11.0	33.0	33.0	11.0	33.0	
Total Split (s)	11.0	34.0	34.0	12.0	35.0	35.0	11.0	33.0	33.0	11.0	33.0	
Total Split (%)	12.2%	37.8%	37.8%	13.3%	38.9%	38.9%	12.2%	36.7%	36.7%	12.2%	36.7%	
Maximum Green (s)	7.0	28.0	28.0	8.0	29.0	29.0	7.0	27.0	27.0	7.0	27.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		21.0	21.0		21.0	21.0		20.0	20.0		20.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	37.4	28.0	28.0	59.8	48.5	48.5	18.2	9.2	9.2	19.0	11.4	
Actuated g/C Ratio	0.42	0.31	0.31	0.66	0.54	0.54	0.20	0.10	0.10	0.21	0.13	
v/c Ratio	0.24	0.68	0.20	0.68	0.52	0.26	0.31	0.27	0.68	0.54	0.40	
Control Delay	10.8	31.0	3.9	20.0	15.9	5.0	29.1	38.1	13.8	41.9	27.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	10.8	31.0	3.9	20.0	15.9	5.0	29.1	38.1	13.8	41.9	27.7	
LOS	B	C	A	C	B	A	C	D	B	D	C	
Approach Delay		26.1			15.4			21.7			33.9	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 5 (6%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 21.1		Intersection LOS: C	
Intersection Capacity Utilization 81.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Mt. Pleasant Street & Veteran's Memorial Parkway



Queues
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: PM Peak Hour (Improvements)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	78	754	113	436	1010	242	84	96	276	157	202
v/c Ratio	0.24	0.68	0.20	0.68	0.52	0.26	0.31	0.27	0.68	0.54	0.40
Control Delay	10.8	31.0	3.9	20.0	15.9	5.0	29.1	38.1	13.8	41.9	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	31.0	3.9	20.0	15.9	5.0	29.1	38.1	13.8	41.9	27.7
Queue Length 50th (m)	4.2	62.7	0.0	39.1	59.3	5.3	12.4	8.7	0.0	25.7	8.3
Queue Length 95th (m)	11.1	83.3	9.0	#98.4	95.2	20.9	22.2	15.1	21.6	42.4	19.8
Internal Link Dist (m)		236.6			193.6			295.9			865.7
Turn Bay Length (m)	140.0		25.0	40.0		45.0	45.0		40.0	35.0	
Base Capacity (vph)	319	1101	578	640	1927	944	275	1061	658	293	1051
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.68	0.20	0.68	0.52	0.26	0.31	0.09	0.42	0.54	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Mt. Pleasant Street & Veteran's Memorial Parkway

Detour: PM Peak Hour (Improvements)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Future Volume (vph)	72	694	104	401	929	223	77	88	254	144	83	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3539	1566	1787	3574	1599	1723	3539	1552	1798	3245	
Flt Permitted	0.28	1.00	1.00	0.18	1.00	1.00	0.62	1.00	1.00	0.61	1.00	
Satd. Flow (perm)	523	3539	1566	340	3574	1599	1133	3539	1552	1148	3245	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	754	113	436	1010	242	84	96	276	157	90	112
RTOR Reduction (vph)	0	0	79	0	0	85	0	0	245	0	98	0
Lane Group Flow (vph)	78	754	34	436	1010	157	84	96	31	157	104	0
Confl. Peds. (#/hr)			9	9			16		8	8		16
Heavy Vehicles (%)	3%	2%	1%	1%	1%	1%	4%	2%	2%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	33.2	27.2	27.2	57.0	47.0	47.0	15.6	10.0	10.0	18.4	11.4	
Effective Green, g (s)	33.2	27.2	27.2	57.0	47.0	47.0	15.6	10.0	10.0	18.4	11.4	
Actuated g/C Ratio	0.37	0.30	0.30	0.63	0.52	0.52	0.17	0.11	0.11	0.20	0.13	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	274	1069	473	630	1866	835	233	393	172	285	411	
v/s Ratio Prot	0.02	0.21		c0.20	0.28		0.02	0.03		c0.04	0.03	
v/s Ratio Perm	0.09		0.02	c0.24		0.10	0.04		0.02	c0.07		
v/c Ratio	0.28	0.71	0.07	0.69	0.54	0.19	0.36	0.24	0.18	0.55	0.25	
Uniform Delay, d1	18.8	27.8	22.4	14.7	14.3	11.4	32.3	36.5	36.3	31.2	35.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.24	1.49	
Incremental Delay, d2	0.6	3.9	0.3	3.3	1.1	0.5	1.0	0.3	0.5	2.3	0.3	
Delay (s)	19.3	31.8	22.7	18.0	15.5	11.9	33.3	36.9	36.8	41.0	53.2	
Level of Service	B	C	C	B	B	B	C	D	D	D	D	
Approach Delay (s)		29.7			15.6			36.2			47.9	
Approach LOS		C			B			D			D	

Intersection Summary				
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	81.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group