Hamilton Transit

BUS MAINTENANCE & STORAGE FACILITY

Appendix G

Traffic Impact Study

January 3, 2020

Prepared for

Hamilton

Prepared by

IBI GROUP

Draft Report

Hamilton Transit Maintenance Storage Facility Traffic Impact Study

Prepared for City of Hamilton
by IBI Group
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1 Introduction

The City of Hamilton is seeking to build a new 430,000 ft^2 Maintenance Storage Facility (MSF) for a fleet of approximately 200 regular and articulated buses with a planned future expansion that will store an additional 100 buses. The MSF will include storage for the fleet, a maintenance garage with 20 bays, paint booth and body shop, two bus CNG fueling and washing lanes, stores, shipping and receiving spaces, administrative offices, reception, meeting rooms, and training spaces. Outdoor functions are also provided with plans to include vehicle circulation, CNG compressor station, fluids tank farm and generators, and a multi-level parking garage ("parkade") for staff use.

1.1 Study Objective

The objective of the traffic impact study is to aid in the design and environmental assessment study of the MSF. The surrounding road network was analysed for traffic impacts of the new facility using an existing conditions year, 2019, and two horizon years: 2022 (post-build) and 2027 (5 years post-build).

2 Context

2.1 Study Area

The study area is located in the northeast section of the City of Hamilton. The proposed site is an irregular shaped parcel of land, bordered by Brant Street, Birch Avenue, Rosemary Avenue and Hillyard Street. City of Hamilton staff were consulted as to the scope of this traffic study and the study area. As shown in Exhibit 2-1, the City has confirmed the study area to include six intersections, which are as follows:

- Wentworth Street North & Brant Street
- Hillyard Street & Brant Street
- Wentworth Street North & Burlington Street East
- Wentworth Street North & Munroe Street
- Burlington Street East & Birch Avenue
- Birch Avenue & Brant Street

Birch Avenue is subject to future Environmental Assessment (EA) for two-way conversion, therefore intersections and accesses on Birch Avenue were not analyzed in detail.

Exhibit 2-1: Study Area

2.2 Land Use

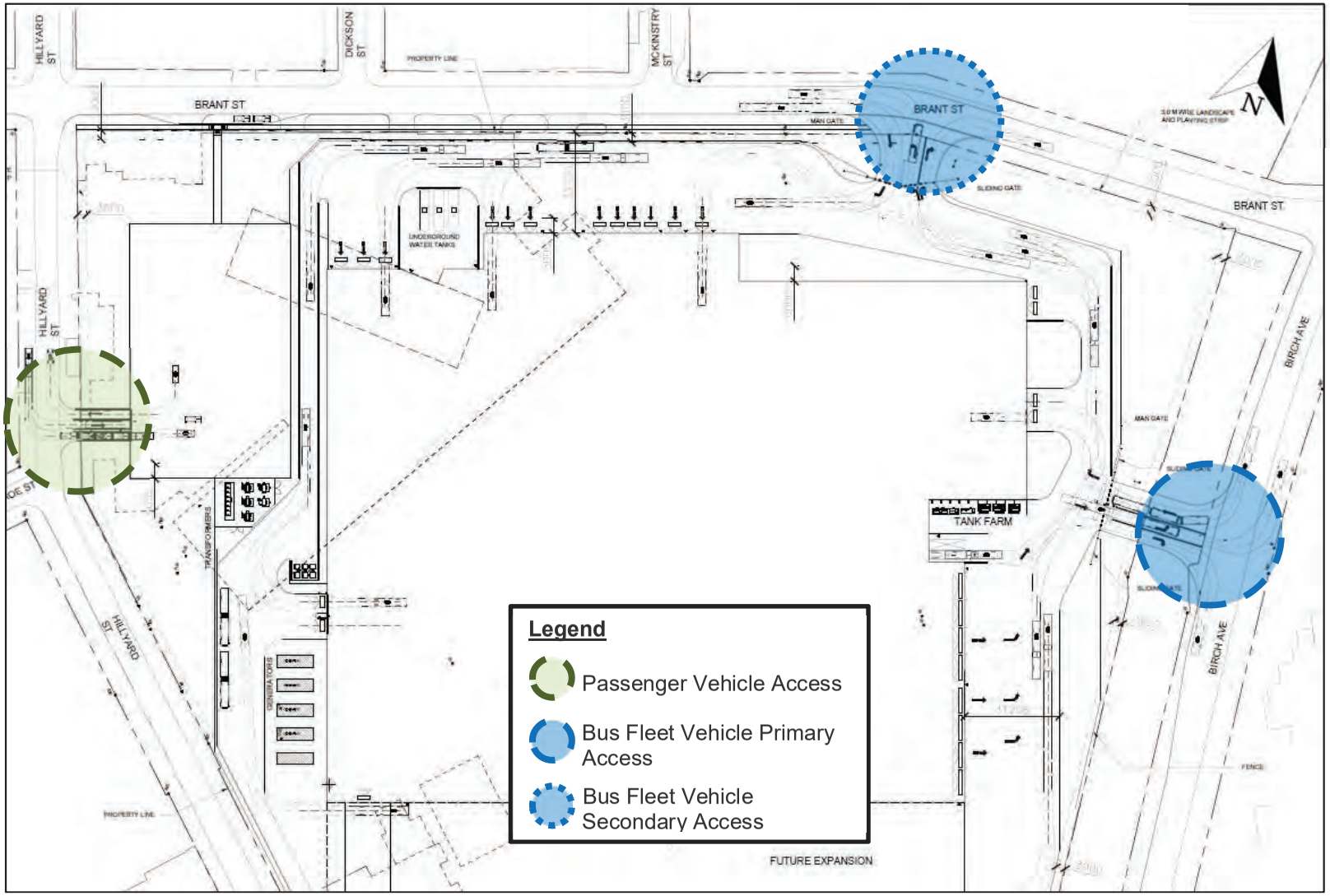
The proposed site area is currently zoned as M6 – for light industrial uses. The site was required to be rezoned due to the project spanning multiple lots and by-law zones. Rezoning is to be completed once property acquisition is finalized. Currently, the site is occupied by a steel fabrication factory as well as an operations centre for the City of Hamilton. Areas surrounding the site are either zoned as a mix of industrial and residential uses.

The site is proposed as a Maintenance Storage Facility (MSF), with capacity for maintenance space for 30 buses, storage for 200 buses, with the future possibility of adding further storage for 100 additional buses. The site will also accommodate a multi-level parking structure on the northwest corner with approximately 400-420 employees/visitor parking spaces.

2.3 Site Plan

The proposed site is to have three accesses; the main bus access on Birch Avenue, the secondary bus access on Brant Street, and the passenger vehicle access on Hillyard Street as shown in Exhibit 2-2. The passenger vehicle access location may lead to some site traffic accessing the site via residential streets.

Exhibit 2-2: Proposed Site Plan (dated April 16th, 2019)



2.4 Existing Road Network

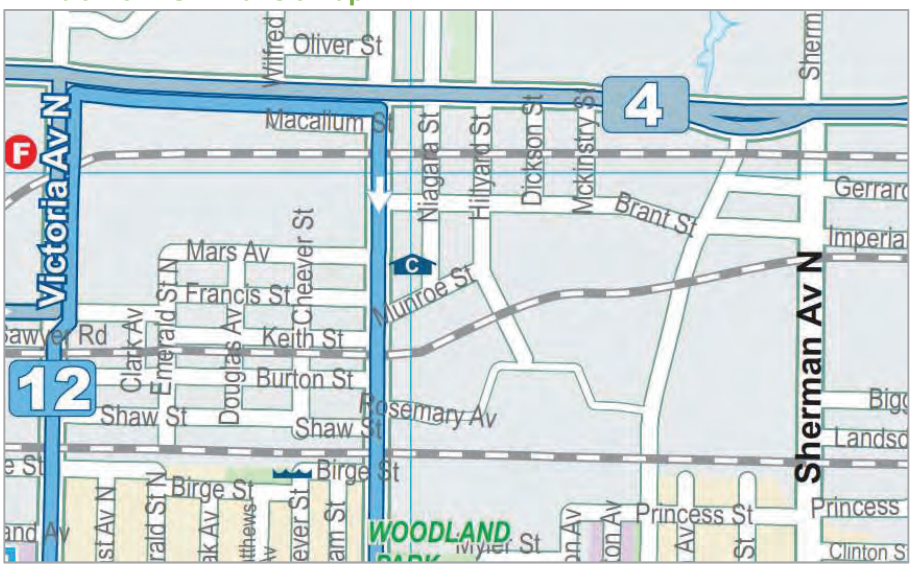
The following provides a summary and review of the road network adjacent to the development site.

- **Burlington Street** is an east-west major arterial road. It connects central Hamilton to the Queen Elizabeth Way, a 400-series highway. Burlington Street is a two to four lane road and has a posted speed limit of 50 km/h from Wentworth Street N to McKinstry Street and a posted speed limit of 60 km/h from McKinstry to Sherman Avenue N within the study area. It predominantly serves employment areas.
- **Birch Avenue** is a southbound one-way minor arterial road. It connects Burlington Street to Wilson Street. Within the study area, Birch Avenue is a three lane road with an assumed speed limit of 50 km/h, and serves an employment area. Birch Avenue has the potential to be converted to a two-way street.
- **Barton Street** is an east-west minor arterial road. It connects central Hamilton to the community of Winona, located west of the City. Within the study area, Barton Street is a four lane road, and has an assumed speed limit of 50 km/h. It services neighbourhoods.
- **Wentworth Street** is a north-south minor arterial road located. It has a four lane cross section, and has an assumed speed limit of 50 km/h within the study area. It connects the Hamilton Harbour at its north end and turns into Charlton Avenue East at its south end. Wentworth Street mostly services employment locales within the study area.
- **Brant Street** is a local east-west two lane road. It connects Wentworth Street to Sherman Avenue, both minor arterial roads. It serves an employment area and has an assumed speed limit of 50 km/h.
- **Niagara Street** is a local north-west two lane road that serves employment and residential areas. A speed limit of 50 km/h is assumed.
- **Hillyard Street** is a local north-west two lane road that serves an employment area. A 50 km/h speed limit is assumed.
- **Munroe Street** is a local east-west two lane road. It has an assumed speed limit of 50 km/h and serves an employment area, as well as a small section zoned for residential use.

Hamilton Street Railway (HSR) operates two bus routes within the study area. Details are provided below:

- **Route 12 (Wentworth) –** travels in the south direction along Wentworth Street with stops at intersections of Burlington Street, Mars Avenue and Burton Street. Service runs only on weekdays from 6:30 AM to 7:30 PM. The route is served every 30 minutes.
- **Route 4 (Bayfront) –** travels in both the east and west direction along Burlington Street with stops at Wentworth Street, Hillyard Street, McKinstry Street, and Birch Avenue. Service runs on weekdays, weekends and holidays with schedule service every 15 minutes during peak hours and every 30 minutes during off-peak hours. Service runs from approximately 5:00 AM to 2:00 AM the next day.

Exhibit 2-3: HSR Transit Map



Source: City of Hamilton HSR System Map (September 2018)

2.5 Future Road Network

During the development of the report, City staff noted that Birch Avenue (currently operating as one-way southbound) is planned to be converted to two-way operation. The Environmental Assessment (EA) for this conversion is planned to begin in mid/late 2019. Since lane geometries, signal timings, and traffic forecasts have not been confirmed, City staff agrees that Birch Avenue & Brant Street, Birch Avenue and Burlington Street, and the Birch Avenue access is to be analyzed as existing (i.e. current configuration). For comparison purposes, site generated traffic volumes distributed southbound on Birch Avenue have been included in the analysis.

3 Existing Conditions

3.1 Traffic Volumes

Traffic volumes were obtained from the City of Hamilton. Exhibit 3-1 provides a summary of the date at which the counts were undertaken for each study intersection. As shown, the intersections are dated between years 2014 to 2019. As per City of Hamilton's guidelines, a few of these TMCs are considered old (> 2years). Given that volumes and expected growth are low, a 2% compound annual rate was applied to scale volumes to a consistent base year (i.e. 2019). These scaled up values are expected to be reflective of existing conditions and are summarized in Exhibit 3-3. TMC reports are provided in Appendix A.

Exhibit 3-1: Data Collection Summary Table

INTERSCTION	CONTROL TYPE	COUNT DATE
Wentworth Street North & Brant Street	T-intersection *(stop control on minor approach)*	2016-09-20
Brant Street & Hillyard Street	TWSC	2019-03-06
Wentworth Street & Burlington Street East	Signalized	2016-09-21
Wentworth Street North & Munroe Street	T-intersection* *(stop control on minor approach)*	2017-09-17
Birch Avenue & Burlington Street East	Signalized	2014-12-08**
Birch Avenue & Brant Street	Signalized	2018-04-25**

**Currently operates with an intersection pedestrian signal (IPS) – City staff reported that the signal is to be removed in 2019*
***Given the future EA of Birch Avenue two-way conversion, Birch Avenue intersections were not analyzed in detail. Analysis of Birch Avenue intersections subject to future EA study.*

3.2 Existing Traffic Operations

Intersection operations analysis was conducted using Synchro (version 9) and following Highway Capacity Manual (HCM 2000) methodologies of intersection analysis. Analysis periods were limited to the weekday AM and PM peak hours, when general background traffic is considered highest.

All critical traffic movements are identified with the following conditions (from City's TIS guidelines):

- For signalized intersections,
    - Volume-to-capacity (v/c) ratios for through movements or shared through/turning movements will operate at 0.85 or greater (0.85 is considered the maximum acceptable level-of-service for these movements);
    - V/C ratios for exclusive turning movements increase to 0.90 or greater (0.90 is considered the maximum acceptable level-of-service for these movements):
    - Queues for an individual movement are projected to exceed available turning lane storage at 95th percentile volumes.
- For unsignalized intersections,
    - Level-of-service, based on average delay per vehicle or individual movements is LOS 'D' or greater;

- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

Level-of-service (LOS) is a measure of performance based on the control delay, as defined in Exhibit 3-2

Exhibit 3-2: Intersection LOS Reference

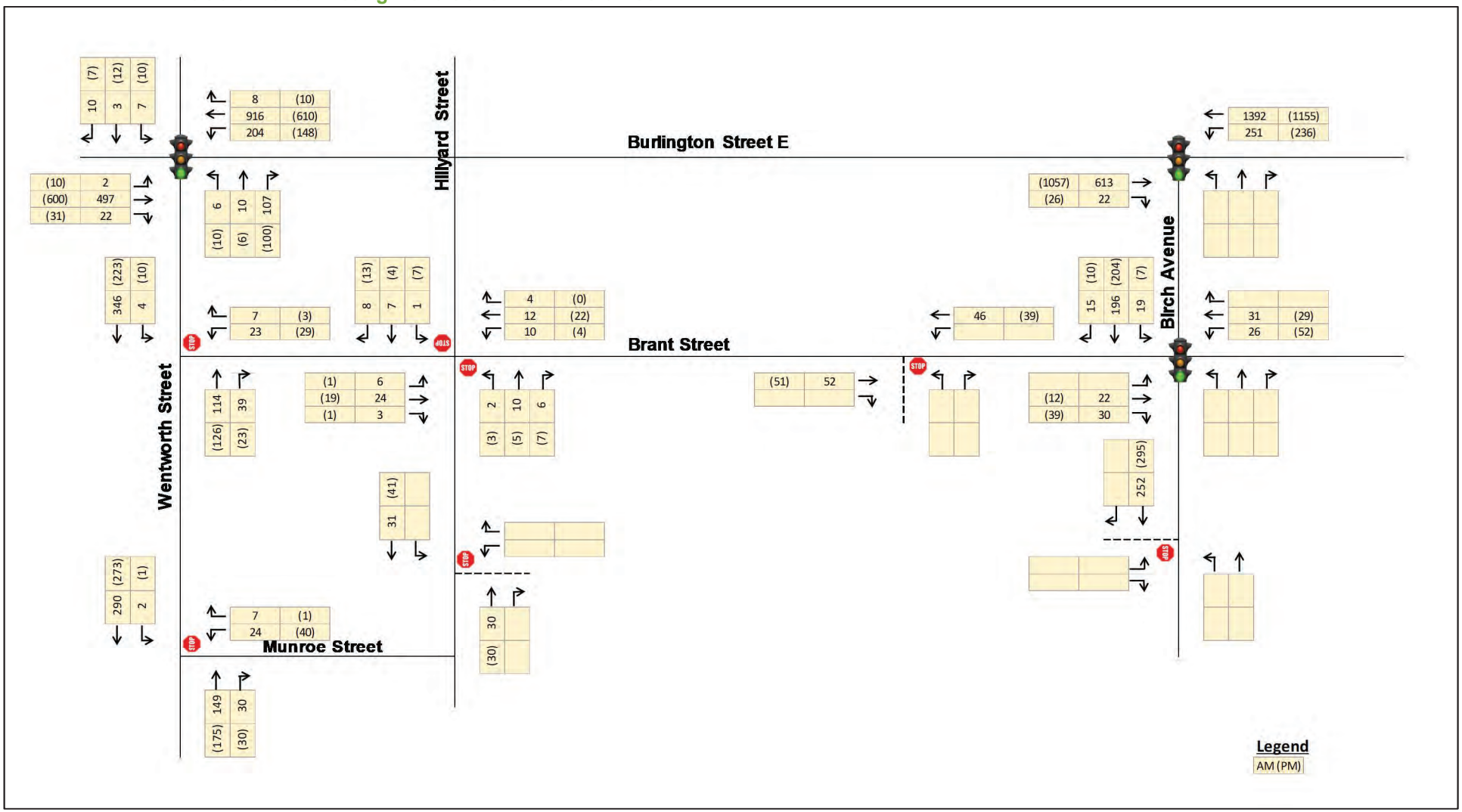
HCM LOS	CONTROL DELAY PER VEHICLE (S)	
	Signalized	Unsignalized
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Default parameter values listed in the City of Hamilton TIS guidelines were used. This includes an ideal saturation rate of 1900 vehicles per hour, peak hour factor of 0.92, lane width of roads of 3.3m.

Operational concerns or deficiencies noted in the studied horizon years are identified and addressed through recommendations and potential mitigation measures and/or operational improvements.

For existing traffic operations, a summary of the analysis for the AM and PM peaks is found in Exhibit 3-4 with full Synchro outputs provided in Appendix B. Based on the results, all intersections in the study area currently operate well, with the signalized intersections operating at LOS B or better. No intersections, signalized or unsignalized, experience any critical movements in either peak periods, indicating stable and free-flow traffic conditions.

Exhibit 3-3: 2019 Existing Conditions Traffic Volumes



Note: Not to scale

Exhibit 3-4: Existing Traffic Analysis (All Movements) Summary

Intersection Name	Control Type	Int LOS	All Movements				
			Mvmt	LOS	Delay (s)	V/C Ratio	95th Percentile Queue (m)
AM PEAK							
Wentworth St N/Burlington St E	Signalized	B	EBL	C	20	0.01	2
			EBTR	C	26	0.53	56
			WBL	B	15	0.47	30
			WBTR	B	16	0.60	77
			NBTLR	C	21	0.07	7
			SBTLR	C	21	0.03	6
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	17	0.24	42
			WBL	C	28	0.33	30
			WBT	A	0	0.33	-
Birch Avenue/ Brant St	Signalized	A	EBTR	B	14	0.06	9
			WBTL	B	15	0.09	13
			SBTLR	A	8	0.13	21
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.05	1
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	1	0.00	0
			WBTLR	A	3	0.01	0
			NBTLR	A	9	0.02	1
			SBTLR	A	9	0.02	1
Munroe St/ Wentworth St N*	Unsignalized	-	WBLR	B	11	0.05	1
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
PM PEAK							
Wentworth St N/Burlington St E	Signalized	B	EBL	B	19	0.05	5
			EBTR	C	27	0.62	69
			WBL	B	15	0.41	22
			WBTR	B	13	0.39	45
			NBTLR	C	21	0.07	7
			SBTLR	C	21	0.06	9
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	14	0.38	59
			WBL	C	30	0.35	30
			WBT	A	0	0.29	-
Birch Avenue/ Brant St	Signalized	A	EBTR	B	12	0.04	7
			WBTL	B	13	0.13	16
			SBTLR	A	6	0.13	13
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.05	1
			SBTL	A	1	0.01	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	0	0.00	0
			WBTLR	A	1	0.00	0
			NBTLR	A	9	0.02	0
			SBTLR	A	9	0.03	1
Munroe St/ Wentworth St N*	Unsignalized	-	WBLR	B	11	0.07	2
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0

**Currently operates with an intersection pedestrian signal (IPS) – City staff reported that the signal is to be removed in 2019 – modelled as 'stop control'*

4 Site Traffic

For this section, site peak periods refers to when site traffic is expected to be highest. Background peak periods represents when general background traffic for the road network is busiest. Analysis for passenger and bus fleet vehicle trips are limited to background peak periods only (7-9 AM & 4-6 PM).

4.1 Trip Generation

4.1.1 Passenger Vehicle Trips

Because the planned operation of the facility is known, staff numbers and types of operation provide a basis for trip generation that is better represented than ITE rates which depends on square footage and other metrics. Projected employee numbers were provided from the final Space Program (version 7). Staffing numbers are summarized below in Exhibit 4-1.

Exhibit 4-1: Staff Operations for MSF (Final Space Program v7)

DESCRIPTION	STAFF NUMBERS
Bus Operators	640
Operations Support Staff	27
Transit Support Services	4
Fleet Maintenance	140
Stores	3
Facility Operations	3
Total	***817***

Considering the use of the facility, the traffic forecasts were separated into 4 categories; staff positions where 1 shift was expected, staff positions where 2 shifts were expected, bus operators and bus fleet vehicles. The fourth category (i.e. bus fleet vehicles) is discussed separately in Section 4.1.2. It was assumed that each employee would use a vehicle due to the fact that many of the employees cannot utilize transit as they are the transit operators and thus would need to arrive outside transit operation times (off-peak / night periods). This may be conservative as all the employees are bus operators and some may have to take transit or use alternative modes of travel. The following assumptions were used to convert employees to trips during the two peak hours.

- Administration and support staffs (single shifts) were assumed to enter during the AM peak and leave during the PM peak (assumed 30 vph);
- Positions where two shifts were required such as transit maintenance, it was assumed that the first shift would arrive during the AM peak hour and leave during the PM peak hour, while a second shift would enter during the PM peak hour and leave outside the peak hours later that evening (assumed 45 vph). A small portion (10 vph) is assumed to enter during off peak and leave in the AM peak. This is consistent with the mechanic/maintenance shift times provided by the City (7 AM-3 PM, 3 PM-11 PM and 11 PM-7 AM);
- Majority of bus operators are expected to arrive and leave during the off peak. During the background peak periods, passenger vehicles from the bus operators

are expected to be the reverse of the bus fleet vehicles entering and leaving the site – refer to Section 4.1.2.

From the above assumptions, a summary of the total traffic generated by the site for passenger vehicles is provided in Exhibit 4-2. Total passenger vehicle two-way trip is approximately 94 in the AM peak hour and 134 in the PM peak hour. Majority of site generated traffic is expected outside of typical peak hours and will marginally impact the local road network.

Exhibit 4-2: Site Generated Trips (Passenger Vehicle Trips during Background Peak hour)

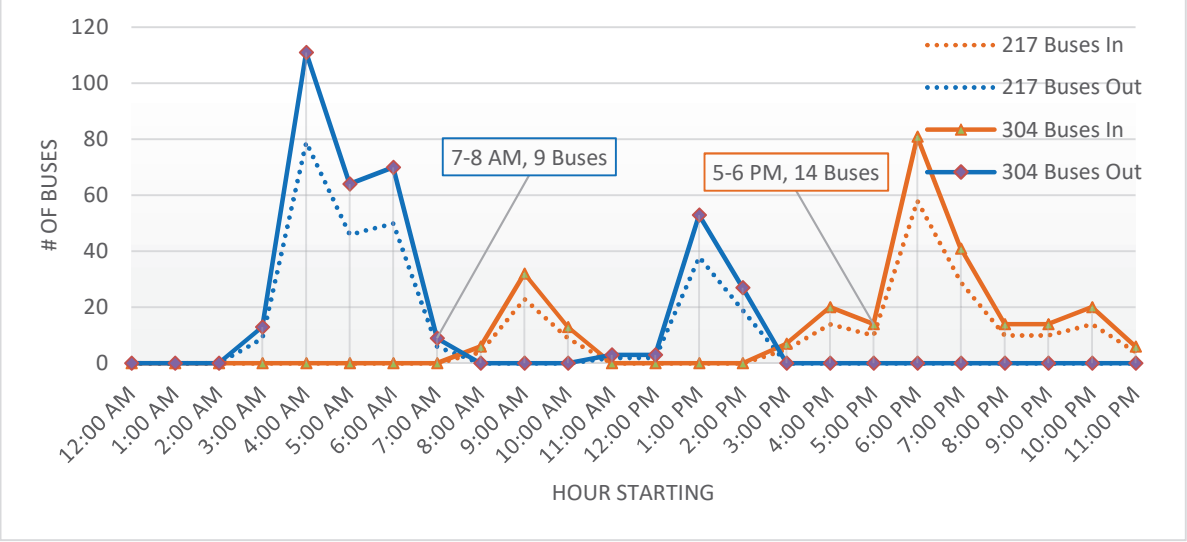
TRAFFIC VOLUME GENERATOR	AM ENTER	AM EXIT	PM ENTER	PM EXIT
Single Shift Positions	30			30
Two Shift Positions	45	10	45	45
Bus Operators*	9			14
Total Passenger Vehicles	***84***	***10***	***45***	***89***

**Bus fleet vehicle trips (refer to Section 4.1.2)*

4.1.2 Bus Fleet Trips

Based on existing bus routes, the Hamilton Street Railway (HSR) provided a service chart which represents required number of buses needed on the City's roadways during a typical weekday. The highest number required is 217 buses and occurs prior to the afternoon background traffic PM peak at 3:01 PM. To estimate generated bus fleet vehicle trips during background peak, the difference in bus levels reflects the buses pulling in or out of the facility. The values corresponding to the background peak periods were used and scaled up by a factor of 1.401 (304 / 217) to represent a future build-out condition of 304 single bus equivalence (SBE) capacity (value considering the future expansion of 100 additional buses). A summary of the results is presented in Exhibit 4-3.

Exhibit 4-3: MSF Bus Fleet Vehicle Pull-in/Pull-out



From the above, a total of 9 and 14 bus vehicles are expected to be generated during AM and PM background peak hours (7-8 AM & 5-6 PM) respectively. This low volume is anticipated as majority of bus fleet vehicles are in operation around the City during this time. These vehicles are expected to minimally affect the local road network during peak times.

4.2 Trip Distribution

As shown in the site plans, three accesses are proposed; the main bus access on Birch Avenue, the secondary bus access on Brant Street, and the passenger vehicle access on Hillyard Street. Trips are distributed through the road network based on shortest path method.

Directional percentage split of site passenger vehicle traffic was developed through manual review of routes to and from nearby arterials and access to the rest of the city. Passenger vehicles are assumed to access/egress the site at the Hillyard Street (parkade) entrance only. This distribution also considers HSR employees using Birch Avenue to access the facility in an effort to reduce cut through traffic to surrounding neighborhoods (discussed in Section 6.2). The general direction of origin and destination for inbound and outbound trips was assumed to be that indicated in Exhibit 4-4. The resultant passenger vehicle site traffic distribution for the AM and PM peak hours is illustrated in Exhibit 4-6. The assigned trips is illustrated in Exhibit 4-7.

Exhibit 4-4: Passenger Vehicle Traffic Splits Per Direction

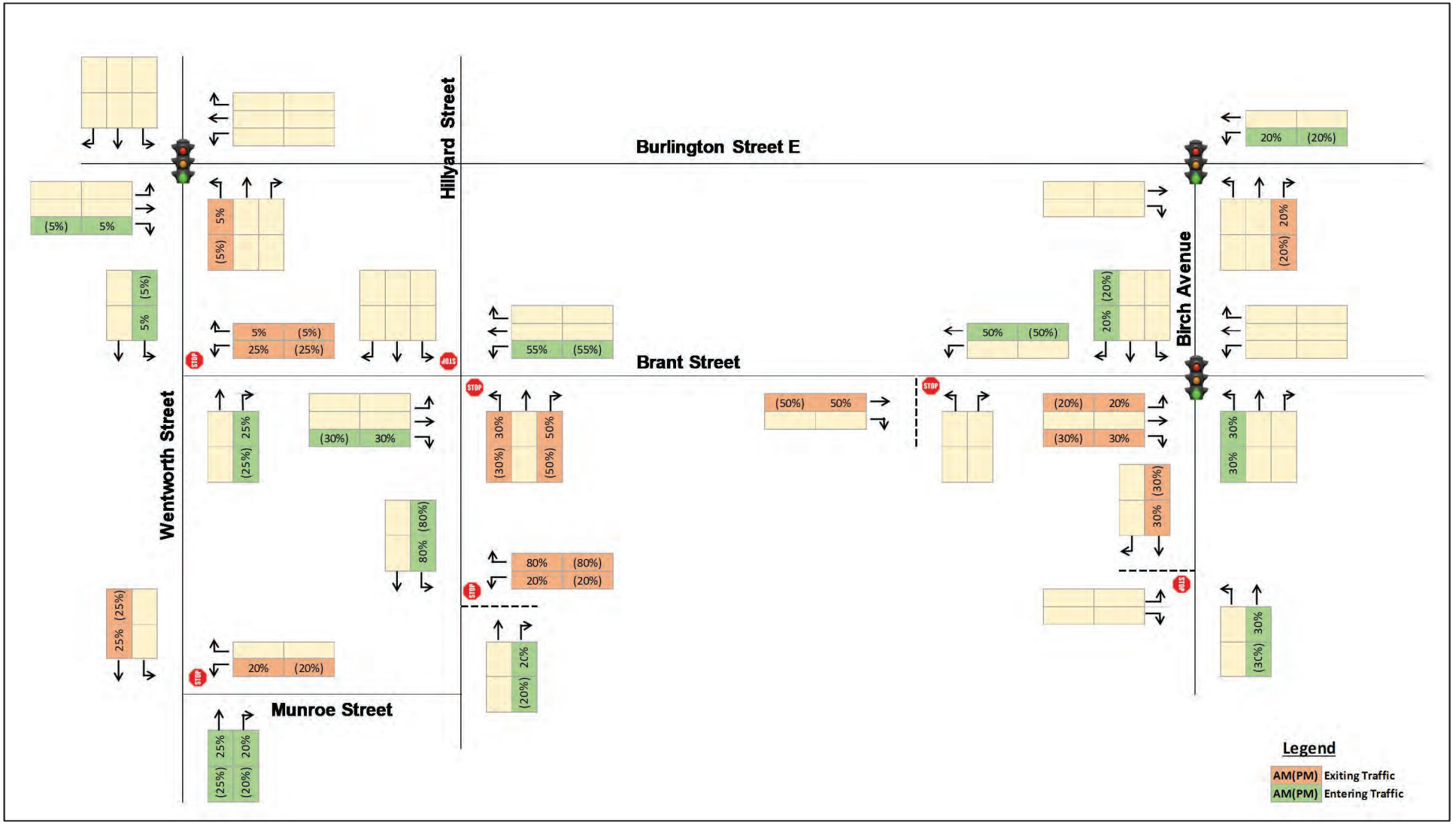
ORIGIN/DESTINATION	PERCENT DISTRIBUTION			
	AM Peak Hour		PM Peak Hour	
To / From the North	In	Out	In	Out
via Birch Avenue / Burlington Street East	10%	10%	10%	10%
To / From the South	In	Out	In	Out
via Wentworth Street North	45%	45%	45%	45%
via Birch Avenue	30%	30%	30%	30%
To / From the East	In	Out	In	Out
via Birch Avenue / Burlington Street East	10%	10%	10%	10%
To / From the West	In	Out	In	Out
via Wentworth Street North / Burlington Street East	5%	5%	5%	5%

Bus traffic splits follows a different distribution due to the fact that buses operate on fixed routes. Given that the ultimate operations of the facility will be up to HSR, buses would likely utilize the access that has the least number of left-turn movements and be oriented towards collector/arterial roads (i.e. Birch Avenue). These distributions also assumes that Birch Avenue will be converted to two-way. Lastly, it is assumed that majority of the bus trips are concentrated towards the main bus access (i.e. Birch Avenue). With input from City's planning department, the general direction of trips originating from and destining to the site are that indicated in Exhibit 4-5. The resultant bus trip distribution for AM and PM is illustrated in Exhibit 4-8. The assigned trips is illustrated in Exhibit 4-9.

Exhibit 4-5: Bus Percentage Splits Per Direction

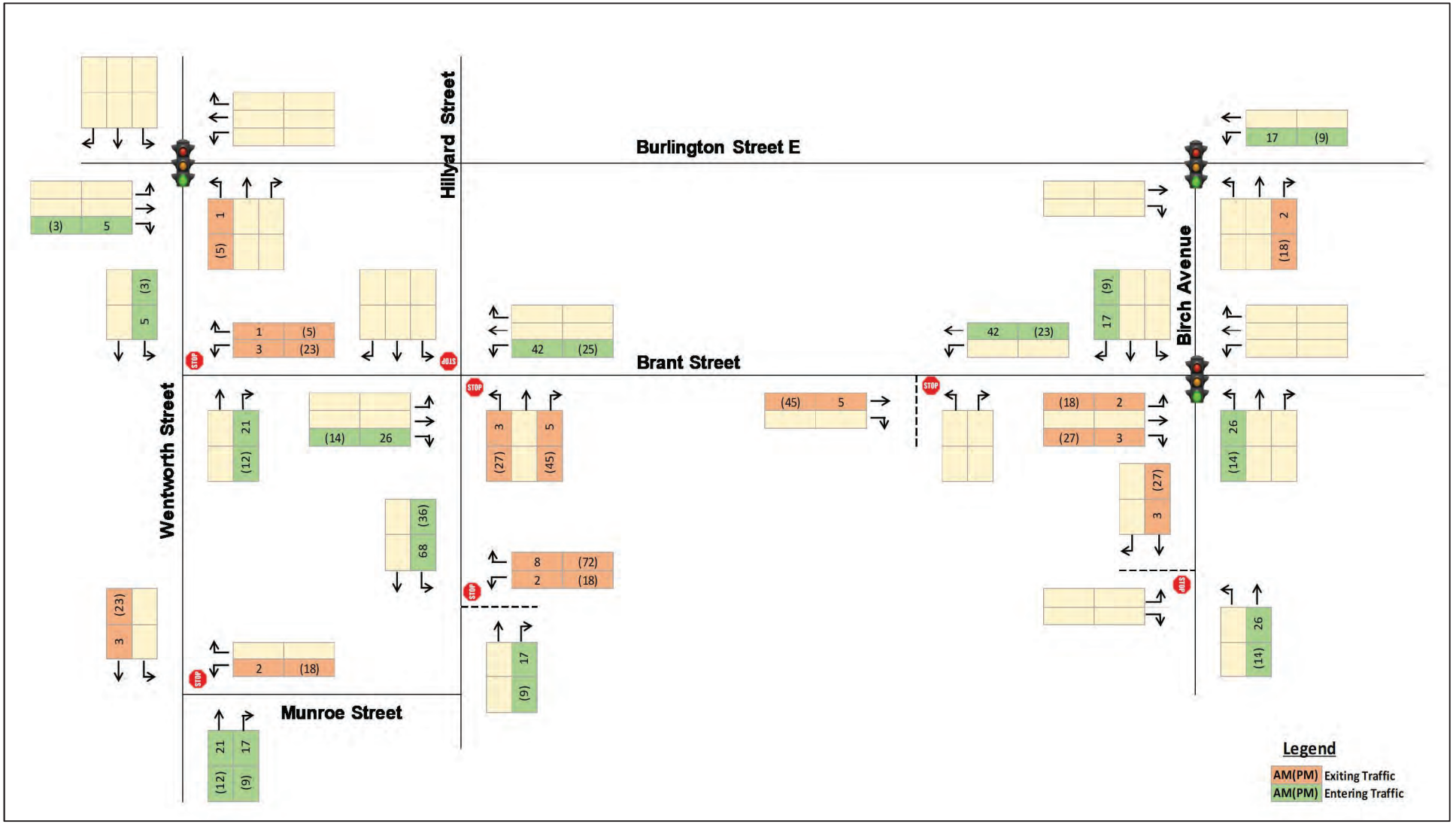
ORIGIN/DESTINATION	PERCENT DISTRIBUTION			
	AM Peak Hour		PM Peak Hour	
To / From the North	In	Out	In	Out
via Birch Avenue	14%	14%	13%	13%
To / From the South	In	Out	In	Out
via Birch Avenue	86%	86%	87%	87%

Exhibit 4-6: Passenger Vehicle Site Distribution



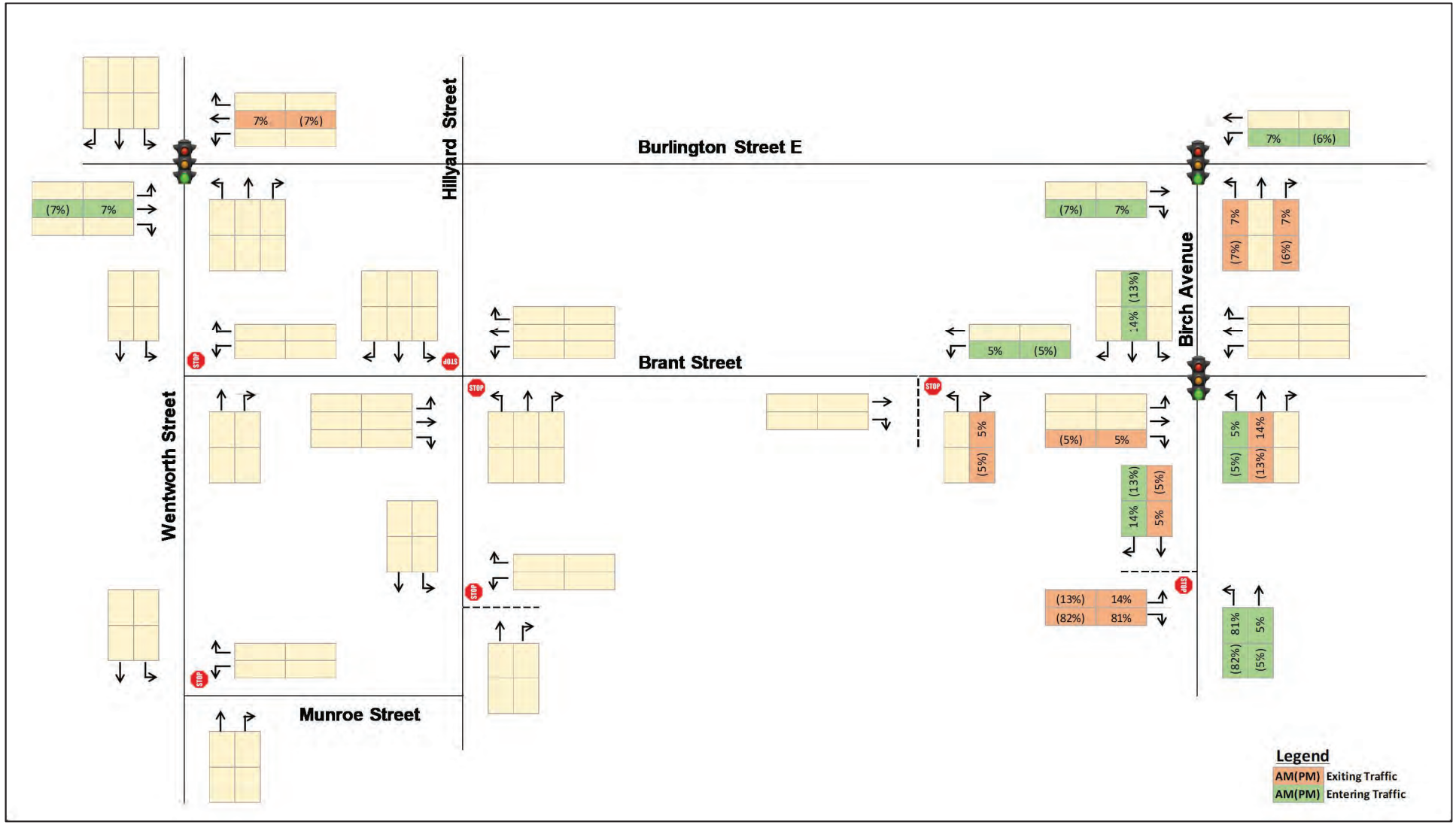
Note: Not to scale, rounded values

Exhibit 4-7: Passenger Vehicle Site Generated Trips



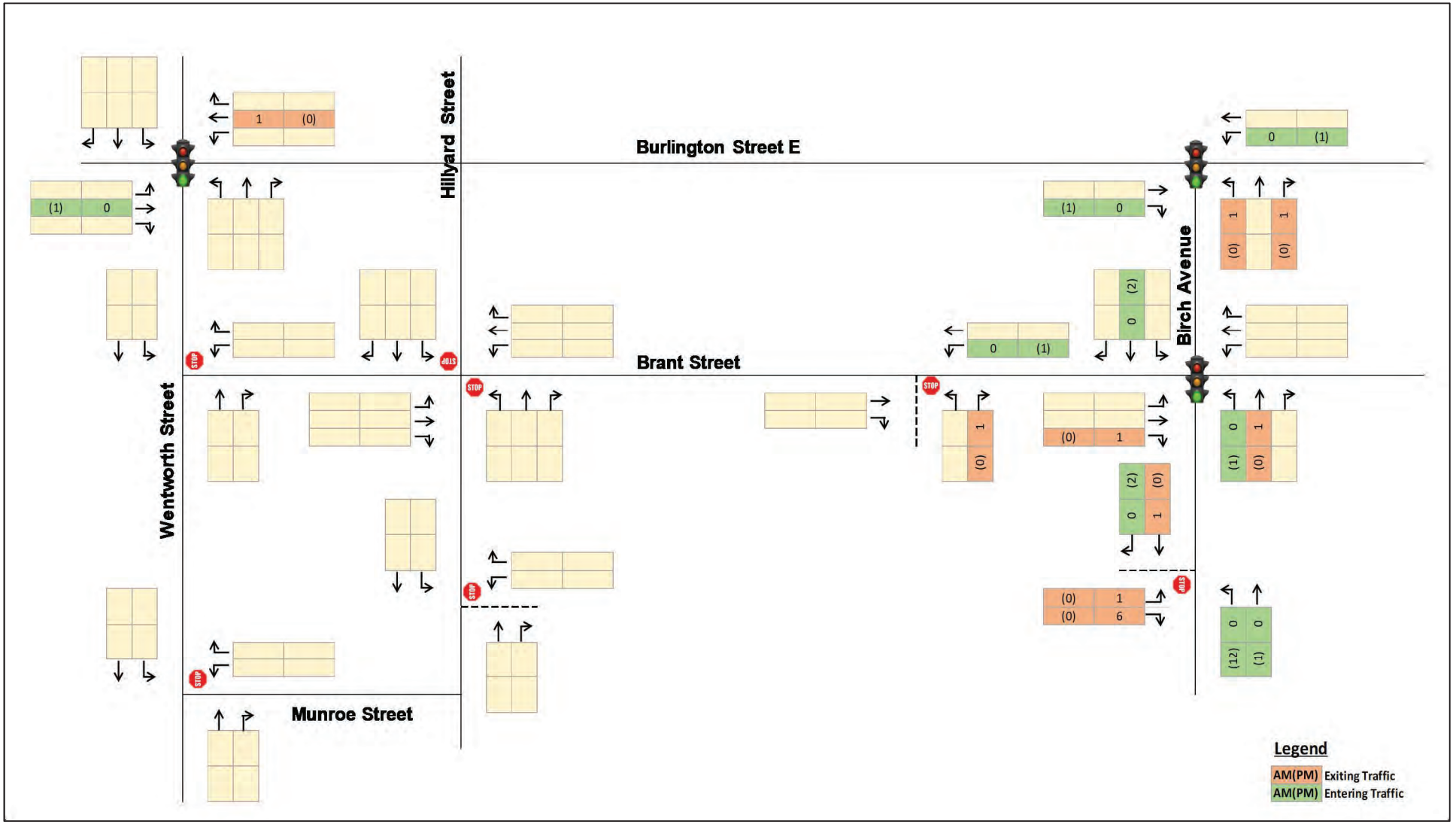
Note: Not to scale, rounded values

Exhibit 4-8: Bus Fleet Vehicle Site Distribution



Note: Not to scale, rounded values

Exhibit 4-9: Bus Fleet Vehicle Site Generated Trips



Note: Not to scale, rounded values

5 Future Conditions

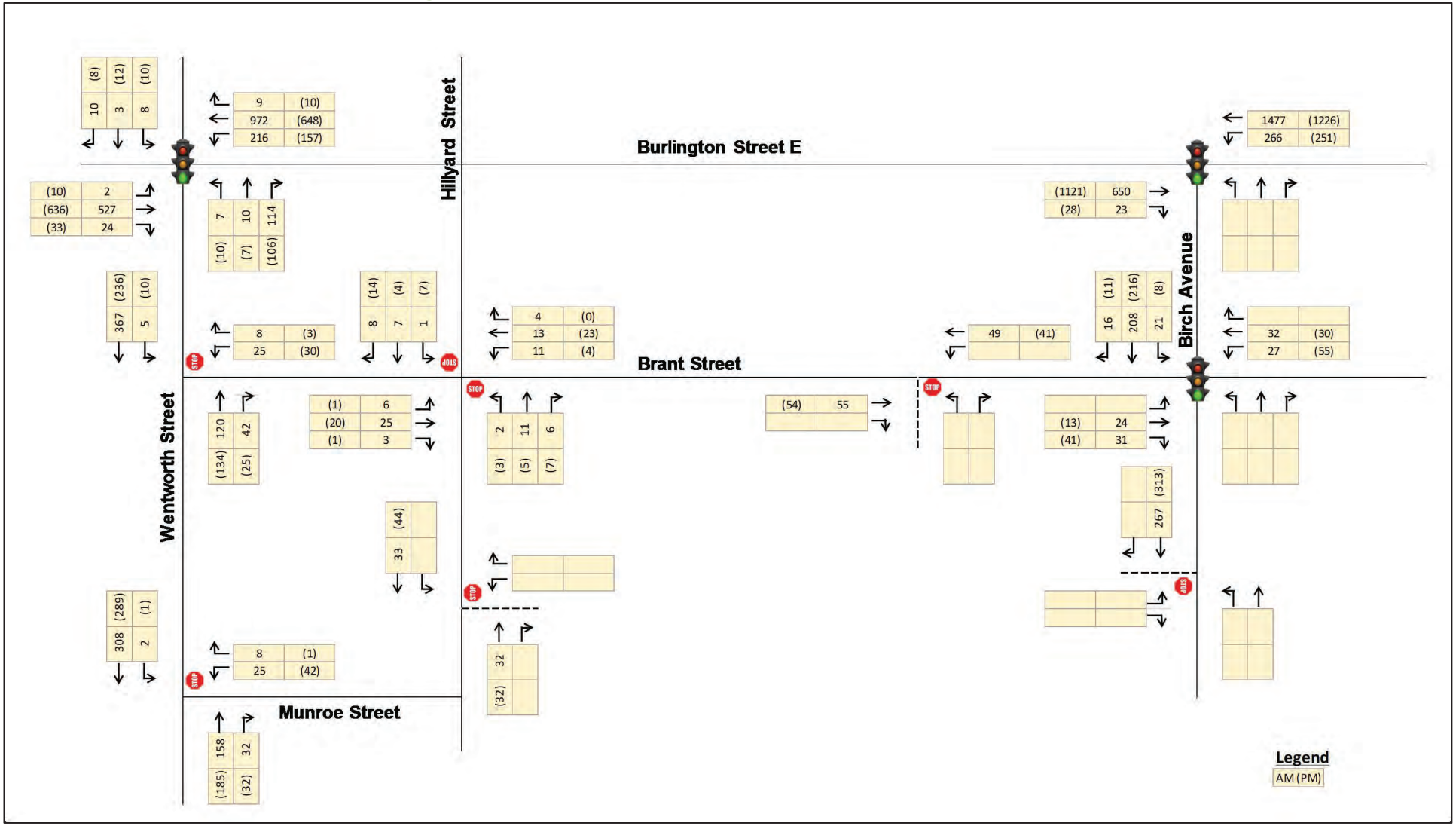
This section discusses the growth rate and future traffic operations under the 2022 and 2027 horizon years.

5.1 Traffic Volumes

To estimate future background growth (i.e. growth not accounted from the development), a 2% was applied to existing volumes. This equates to a growth of approximately 6% and 17% to years 2022 and 2027, respectively.

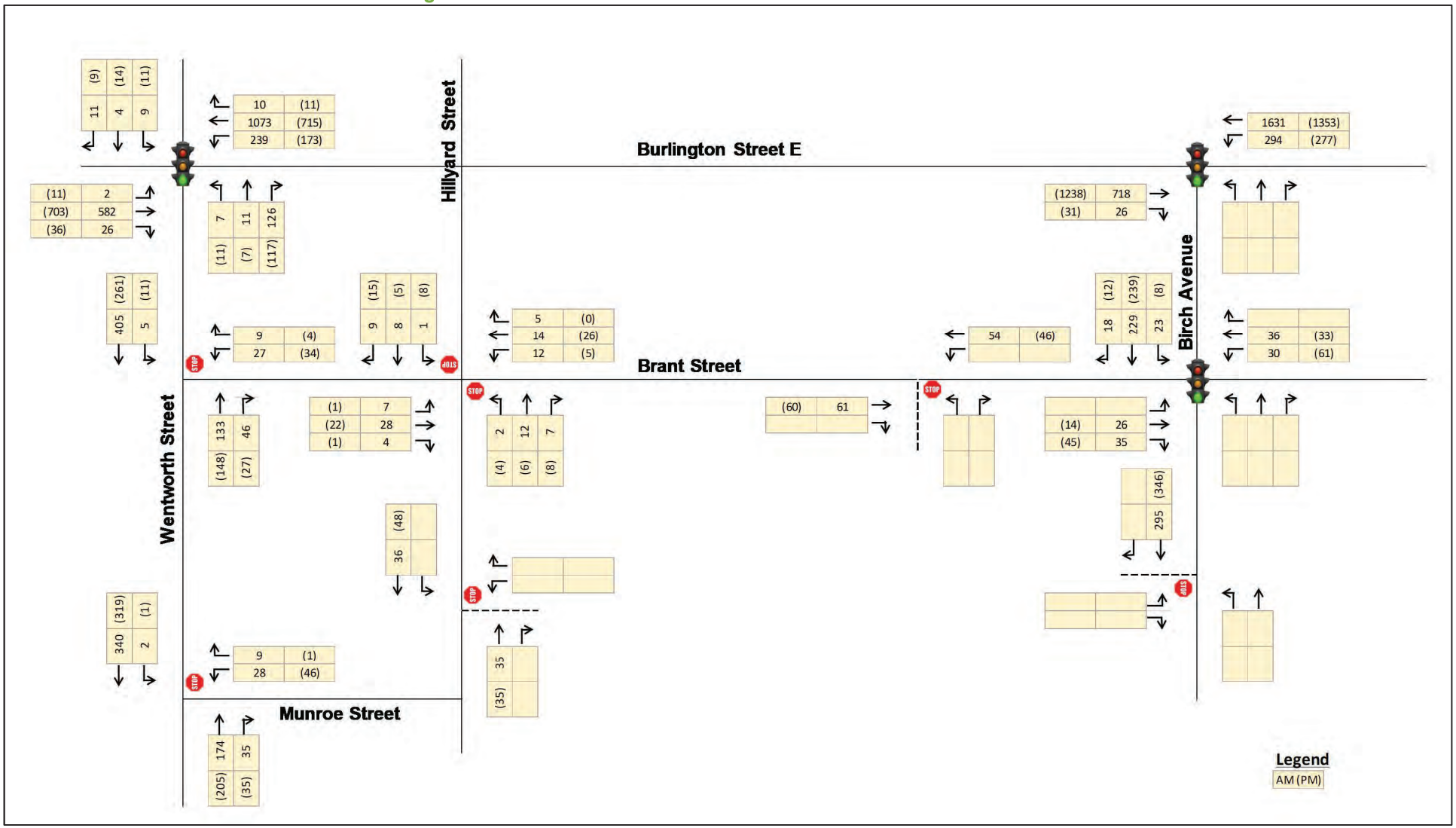
The rate was determined through a background review of historical counts with results indicating low growth. However, given the uncertainty with the conversion of Birch Avenue to two-way operation with potential traffic diversion through the study area, a 2% was considered appropriate. This rate is also endorsed in the City's *Traffic Impact Study Guideline (2009*) and was therefore carried forward for analyses. The traffic volumes for background conditions are shown in Exhibit 5-1 and Exhibit 5-2. With the added site development traffic (discussed in Section 4), the future total volumes are shown in Exhibit 5-3 and Exhibit 5-4.

Exhibit 5-1: 2022 Future Background Traffic Volumes



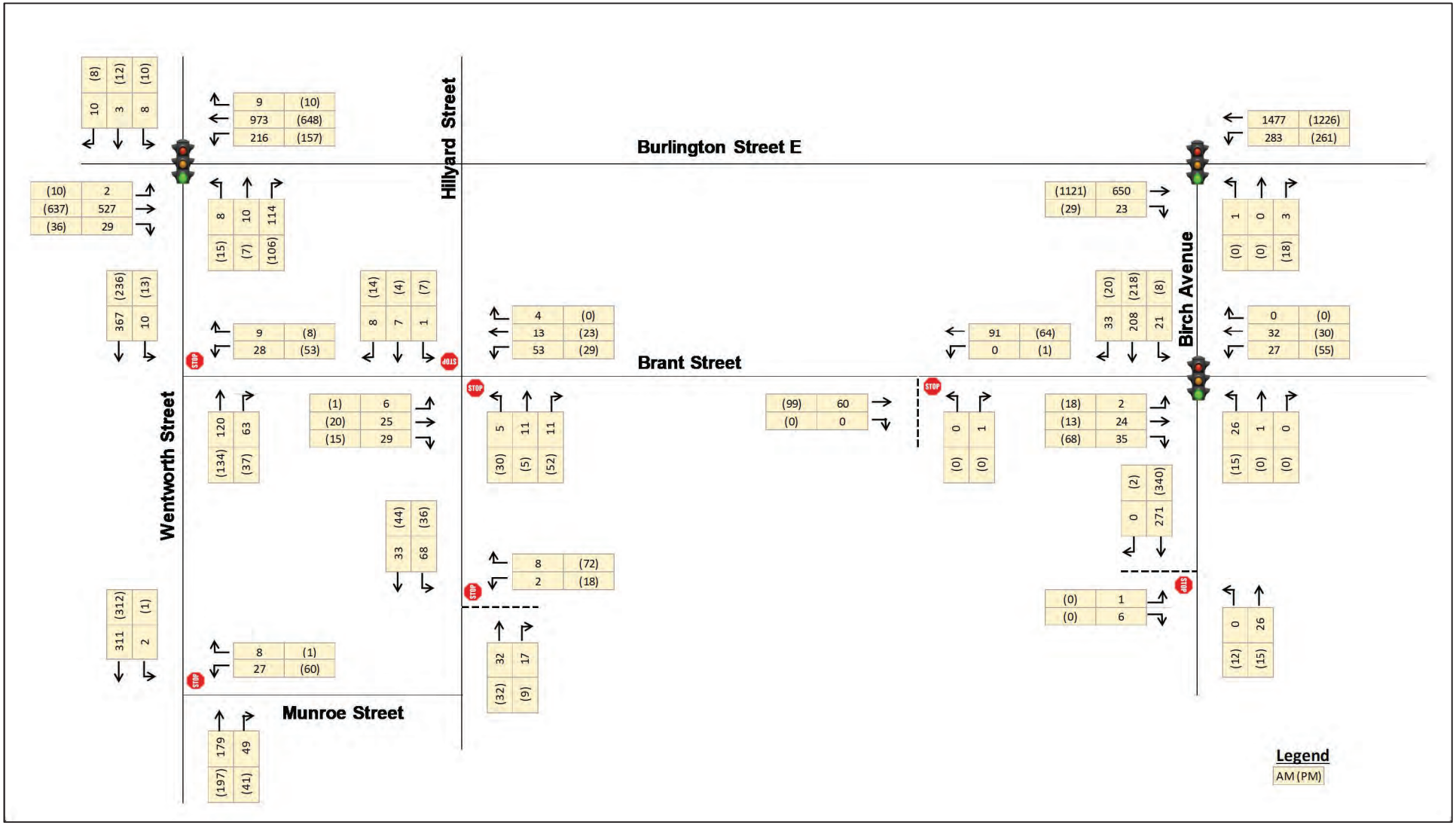
Note: Not to scale, rounded values

Exhibit 5-2: 2027 Future Background Traffic Volumes



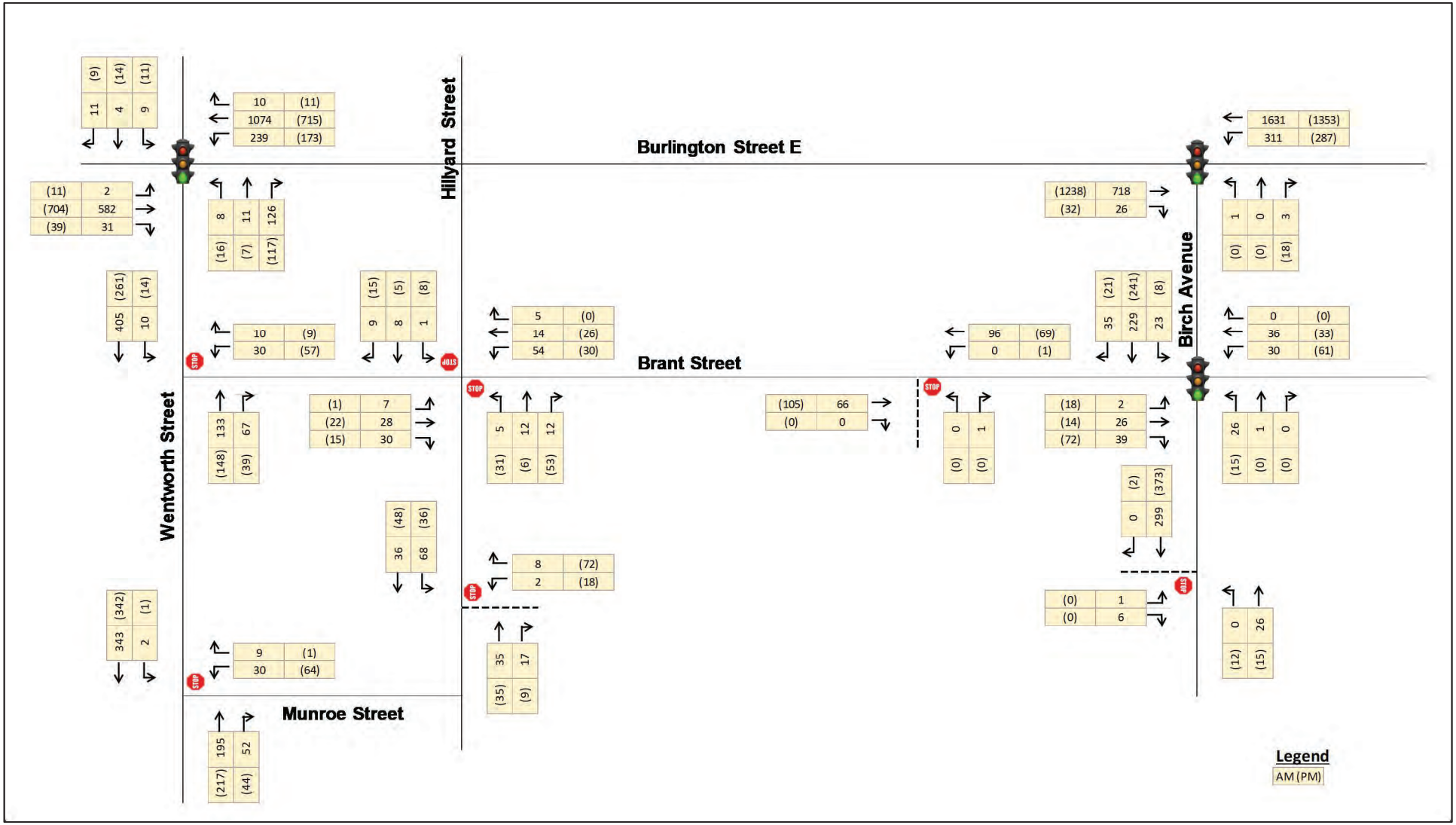
Note: Not to scale, rounded values

Exhibit 5-3: 2022 Future Total Traffic Volumes



Note: Not to scale, rounded values

Exhibit 5-4: 2027 Future Total Traffic Volumes



Note: Not to scale, rounded values

5.2 2022 Future Background

Exhibit 5-5 summarize the signalized and unsignalized operations, respectively during the AM and PM peaks. Future background Synchro reports are provided in Appendix C.

With the increased traffic volumes from background growth, the study area intersections are expected to operate with sufficient residual capacity during the AM and PM peak periods at LOS B or better. When compared to existing traffic conditions, delay increases by 1-2 seconds for individual/shared movements and are expected to marginal. The intersection of Birch Avenue and Brant Street deteriorates slightly in the AM peak and now operates at LOS B.

Overall, all study intersections continue to operate well with no critical movements or capacity concerns.

5.3 2022 Future Total

Exhibit 5-6 summarize the signalized and unsignalized intersection operations, respectively during the AM and PM peaks. Future total Synchro reports are provided in Appendix D.

As stated in Section 2.5, the study intersections on Birch Avenue have been analyzed as existing (southbound direction only). Although not modelled, northbound site traffic on Birch Avenue is expected to minimally affect the three intersections as they all have sufficient capacity and is currently operating well at LOS B or better. It is also noted that the generated site, particularly along Birch Avenue are low during the busy periods of the local road network.

To evaluate the impact of the proposed development has on the remainder of the study area network, the 2022 future total operations are compared to the 2022 future background operations. The following changes have been observed:

- In general, traffic operations marginally deteriorate due to additional trips generated by the MSF. During the PM peak, the Wentworth Street & Burlington Street intersection deteriorates slightly from LOS B to LOS C, however, sufficient capacity is provided. Delay at all other intersections increases slightly by 1-2 seconds; and
- For the site accesses, all individual/shared movements operate well with LOS B or better. During both peak periods, a few exiting movements now operate at LOS B with delays up to 10 seconds. This indicates good operation.

In summary, all study intersections continue to operate well with no critical movements or capacity concerns.

5.4 2027 Future Background

Exhibit 5-7 summarize the signalized and unsignalized intersection operations, respectively during the AM and PM peaks. Future background Synchro reports are provided in Appendix E.

With the increased traffic volumes from background growth, the study area intersections are expected to operate with sufficient reserve capacity during the AM and PM peak periods operating at LOS C or better. When compared to existing traffic conditions, delay increases by about 1-3 seconds for individual/shared movements and are expected to marginal.

Overall, all study intersections continue to operate well with no critical movements or capacity concerns.

5.5 2027 Future Total

Exhibit 5-8 summarize the signalized and unsignalized intersection operations, respectively during the AM and PM peaks. Future total Synchro reports are provided in Appendix F.

As stated in Section 2.5, the study intersections on Birch Avenue have been analyzed as existing (southbound direction only). Although not modelled, northbound site traffic on Birch Avenue is expected to minimally affect the three intersections as they all have sufficient capacity and is currently operating well at LOS B or better. It is also noted that the generated site, particularly along Birch Avenue are low during the busy periods of the local road network.

To evaluate the impact of the proposed development has on the remainder of the study area network, the 2027 future total operations are compared to the 2027 future background operations. The following changes have been observed:

- In general, traffic operations marginally deteriorate due to additional trips generated by the MSF development. Delays for individual/shared movements for the study intersections increase by 1-2 seconds; and
- For the site accesses, all individual/shared movements operate well with LOS B or better. During both peak periods, a few exiting movements now operate at LOS B with delays up to 10 seconds. This indicates good operation.

In summary, all study intersections continue to operate well with no critical movements or capacity concerns.

Exhibit 5-5: 2022 Future Background Traffic Analysis Summary

Intersection Name	Control Type	Int LOS	All Movements				
			Mvmt	LOS	Delay (s)	V/C Ratio	95th Percentile Queue (m)
AM PEAK							
Wentworth St N/Burlington St E	Signalized	B	EBL	C	20	0.01	2
			EBTR	C	27	0.56	60
			WBL	B	16	0.52	32
			WBTR	B	16	0.64	84
			NBTLR	C	21	0.07	7
			SBTLR	C	21	0.04	7
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	18	0.26	45
			WBL	C	29	0.35	32
			WBT	A	0	0.35	-
Birch Avenue/ Brant St	Signalized	B	EBTR	B	14	0.07	9
			WBTL	B	15	0.09	13
			SBTLR	A	8	0.13	22
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.05	1
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	1	0.00	0
			WBTLR	A	3	0.01	0
			NBTLR	A	9	0.02	1
			SBTLR	A	9	0.02	1
Munroe St/ Wentworth St N	Unsignalized	-	WBLR	B	11	0.05	1
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	A	0	0.00	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	0	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	0	0.00	0
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
PM PEAK							
Wentworth St N/Burlington St E	Signalized	B	EBL	B	19	0.05	5
			EBTR	C	28	0.66	74
			WBL	B	16	0.45	23
			WBTR	B	13	0.42	49
			NBTLR	C	21	0.07	7
			SBTLR	C	21	0.06	9
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	14	0.40	64
			WBL	C	31	0.38	32
			WBT	A	0	0.30	-
Birch Avenue/ Brant St	Signalized	A	EBTR	B	12	0.05	7
			WBTL	B	13	0.13	17
			SBTLR	A	6	0.14	13
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.05	1
			SBTL	A	1	0.01	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	0	0.00	0
			WBTLR	A	1	0.00	0
			NBTLR	A	9	0.02	0
			SBTLR	A	9	0.03	1
Munroe St/ Wentworth St N	Unsignalized	-	WBLR	B	11	0.07	2
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	A	0	0.00	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	0	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	0	0.00	0
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0

Exhibit 5-6: 2022 Future Total Traffic Analysis Summary

Intersection Name	Control Type	Int LOS	All Movements				
			Mvmt	LOS	Delay (s)	V/C Ratio	95th Percentile Queue (m)
AM PEAK							
Wentworth St N/Burlington St E	Signalized	B	EBL	C	20	0.01	2
			EBTR	C	27	0.57	61
			WBL	B	16	0.52	32
			WBTR	B	16	0.64	84
			NBTLR	C	21	0.07	8
			SBTLR	C	21	0.04	7
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	18	0.26	45
			WBL	C	29	0.38	34
			WBT	A	0	0.35	-
Birch Avenue/ Brant St	Signalized	B	EBTR	B	14	0.07	9
			WBTL	B	15	0.10	13
			SBTLR	A	8	0.14	23
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.07	2
			SBTL	A	1	0.01	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	1	0.00	0
			WBTLR	A	6	0.04	1
			NBTLR	A	10	0.04	1
			SBTLR	A	10	0.02	1
Munroe St/ Wentworth St N*	Unsignalized	-	WBLR	B	11	0.06	2
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	B	10	0.01	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	10	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	9	0.02	0
			SBTL	A	6	0.06	2
			NBTR	A	0	0.00	0
PM PEAK							
Wentworth St N/Burlington St E	Signalized	C	EBL	B	19	0.05	5
			EBTR	C	28	0.67	74
			WBL	B	16	0.45	23
			WBTR	B	13	0.42	49
			NBTLR	C	21	0.08	8
			SBTLR	C	21	0.06	9
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	14	0.40	64
			WBL	C	31	0.39	33
			WBT	A	0	0.30	-
Birch Avenue/ Brant St	Signalized	A	EBTR	B	12	0.07	8
			WBTL	B	13	0.13	17
			SBTLR	A	6	0.14	12
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.10	3
			SBTL	A	1	0.01	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	0	0.00	0
			WBTLR	A	4	0.02	1
			NBTLR	A	9	0.10	3
			SBTLR	A	9	0.03	1
Munroe St/ Wentworth St N*	Unsignalized	-	WBLR	B	12	0.13	3
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	B	10	0.01	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	0	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	9	0.13	4
			SBTL	A	4	0.03	1
			NBTR	A	0	0.00	0

Exhibit 5-7: 2027 Future Background Traffic Analysis Summary

Intersection Name	Control Type	Int LOS	All Movements				
			Mvmt	LOS	Delay (s)	V/C Ratio	95th Percentile Queue (m)
AM PEAK							
Wentworth St N/Burlington St E	Signalized	C	EBL	C	20	0.01	2
			EBTR	C	28	0.62	67
			WBL	B	18	0.60	35
			WBTR	B	18	0.70	98
			NBTLR	C	21	0.08	8
			SBTLR	C	21	0.04	7
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	19	0.28	51
			WBL	C	29	0.39	35
			WBT	A	1	0.39	-
Birch Avenue/ Brant St	Signalized	B	EBTR	B	14	0.07	10
			WBTL	B	15	0.11	15
			SBTLR	A	8	0.15	24
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.06	2
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	1	0.00	0
			WBTLR	A	3	0.01	0
			NBTLR	A	9	0.03	1
			SBTLR	A	9	0.02	1
Munroe St/ Wentworth St N	Unsignalized	-	WBLR	B	11	0.07	2
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	A	0	0.00	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	0	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	0	0.00	0
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
PM PEAK							
Wentworth St N/Burlington St E	Signalized	C	EBL	B	20	0.06	5
			EBTR	C	30	0.73	84
			WBL	B	18	0.53	26
			WBTR	B	13	0.46	55
			NBTLR	C	21	0.08	8
			SBTLR	C	22	0.07	10
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	15	0.45	72
			WBL	C	31	0.41	35
			WBT	A	0	0.34	-
Birch Avenue/ Brant St	Signalized	A	EBTR	B	12	0.05	7
			WBTL	B	13	0.15	18
			SBTLR	A	7	0.15	13
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	11	0.06	2
			SBTL	A	1	0.01	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	0	0.00	0
			WBTLR	A	1	0.00	0
			NBTLR	A	9	0.02	1
			SBTLR	A	9	0.03	1
Munroe St/ Wentworth St N	Unsignalized	-	WBLR	B	12	0.09	2
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	A	0	0.00	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	0	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	0	0.00	0
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0

Exhibit 5-8: 2027 Future Total Traffic Analysis Summary

Intersection Name	Control Type	Int LOS	All Movements				
			Mvmt	LOS	Delay (s)	V/C Ratio	95th Percentile Queue (m)
AM PEAK							
Wentworth St N/Burlington St E	Signalized	C	EBL	C	20	0.01	2
			EBTR	C	28	0.63	68
			WBL	B	19	0.61	35
			WBTR	B	18	0.70	98
			NBTLR	C	21	0.08	8
			SBTLR	C	21	0.04	7
Burlington St E/ Birch Avenue	Signalized	A	EBTR	B	19	0.28	51
			WBL	C	30	0.41	37
			WBT	A	1	0.39	-
Birch Avenue/ Brant St	Signalized	B	EBTR	B	14	0.07	10
			WBTL	B	15	0.11	15
			SBTLR	A	8	0.15	25
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	12	0.08	2
			SBTL	A	1	0.01	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	1	0.00	0
			WBTLR	A	6	0.04	1
			NBTLR	A	10	0.04	1
			SBTLR	A	10	0.03	1
Munroe St/ Wentworth St N*	Unsignalized	-	WBLR	B	12	0.08	2
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	B	10	0.01	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	10	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	9	0.02	0
			SBTL	A	6	0.06	2
			NBTR	A	0	0.00	0
PM PEAK							
Wentworth St N/Burlington St E	Signalized	C	EBL	B	20	0.06	5
			EBTR	C	30	0.73	84
			WBL	B	18	0.53	26
			WBTR	B	13	0.46	55
			NBTLR	C	21	0.08	8
			SBTLR	C	22	0.07	10
Burlington St E/ Birch Avenue	Signalized	B	EBTR	B	15	0.45	72
			WBL	C	31	0.43	36
			WBT	A	0	0.34	-
Birch Avenue/ Brant St	Signalized	A	EBTR	B	12	0.07	9
			WBTL	B	13	0.15	18
			SBTLR	A	6	0.16	13
Wentworth St N/ Brant St	Unsignalized	-	WBLR	B	12	0.11	3
			SBTL	A	1	0.01	0
			NBTR	A	0	0.00	0
Brant St/ Hillyard St	Unsignalized	-	EBTLR	A	0	0.00	0
			WBTLR	A	4	0.02	1
			NBTLR	A	10	0.11	3
			SBTLR	A	9	0.03	1
Munroe St/ Wentworth St N*	Unsignalized	-	WBLR	B	13	0.13	4
			SBTL	A	0	0.00	0
			NBTR	A	0	0.00	0
Birch Ave & Site Access #1	Unsignalized	-	EBL	A	0	0.00	0
			EBR	B	10	0.01	0
			SBTR	A	0	0.00	0
Brant Street & Site Access #2	Unsignalized	-	NBL	A	0	0.00	0
			NBR	A	0	0.00	0
			EBTR	A	0	0.00	0
			WBTL	A	0	0.00	0
Hillyard St & Site Access #3	Unsignalized	-	WBLR	A	9	0.13	4
			SBTL	A	4	0.03	1
			NBTR	A	0	0.00	0

6 Improvement Measures

6.1 Hillyard Street and Brant Street Intersection

In consultation with the City, staff requested analysis of converting the existing intersection from two-way stop control (TWSC) to all-way stop control (AWSC). The AWSC warrant was performed using OTM Book 5 (Regulatory Signs) guidelines. The results is summarized in Exhibit 6-1.

Exhibit 6-1: All-way Stop Control Warrant for Hillyard Street & Brant Street Intersection

Justification	Description	Minimum Requirement	Compliance Section		Justification Met?
			Numerical	%	
1. Minimum Volume Warrant	A. Vehicle volume on all approaches, for the highest hour recorded	350	172	49%	NO
	B. Vehicle volume split	65 / 35	53 / 47	Met	YES

Review of traffic volumes shows that AWSC is appropriate at this location as the intersection has moderate and relatively balanced volume levels (53 / 47 split) for each approach. Although the volume criteria is not met, from a traffic safety perspective, AWSC can reduce right-angle and turning collisions. It provides a more orderly movement at an intersection, reducing through and turning speeds on Brant Street, and minimizing safety concerns of any sight distance restrictions that may be present. At the intersection and on the east quadrants, as illustrated in Exhibit 6-2, there currently exists a safety hazard where sightlines are obstructed from trees/utility poles (left image) and the meat plant / warehouse (right image). This concern can be addressed with the proposed improvement.

Exhibit 6-2: Sightline Obstruction at Hillyard Street and Brant Street Intersection

The AWSC improvement measure was compared using 2027 future total volumes, with results presented in Exhibit 6-3.

Exhibit 6-3: Analysis of Improvements to Hillyard Street and Brant Street Intersection

Control Type	AM PEAK					PM PEAK				
	Avg. Delay	Critical Movements				Avg. Delay	Critical Movements			
		Mvmnt	LOS	Delay	95% Queue		Mvmnt	LOS	Delay	95% Queue
Two-Way Stop Control (TWSC) – Existing	5	EBTLR	A	1	0	6	EBTLR	A	0	0
		WBTLR	A	6	1		WBTLR	A	4	1
		NBTLR	A	10	1		NBTLR	A	10	3
		SBTLR	A	10	1		SBTLR	A	9	1
All-way Stop Control (AWSC)	8	EBTLR	A	7	-	8	EBTLR	A	7	-
		WBTLR	A	8	-		WBTLR	A	8	-
		NBTLR	A	7	-		NBTLR	A	8	-
		SBTLR	A	7	-		SBTLR	A	7	-

Traffic operations for both alternatives are similar, with average intersection delays higher by 2-3 seconds for the AWSC. With added signage and pavement markings, the Hillyard Street (minor) approaches will decrease in delay, however at the expense of the Brant Street (major) approaches which was originally operating as free-flow. Overall, both alternatives are expected to operate well with average intersection delays of 8 seconds or lower.

Given that traffic operations for the two options is comparable and with safety / sight line improvements, converting TWSC to AWSC is recommended for this location.

6.2 Traffic Calming / Management

With the introduction of MSF, some site generated traffic are expected to travel through residential streets (i.e. Brant Street, Niagara Street, and Munroe Street). These volumes are expected to be low, however most of these trips (discussed in Section 4) are made during off peak periods (4:30-6:30 AM, 1-3:30 PM) which may cause noise concerns to local residents.

In this situation, traffic calming / management measures may be appropriate to safely reduce vehicular speeds and attempt to reroute traffic. It is recommended that HSR develop an appropriate access route plan for employees entering and exiting the site. HSR staff should be instructed to travel via Birch Avenue in order to reduce impacts to surrounding neighbourhoods. This is align with the City's Traffic Calming / Management Policy (updated 2013) that considers management plans to be preferable than street-by-street traffic calming measures which may inadvertently shift problems to adjacent roadways.

If cut-through traffic or speeding are a concern following the construction of MSF, implementation of speed humps may be appropriate on Niagara Street and Munroe Street. This is subject to further review to confirm the observed need (e.g. spot speed study) and with consultation with Ward 3 Councillor.

6.3 Left Turn Assessment

To assess potential left-turn lane requirements associated with the proposed development, the MTO Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (June 2017) was reviewed. For the primary bus access off of Birch Avenue, the MTO supplement's Exhibit EA-7-1 (left turn storage at a two lane undivided highway, unsignalized) was used.

Given that traffic forecasts for the two-way conversion of Birch Avenue have not yet been established, a preliminary assessment was conducted using the following assumptions:

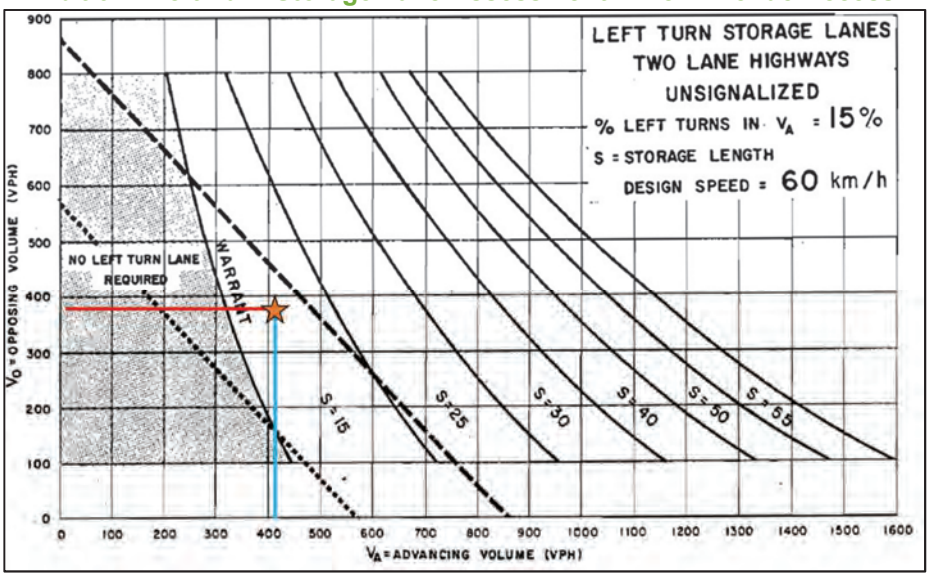
- Two lane undivided roadway (one-northbound, one southbound);
- 60 km/h design speed (50 km/h posted speed limit);
- Advancing and opposing volume of 375 vph. Opposing volume is represented by the full southbound approach volume for 2027 future total condition. Due to lack of northbound volumes, the advancing volume was assumed to be that of the opposing volume;
- Left turning traffic volume – 42 vph. This value is the amount of bus fleet vehicles generated during the PM peak (12 vph) multiplied by a 3.5 factor. This factor is to represent impact from an equivalent passenger vehicle (3.5 passenger car equivalence for buses).

The preliminary assessment shows that northbound left-turn storage lanes is warranted at the Birch Avenue entrance. The MTO Design supplement suggests a minimum storage of 15

metres, as illustrated in Exhibit 6-4. To accommodate for vehicle type, it is recommended that the length be extended to 20 metres to safely store at least one (18 metre) articulated bus.

It is recommended that future analysis and review be conducted once traffic forecasts are confirmed under the Birch Avenue EA.

Exhibit 6-4: Left Turn Storage Lane Assessment: Birch Avenue Access



7 Sight Distance

Following TAC Geometric Design Guide for Canadian Roads, departure sight triangles for each accesses were reviewed. These sight triangles are defined as areas free of obstruction at each quadrant of each intersection approach controlled by either a stop or yield sign. It allows drivers of the vehicles on the major road to see any vehicles stopped on the minor road approach and to be prepared to slow or stop, if needed.

At both the Birch Avenue and Brant Street accesses, the adjacent roadways are relatively straight and flat (< 3% grade). No sightline deficiencies exists at either intersections. Drivers on both approaches will have appropriate sightlines, minimum stopping sight distance, to respond to critical intersection decision points at the unsignalized accesses. The site plans show 5-metre sight triangles in keeping with site plan guidelines.

At the Hillyard Street access, due to the curvature of the alignment, existing vegetation and the utility pole to the south, sightlines are currently obstructed for traffic entering/exiting the parkade. This concern is mitigated by the existing all-way stop control at Munroe Street and Hillyard Street intersection (20-25 metres south of the entrance) that will provide appropriate visibility for incoming traffic. To/from the north leg, the site plans also show a 5-metre sight triangle.

Overall, it is concluded that all three accesses would either have sufficient sightline or have appropriate traffic control to function safely.

8 Parking Demand & Supply

To aid in the design of the multi-storey parking garage, a separate memorandum was developed and titled “Parking Demand & Supply Review” (attached as Appendix G). The memorandum includes a parking survey, staffing comparison, and adjustment factors to determine minimum number of parking spaces required for the MSF. This is aligned with Hamilton’s TDM for Development guideline to avoid an oversupply of parking and to encourage employees and visitors to choose alternative modes of transportation. It recommends that the new MSF to have a minimum parking provision of 402 parking spaces, 10 of which are barrier-free. These values were taken into consideration in determining the final parking design.

9 Parkade Access Analysis

The multi-storey parking structure is required to have a secure perimeter with card reading technology at the entry point combined with an overhead door. The site layout proposes a pedestal card reader and video intercom at the vehicle entrance along with roll up doors. With this control type, it is important to ensure that entry driveway controls do not cause vehicles to back onto public streets where they can potentially disrupt local traffic and causing safety hazards.

There are a number of factors that have been considered and are as follows:

- One access provided for a parking structure of approximately 400-420 parking spaces;
- From background review, this control type typically has a service rate of 250-300 vph. Typical planning practices assumes a vehicle generation rate of 0.5 vehicles per parking space, resulting in approximately 200-210 vph (near threshold);
- Expected site generated traffic of 84 vph and 45 vph (discussed in Section 4.1.1) entering the parking structure during the AM and PM peak periods respectively. It is noted that most of entering traffic falls outside of background peak periods (operators required off peak);
- Transit operators and fleet maintenance staff have shift changes which will contribute to sharper peak flows (peak hour factor); and
- Future expansion and storage of 100 additional buses (with associated transit operators).

With the above considerations, two-lane entry and one-lane exit is recommended for the site access on Hillyard Street.

Under this configuration, the access is anticipated to operate well at LOS A for all movements. During the busier AM peak for entering traffic, the shared southbound through/left and northbound through/right lanes has delays of 6-9 seconds with 95th percentile queues of 2 metres. This is within an acceptable range for the parking facility and will minimally affect local traffic. It is also recommended that the card reader gate be stationed far enough into the site (10 m) to store at least two cars if the site plan allows for it.

10 Active Transportation

The proposed site layout will provide good pedestrian/cycling facilities and is summarized below.

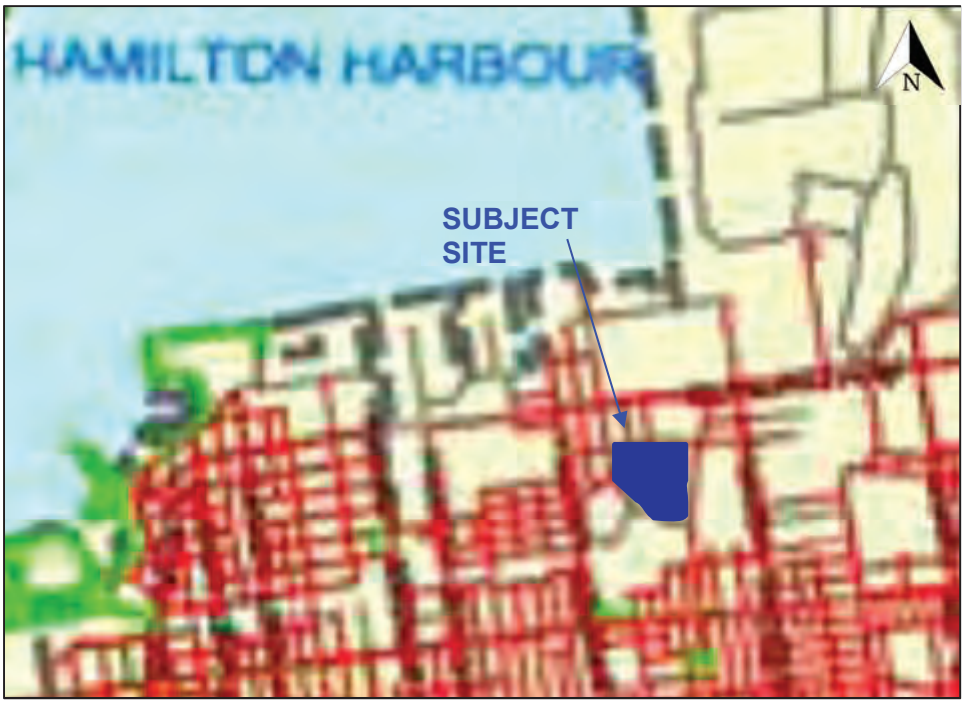
Short-term bike storage will be provided at a rate of 2.5% of all peak visitors, and long term bike storage will be provided at a rate of 5% of all occupants. The designated area for bike storage is on the first level of the parking garage – P1 and is roughly 200 metres from the planned bike network. Showers will also be provided onsite. The present Hamilton bicycle network does not connect to the subject lands (closest being on Victoria Avenue North), however, the City of Hamilton Transportation Master Plan (updated 2018) shows planned bike routes running along Burlington Street and Birch Avenue, which will significantly improve connectivity to the larger bike network. Bike lanes on Birch Avenue will require further review under the EA. It is also noted that City staff are currently pursuing a multi-use path through the hydro corridor in place of bike lanes on Birch Avenue. The existing and planned bike routes are shown in Exhibit 10-1 below.

Currently, there is a well-established sidewalk network surrounding the site and it is easily accessible by pedestrians. The City of Hamilton's Pedestrian Mobility Plan (refer to Exhibit 10-2) identifies the area surrounding MSF as "Industrial" and require sidewalks of minimum 1.8 m clear zone width. Hillyard Street, Brant Street and Birch Avenue currently have pedestrian sidewalks on either side of the road with illumination. All other smaller adjacent roadways have sidewalks which prioritizes pedestrian movements to adjacent neighbourhoods (west and northwest of site). Latest site plans also show sidewalks and curbs on the south side of Brant Street, north of the property limits. If the multi-use path in the hydro corridor is constructed, a sidewalk path will be included for connection.

These projects are currently underway and should provide safe, connected, and protected cycling and pedestrian network surrounding the subject lands.

Exhibit 10-1: Existing and Planned Bicycle Facilities

Exhibit 10-2: Existing Pedestrian Network (shown in red)



Source: City of Hamilton Pedestrian Mobility Plan (higher resolution image not available online)

11 Summary and Conclusions

The proposed 430,000 ft^2 Maintenance Storage Facility is a key component of the City's planned transit system expansion. The facility will house a total of approximately 200 regular and articulated buses with a planned future expansion that will store an additional 100 buses. The study provides a transportation impact assessment of the facility including traffic and bus-related operations up to the 2027 horizon.

For the future road network, Birch Avenue has been identified for conversion from one-way to two-way. The City has agreed that Birch Avenue intersections will not be analyzed in detail given limited information.

Vehicular access to the site will be provided by three locations; Birch Avenue which is the primary bus access, Brant street which is the secondary bus access, and Hillyard Street which serve passenger vehicles only. In addition, a multi-level parking structure is planned on the northwest corner of the study area.

The conclusions of the study is summarized below.

- Overall, under 2019 existing conditions, the study area intersections all operate well with sufficient reserve capacity during both peak periods. There are no intersections or movements that are considered to be operating at critical levels.
- Under both 2022 and 2027 future background conditions, traffic operations are maintained with sufficient capacity for all movements and intersections. Each study intersections is expected to operate at levels-of-service C or better.

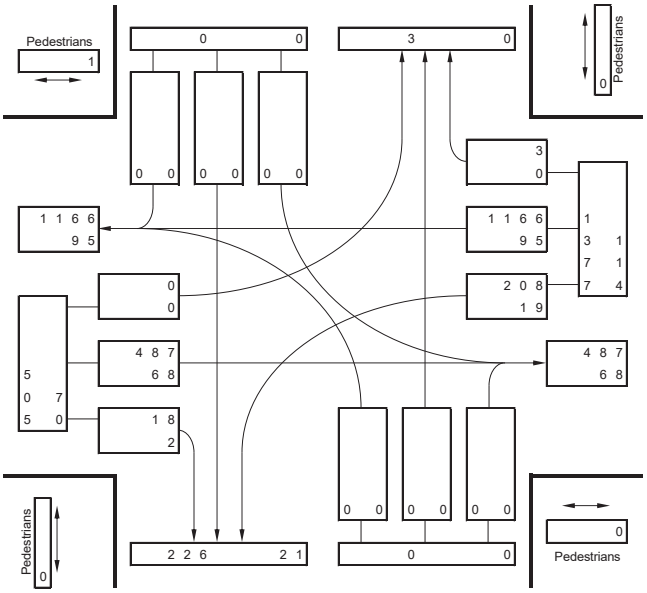
- The subject site is expected to generate a total of 94 and 134 two-way trips for passenger vehicles in the AM and PM peak hour respectively. Separately, for bus fleet vehicles, a total of 9 and 14 vehicle trips are expected to be generated during the two peak periods. Majority of site generated traffic are generated outside of background peak periods and will minimally impact the road network.
- Under both the 2022 and 2027 future total conditions, traffic operations are expected to be similar to future background conditions. There are no intersections or movements in the study area that are anticipated to operate at critical levels. The site accesses are expected to operate well, either operating at levels-of-service B or better.
- During development of improvement measures, converting Hillyard Street & Brant Street intersection to all-way stop control (AWSC) is recommended. Although OTM warrant is not met, traffic operations for AWSC is comparable to the existing two-way stop control. This improvement will also provide for a more orderly movement at the intersection, reduce through and turning speeds on Brant Street, and improve sightline concerns at the east-leg.
- Traffic calming was considered for the study area, in addition to the above bullet, it is recommended that HSR develop an appropriate access route plan for staff travel to minimize impacts to surrounding neighbourhoods. HSR should instruct employees to access the facility via Birch Avenue. If cut-through or speeding are a concern following the construction of the development, speed humps may be appropriate on Niagara Street and Munroe Street. This is subject to further review / study (e.g. consultation with Ward 3 Councillor) at that time.
- A preliminary left turn assessment was conducted for the Birch Avenue access. A single northbound left-turn lane is recommended with a minimum storage length of 20 metres. Once traffic forecast are developed under the Birch Avenue EA, further analysis is recommended to confirm findings.
- Following TAC geometric guidelines, all three accesses have sufficient sightline or have appropriate traffic control to function safely.
- Parking Demand & Supply review was completed in a separate study (attached). A minimum parking provision of 402 parking spaces with 10 being barrier-free was recommended. This is aligned with Hamilton's TDM for Development guideline to avoid an oversupply of parking and to encourage employees and visitors to choose alternative modes of transportation.
- The parkade access analysis shows that two-lane entry and one-lane exit is the recommended configuration for the Hillyard Street access. If site plans allow, it is also recommended that the card reader gate be stationed 10 metres into the site. This is to ensure that vehicles do not back onto public streets causing blockages to local traffic.
- The site will have good connection to the active transportation network. It would be accessible via existing sidewalks on Hillyard Street, Brant Street and Birch Avenue and the planned bike routes along Burlington Street and Birch Avenue. Latest site plans show sidewalks and curbs on the south side of Brant Street, north of the property limits. City staff are currently pursuing a multi-use path through the hydro corridor in place of bike lanes on Birch Avenue. Short term bike storage at a rate of 2.5% of peak visitors, long term bike storage at a 5% rate of all occupants is recommended and is located at the first level of the parking garage (P1). Showers will also be provided.

APPENDIX A

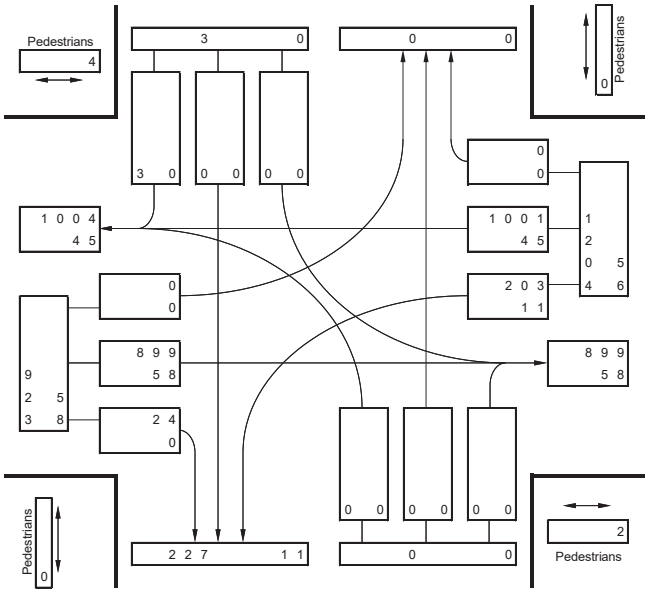
Turning Movement Counts (TMCs)

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 18

Intersection: **Burlington St** **at** **Birch Ave** Total Vehicles: 11,425 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 8.196 Dec 8, 2014
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.11 Period: 7 hours
Comments:

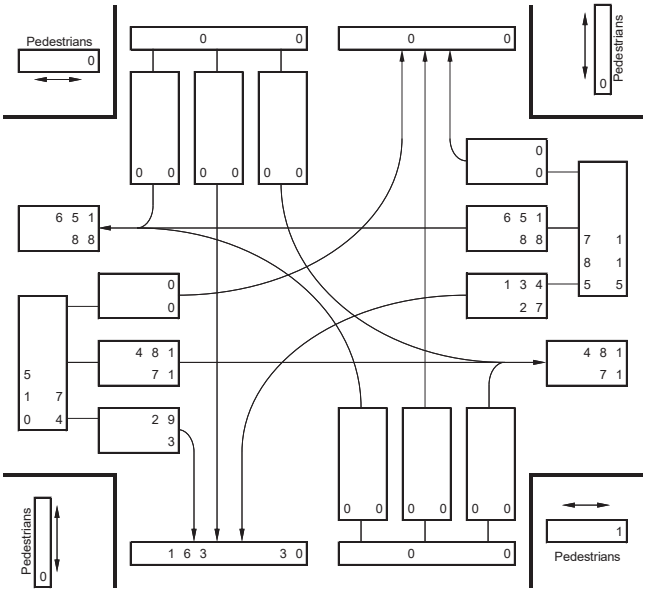


A.M. PEAK HOUR = 7:45 AM - 8:45 AM

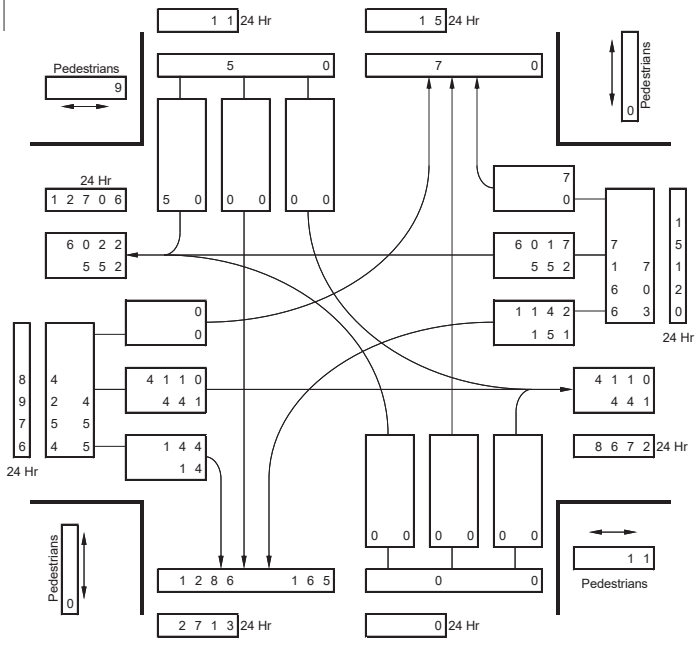


P.M. PEAK HOUR = 4:30 PM - 5:30 PM

N



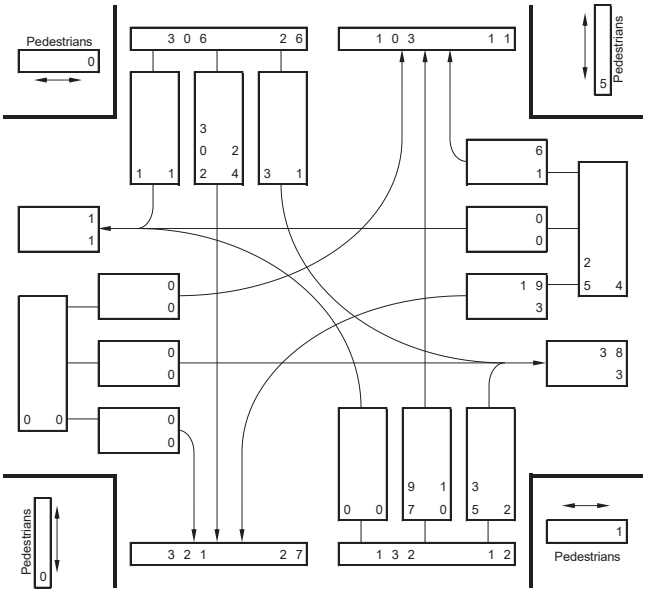
NORMAL HOUR = 2:00 PM - 3:00 PM



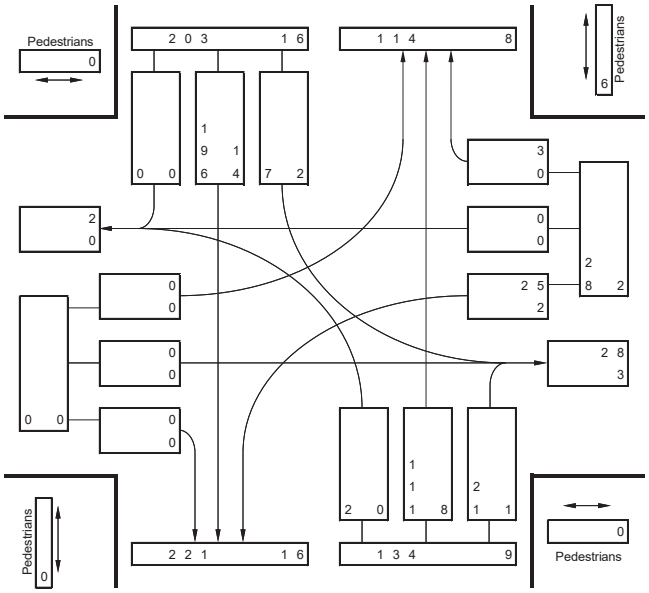
7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 100

Intersection: **Brant St** **at** **Wentworth St** Total Vehicles: 2,413 Date: Tuesday
Direction: (East/West) (North/South) M.V.E./Year: 1.682 Sep 20, 2016
Road Condition: Dry Weather: Clear AWDT Factor: 2.05 Period: 7 hours
Comments:

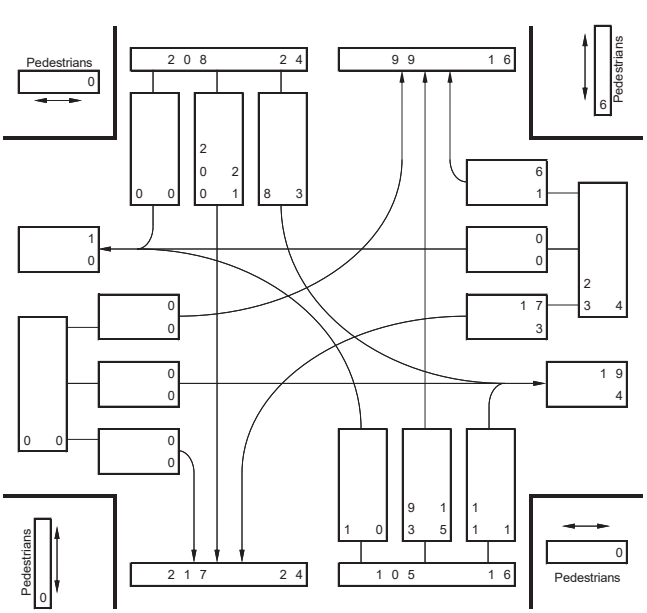


A.M. PEAK HOUR = 9:00 AM - 10:00 AM

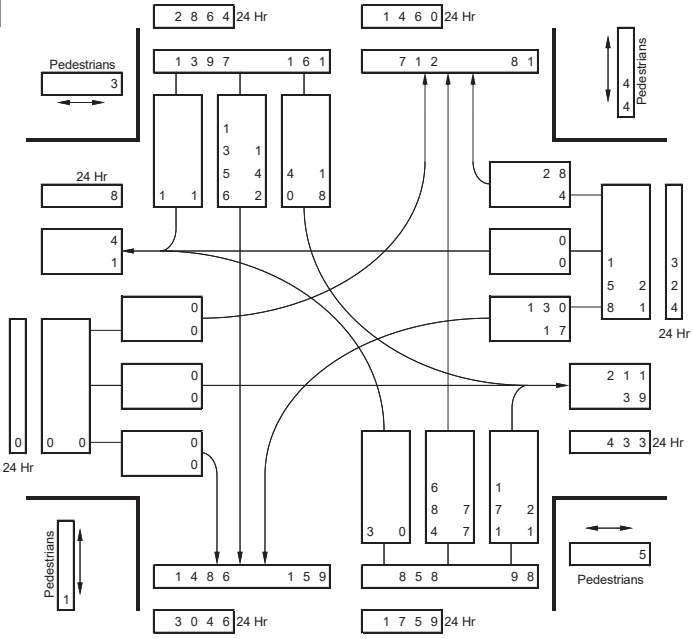


P.M. PEAK HOUR = 5:00 PM - 6:00 PM

N



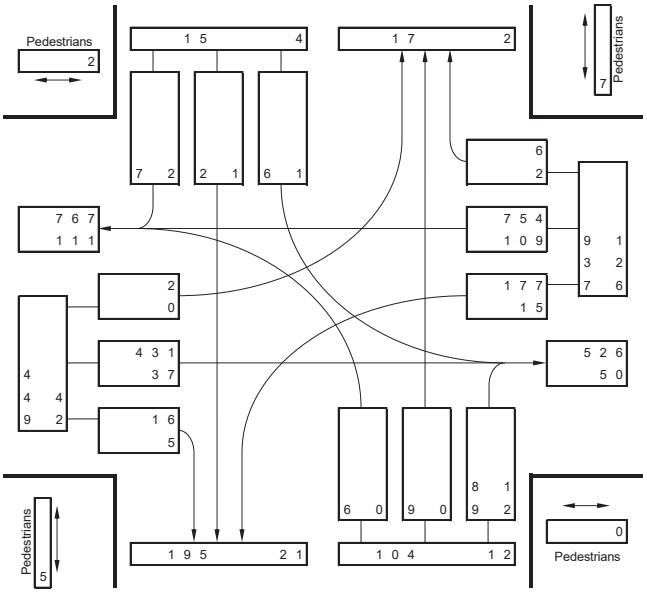
NORMAL HOUR = 1:30 PM - 2:30 PM



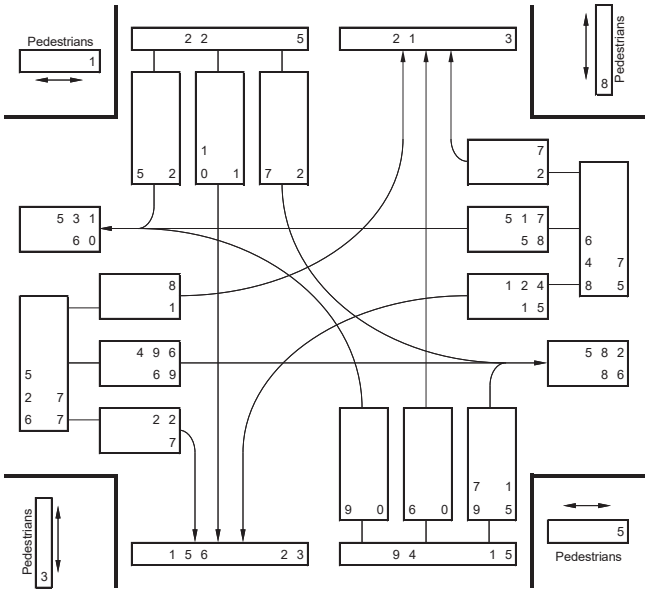
7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 102

Intersection: **Burlington St** **at** **Wentworth St** Total Vehicles: 8,564 Date: Wednesday
Direction: (East/West) (North/South) M.V.E./Year: 5.911 Sep 21, 2016
Road Condition: Dry Weather: Clear AWDT Factor: 2.03 Period: 7 hours
Comments:

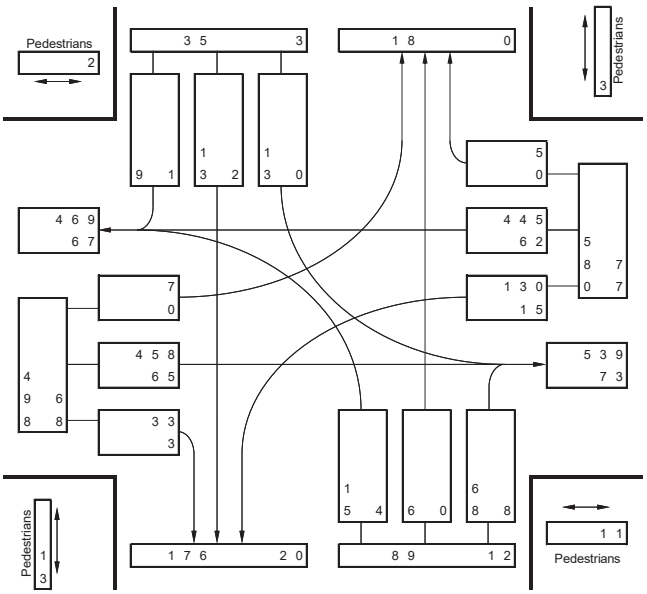


A.M. PEAK HOUR = 8:00 AM - 9:00 AM

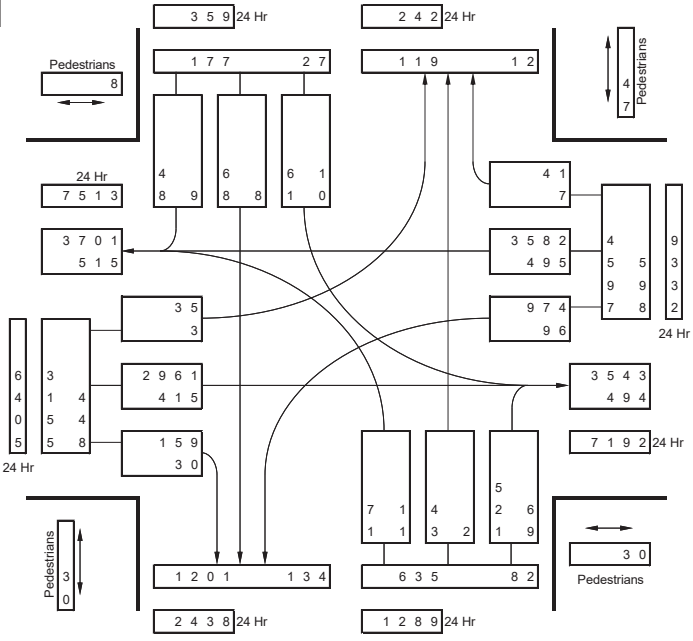


P.M. PEAK HOUR = 5:00 PM - 6:00 PM

N



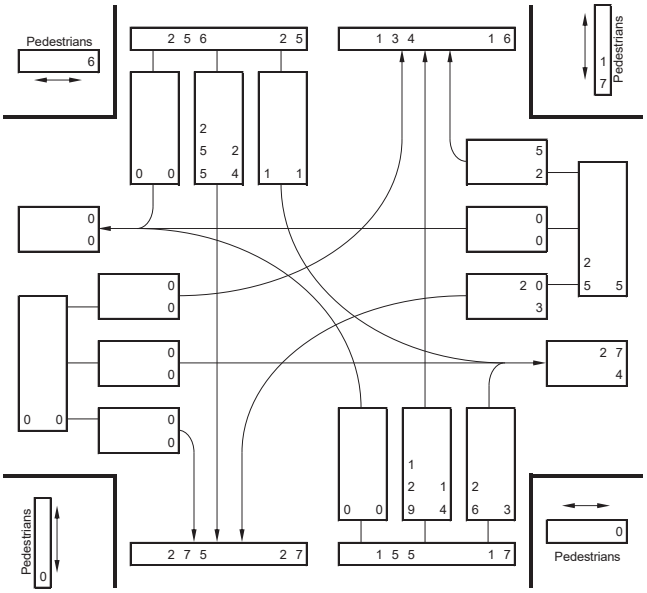
NORMAL HOUR = 1:45 PM - 2:45 PM



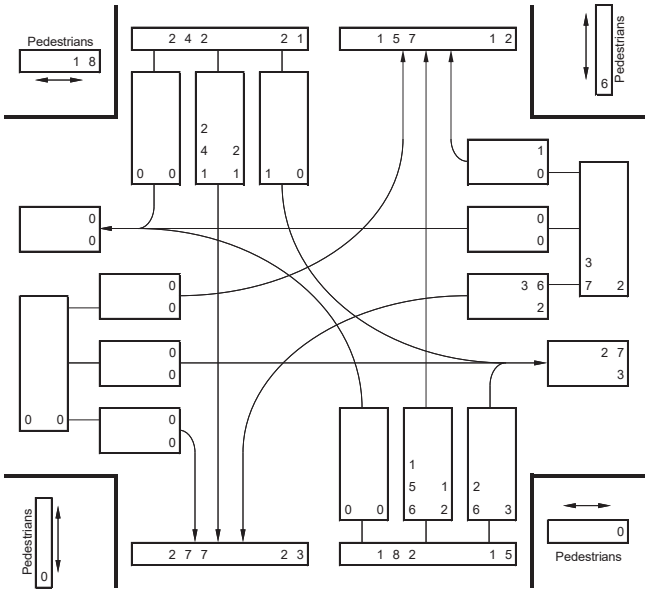
7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 50

Intersection: **Monroe St** **at** **Wentworth St N** Total Vehicles: 2,501 Date: Monday
Direction: (East/West) (North/South) M.V.E./Year: 1.769 Sep 18, 2017
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.08 Period: 7 hours
Comments:

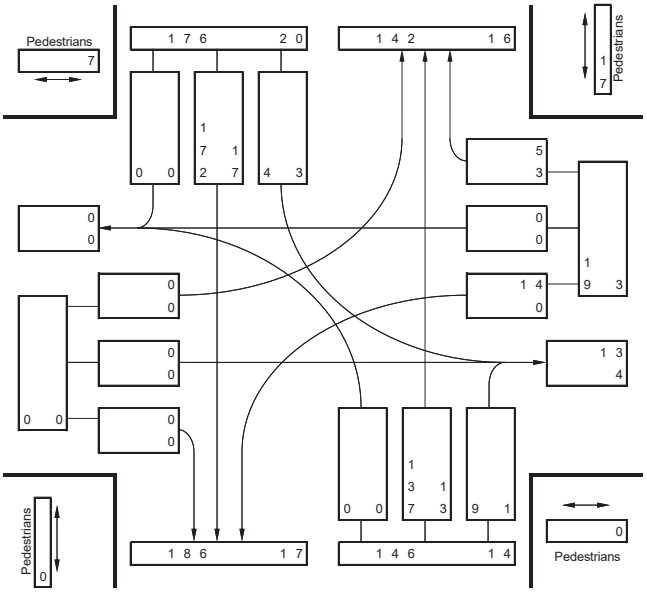


A.M. PEAK HOUR = 8:45 AM - 9:45 AM

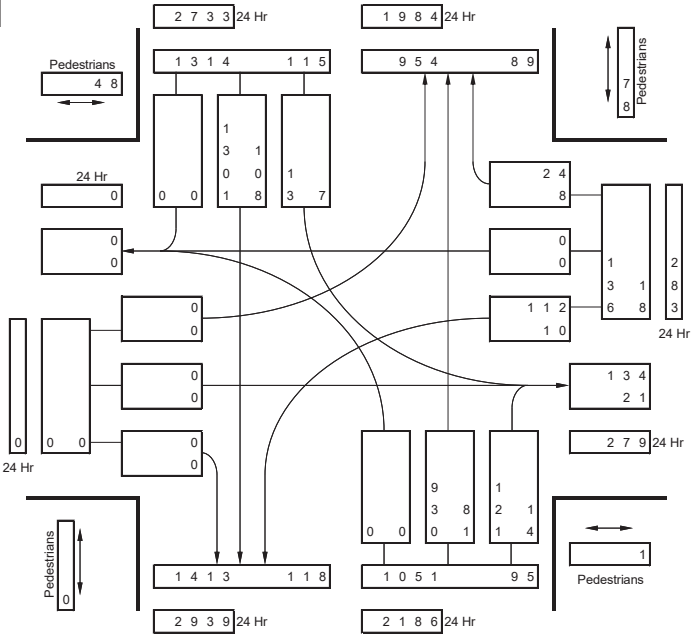


P.M. PEAK HOUR = 4:15 PM - 5:15 PM

N



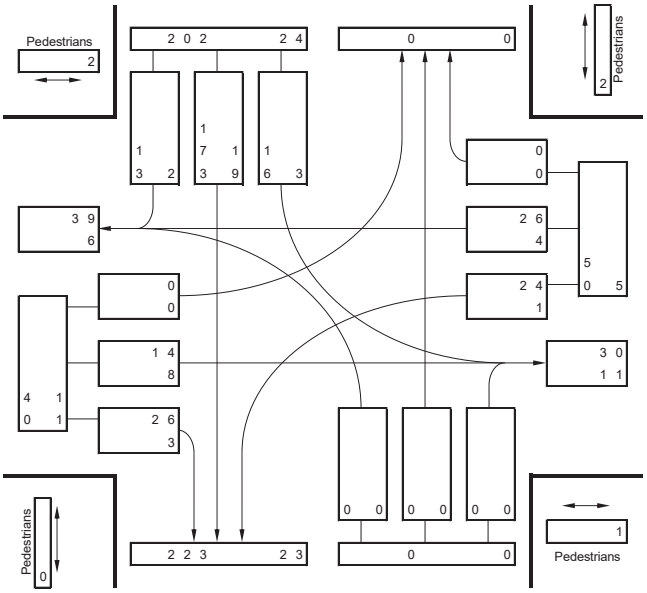
NORMAL HOUR = 2:30 PM - 3:30 PM



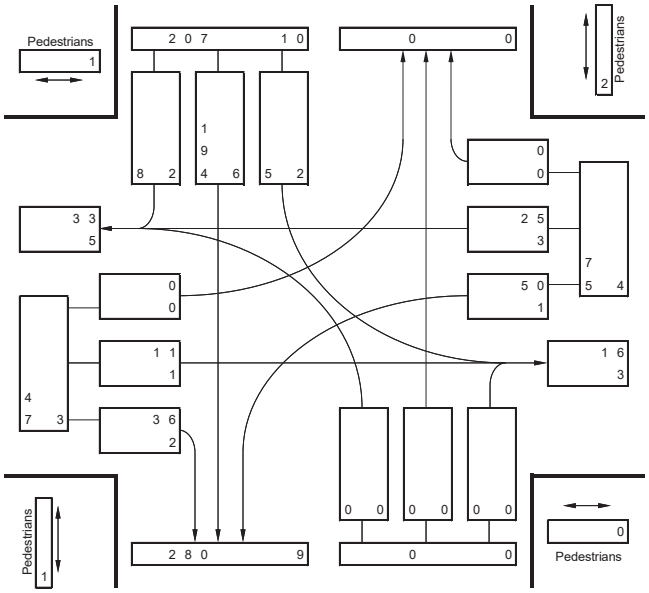
7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 31

Intersection: **Birch Ave** **at** **Brant St** Total Vehicles: 1,819 Date: Wednesday
Direction: (North/South) (East/West) M.V.E./Year: 1.342 Apr 25, 2018
Road Condition: Wet Weather: Rain AWDT Factor: 2.17 Period: 7 hours
Comments:

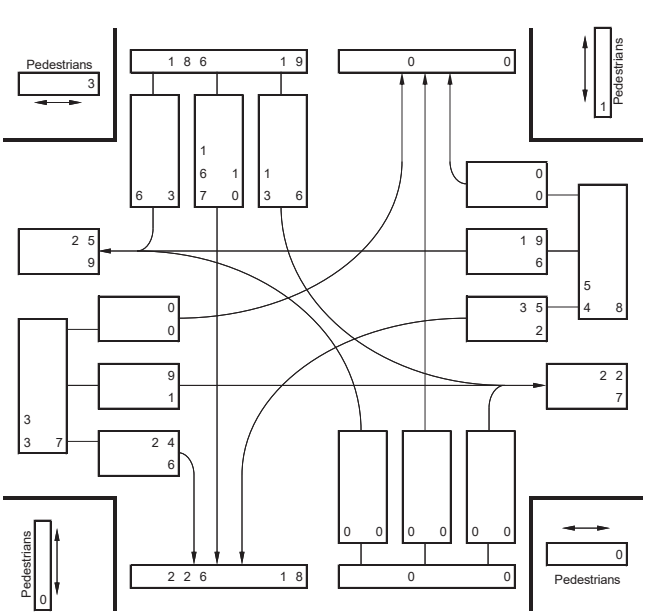


A.M. PEAK HOUR = 7:45 AM - 8:45 AM

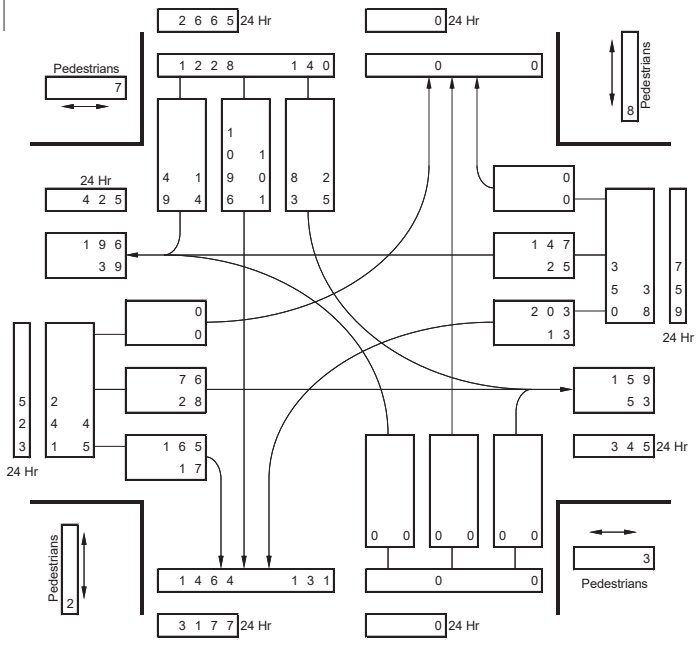


P.M. PEAK HOUR = 4:00 PM - 5:00 PM

N



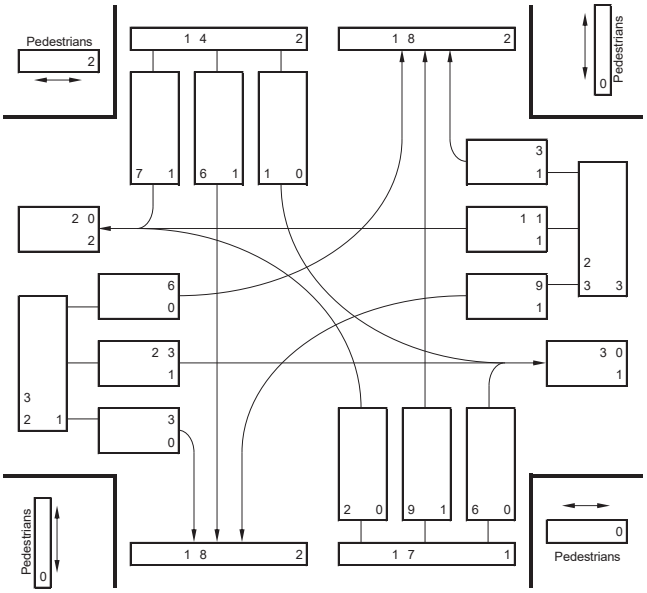
NORMAL HOUR = 2:30 PM - 3:30 PM



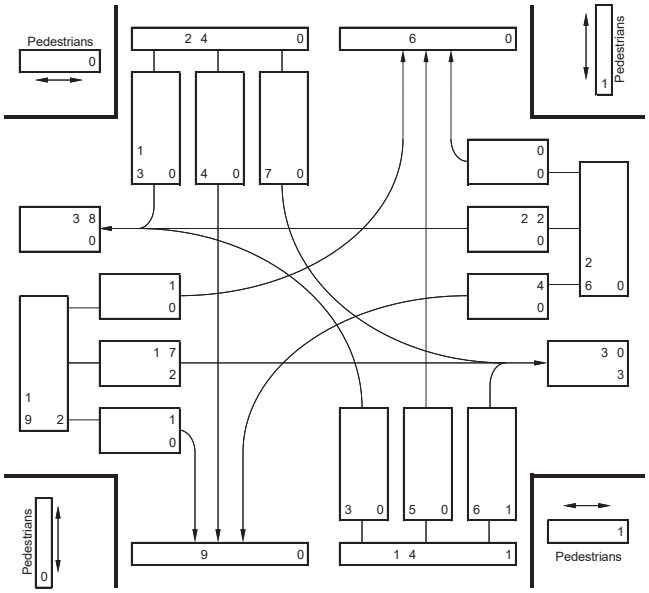
7 Hr & 24 Hr TOTAL VOLUMES

City of Hamilton **TURNING MOVEMENT FLOW CHART** Loc. Code: 631

Intersection: **Brant St** **at** **Hillyard St** Total Vehicles: 544 Date: Wednesday
Direction: (East/West) (North/South) M.V.E./Year: .425 Mar 6, 2019
Road Condition: Dry Weather: Cloudy AWDT Factor: 2.3 Period: 7 hours
Comments:

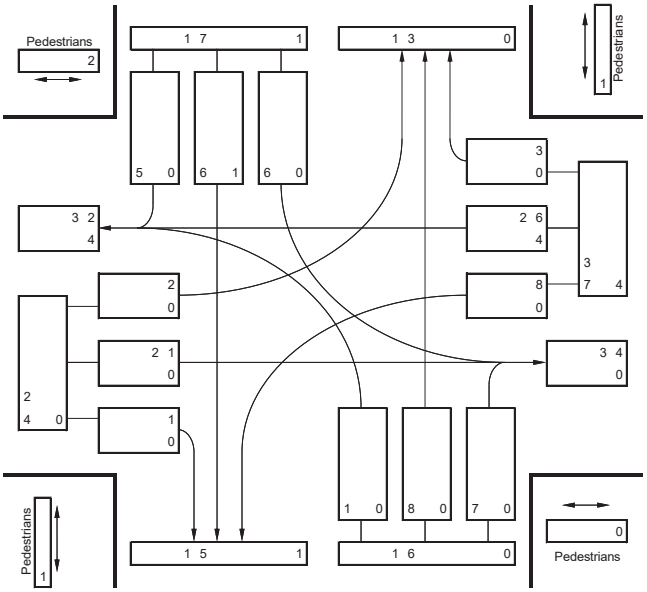


A.M. PEAK HOUR = 7:45 AM - 8:45 AM

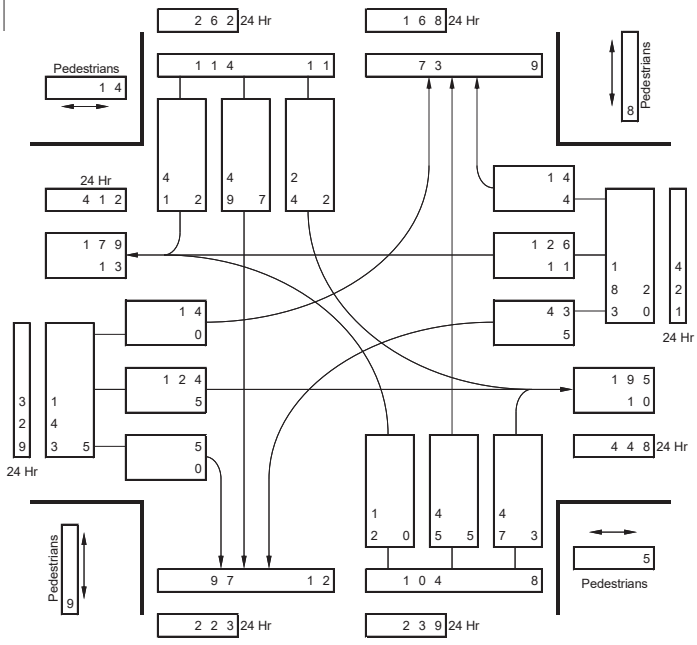


P.M. PEAK HOUR = 5:00 PM - 6:00 PM

N



NORMAL HOUR = 2:30 PM - 3:30 PM



7 Hr & 24 Hr TOTAL VOLUMES

APPENDIX B

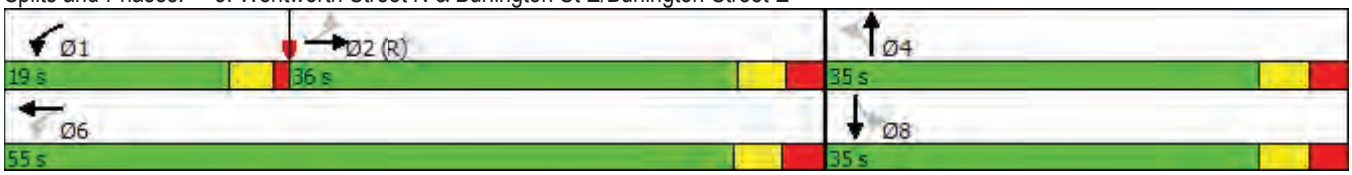
Synchro Outputs – Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	497	22	204	916	8	6	10	107	7	3	10
Future Volume (vph)	2	497	22	204	916	8	6	10	107	7	3	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.994			0.999			0.870			0.932	
Flt Protected	0.950			0.950				0.997			0.982	
Satd. Flow (prot)	1745	3192	0	1616	3082	0	0	2742	0	0	1394	0
Flt Permitted	0.285			0.312				0.946			0.915	
Satd. Flow (perm)	523	3192	0	531	3082	0	0	2602	0	0	1299	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			2			116			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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%	8%	24%	8%	13%	25%	0%	0%	12%	14%	33%	22%
Adj. Flow (vph)	2	540	24	222	996	9	7	11	116	8	3	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	564	0	222	1005	0	0	134	0	0	22	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	36.0	36.0		19.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	40.0%	40.0%		21.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	30.0	30.0		15.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	30.0	30.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.33	0.33		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.01	0.53		0.46	0.60			0.15			0.05	
Control Delay	20.5	26.2		13.1	15.8			6.3			14.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.5	26.2		13.1	15.8			6.3			14.9	
LOS	C	C		B	B			A			B	
Approach Delay		26.2			15.3			6.3			14.9	
Approach LOS		C			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 65.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington St E/Burlington Street E



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	613	22	251	1392	0	0
Future Volume (vph)	613	22	251	1392	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.995					
Flt Protected			0.950			
Satd. Flow (prot)	4457	0	3224	4821	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4457	0	3224	4821	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	10%	5%	4%	0%	0%
Adj. Flow (vph)	666	24	273	1513	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	690	0	273	1513	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	62.0		28.0			
Total Split (%)	68.9%		31.1%			
Maximum Green (s)	57.0		22.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	57.0		22.9	90.0		
Actuated g/C Ratio	0.63		0.25	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.24		0.33	0.31		
Control Delay	16.9		28.7	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	16.9		28.7	0.2		
LOS	B		C	A		
Approach Delay	16.9			4.5		
Approach LOS	B			A		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 8.0		Intersection LOS: A	
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	7	114	39	4	346
Future Volume (vph)	23	7	114	39	4	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.967		0.962			
Flt Protected	0.964					0.999
Satd. Flow (prot)	1502	0	3109	0	0	3252
Flt Permitted	0.964					0.999
Satd. Flow (perm)	1502	0	3109	0	0	3252
Link Speed (k/h)	48		50			50
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	14%	9%	5%	25%	7%
Adj. Flow (vph)	25	8	124	42	4	376
Shared Lane Traffic (%)						
Lane Group Flow (vph)	33	0	166	0	0	380
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

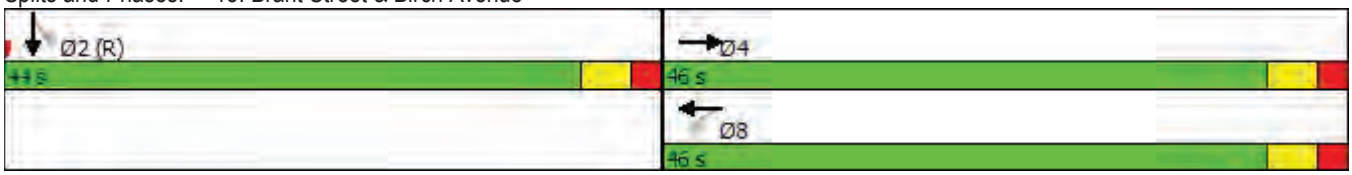
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.4%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	22	30	26	31	0	0	0	0	19	196	15
Future Volume (vph)	0	22	30	26	31	0	0	0	0	19	196	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.922									0.990	
Flt Protected					0.978						0.996	
Satd. Flow (prot)	0	1400	0	0	1649	0	0	0	0	0	4466	0
Flt Permitted					0.891						0.996	
Satd. Flow (perm)	0	1400	0	0	1502	0	0	0	0	0	4466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33									15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			391.5			242.7	
Travel Time (s)		11.4			7.7			28.2			17.5	
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%	36%	10%	4%	13%	0%	0%	0%	0%	16%	10%	13%
Adj. Flow (vph)	0	24	33	28	34	0	0	0	0	21	213	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	62	0	0	0	0	0	250	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		46.0		46.0	46.0					44.0	44.0	
Total Split (%)		51.1%		51.1%	51.1%					48.9%	48.9%	
Maximum Green (s)		40.5		40.5	40.5					38.6	38.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		40.5			40.5						38.6	
Actuated g/C Ratio		0.45			0.45						0.43	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.09			0.09						0.13	
Control Delay		8.1			14.8						7.7	
Queue Delay		0.0			0.0						0.0	
Total Delay		8.1			14.8						7.7	
LOS		A			B						A	
Approach Delay		8.1			14.8						7.7	
Approach LOS		A			B						A	

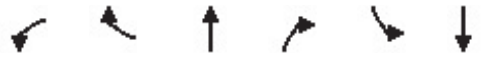
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.13			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 27.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	24	3	10	12	4	2	10	6	1	7	8
Future Volume (vph)	6	24	3	10	12	4	2	10	6	1	7	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.989			0.981			0.953			0.932	
Flt Protected		0.990			0.981			0.995			0.997	
Satd. Flow (prot)	0	1748	0	0	1589	0	0	1651	0	0	1514	0
Flt Permitted		0.990			0.981			0.995			0.997	
Satd. Flow (perm)	0	1748	0	0	1589	0	0	1651	0	0	1514	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			137.3			105.1	
Travel Time (s)		7.8			7.2			10.3			7.9	
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%	4%	0%	10%	8%	25%	0%	10%	0%	0%	14%	13%
Adj. Flow (vph)	7	26	3	11	13	4	2	11	7	1	8	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	28	0	0	20	0	0	18	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	7	149	30	2	290
Future Volume (vph)	24	7	149	30	2	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.968		0.975			
Flt Protected	0.963					
Satd. Flow (prot)	1466	0	3093	0	0	3194
Flt Permitted	0.963					
Satd. Flow (perm)	1466	0	3093	0	0	3194
Link Speed (k/h)	48		50			50
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.4			17.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	29%	10%	10%	50%	9%
Adj. Flow (vph)	26	8	162	33	2	315
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	0	195	0	0	317
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

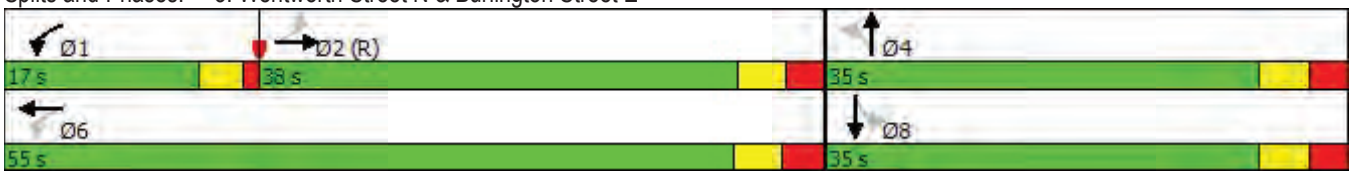
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.4%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	600	31	148	610	10	10	6	100	10	12	7
Future Volume (vph)	10	600	31	148	610	10	10	6	100	10	12	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.993			0.998			0.871			0.966	
Flt Protected	0.950			0.950				0.996			0.983	
Satd. Flow (prot)	1572	3078	0	1572	3160	0	0	2662	0	0	1429	0
Flt Permitted	0.395			0.254				0.938			0.912	
Satd. Flow (perm)	654	3078	0	420	3160	0	0	2507	0	0	1326	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			109			8	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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 (%)	11%	12%	24%	11%	10%	22%	0%	0%	16%	22%	11%	40%
Adj. Flow (vph)	11	652	34	161	663	11	11	7	109	11	13	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	686	0	161	674	0	0	127	0	0	32	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	38.0	38.0		17.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	42.2%	42.2%		18.9%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	32.0	32.0		13.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	32.0	32.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.36	0.36		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.05	0.62		0.40	0.39			0.14			0.07	
Control Delay	19.9	26.9		12.5	12.8			6.5			17.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	19.9	26.9		12.5	12.8			6.5			17.9	
LOS	B	C		B	B			A			B	
Approach Delay		26.7			12.7			6.5			17.9	
Approach LOS		C			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 18.1		Intersection LOS: B	
Intersection Capacity Utilization 57.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington Street E



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1057	26	236	1155	0	0
Future Volume (vph)	1057	26	236	1155	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.996					
Flt Protected			0.950			
Satd. Flow (prot)	4718	0	3134	4643	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4718	0	3134	4643	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	8					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	0%	8%	8%	0%	0%
Adj. Flow (vph)	1149	28	257	1255	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1177	0	257	1255	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	64.0		26.0			
Total Split (%)	71.1%		28.9%			
Maximum Green (s)	59.0		20.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	59.0		20.9	90.0		
Actuated g/C Ratio	0.66		0.23	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.38		0.35	0.27		
Control Delay	13.7		30.6	0.1		
Queue Delay	0.0		0.0	0.0		
Total Delay	13.7		30.6	0.1		
LOS	B		C	A		
Approach Delay	13.7			5.3		
Approach LOS	B			A		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 37.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	29	3	126	23	10	223
Future Volume (vph)	29	3	126	23	10	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.988		0.977			
Flt Protected	0.956					0.998
Satd. Flow (prot)	1630	0	3196	0	0	3235
Flt Permitted	0.956					0.998
Satd. Flow (perm)	1630	0	3196	0	0	3235
Link Speed (k/h)	48		48			48
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.7			16.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	0%	7%	5%	22%	7%
Adj. Flow (vph)	32	3	137	25	11	242
Shared Lane Traffic (%)						
Lane Group Flow (vph)	35	0	162	0	0	253
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

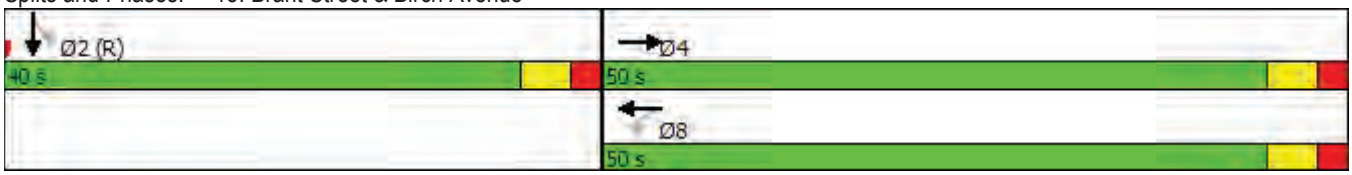
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.5%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	12	39	52	29	0	0	0	0	7	204	10
Future Volume (vph)	0	12	39	52	29	0	0	0	0	7	204	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.897									0.993	
Flt Protected					0.969						0.998	
Satd. Flow (prot)	0	1559	0	0	1691	0	0	0	0	0	4749	0
Flt Permitted					0.822						0.998	
Satd. Flow (perm)	0	1559	0	0	1435	0	0	0	0	0	4749	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42									9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			391.5			242.7	
Travel Time (s)		11.4			7.7			28.2			17.5	
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%	8%	5%	2%	11%	0%	0%	0%	0%	29%	3%	20%
Adj. Flow (vph)	0	13	42	57	32	0	0	0	0	8	222	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	89	0	0	0	0	0	241	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		50.0		50.0	50.0					40.0	40.0	
Total Split (%)		55.6%		55.6%	55.6%					44.4%	44.4%	
Maximum Green (s)		44.5		44.5	44.5					34.6	34.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		44.5			44.5						34.6	
Actuated g/C Ratio		0.49			0.49						0.38	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.07			0.13						0.13	
Control Delay		5.5			12.9						6.2	
Queue Delay		0.0			0.0						0.0	
Total Delay		5.5			12.9						6.2	
LOS		A			B						A	
Approach Delay		5.5			12.9						6.2	
Approach LOS		A			B						A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.13			
Intersection Signal Delay: 7.6		Intersection LOS: A	
Intersection Capacity Utilization 28.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	19	1	4	22	0	3	5	7	7	4	13
Future Volume (vph)	1	19	1	4	22	0	3	5	7	7	4	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.994						0.932			0.927	
Flt Protected		0.998			0.993			0.991			0.985	
Satd. Flow (prot)	0	1656	0	0	1824	0	0	1585	0	0	1659	0
Flt Permitted		0.998			0.993			0.991			0.985	
Satd. Flow (perm)	0	1656	0	0	1824	0	0	1585	0	0	1659	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			137.3			105.1	
Travel Time (s)		7.8			7.2			10.3			7.9	
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%	11%	0%	0%	0%	0%	0%	0%	14%	0%	0%	2%
Adj. Flow (vph)	1	21	1	4	24	0	3	5	8	8	4	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	23	0	0	28	0	0	16	0	0	26	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	1	175	30	1	273
Future Volume (vph)	40	1	175	30	1	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.997		0.978			
Flt Protected	0.953					
Satd. Flow (prot)	1664	0	3176	0	0	3232
Flt Permitted	0.953					
Satd. Flow (perm)	1664	0	3176	0	0	3232
Link Speed (k/h)	48		48			48
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.9			17.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	7%	10%	0%	8%
Adj. Flow (vph)	43	1	190	33	1	297
Shared Lane Traffic (%)						
Lane Group Flow (vph)	44	0	223	0	0	298
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.2%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX C

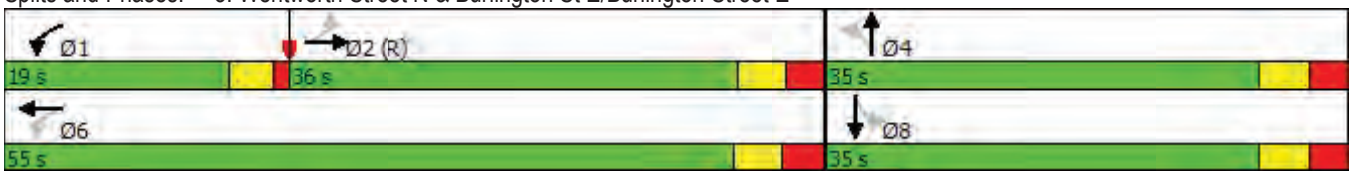
Synchro Outputs – Future Background 2022 Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	527	24	216	972	9	7	10	114	8	3	10
Future Volume (vph)	2	527	24	216	972	9	7	10	114	8	3	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.993			0.999			0.870			0.935	
Flt Protected	0.950			0.950				0.997			0.981	
Satd. Flow (prot)	1745	3188	0	1616	3082	0	0	2742	0	0	1400	0
Flt Permitted	0.268			0.290				0.945			0.905	
Satd. Flow (perm)	492	3188	0	493	3082	0	0	2599	0	0	1292	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			2			124			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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%	8%	24%	8%	13%	25%	0%	0%	12%	14%	33%	22%
Adj. Flow (vph)	2	573	26	235	1057	10	8	11	124	9	3	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	599	0	235	1067	0	0	143	0	0	23	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	36.0	36.0		19.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	40.0%	40.0%		21.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	30.0	30.0		15.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	30.0	30.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.33	0.33		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.01	0.56		0.50	0.64			0.16			0.05	
Control Delay	20.5	26.9		13.8	16.5			6.2			15.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.5	26.9		13.8	16.5			6.2			15.0	
LOS	C	C		B	B			A			B	
Approach Delay		26.8			16.0			6.2			15.0	
Approach LOS		C			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 67.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington St E/Burlington Street E



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	650	23	266	1477	0	0
Future Volume (vph)	650	23	266	1477	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.995					
Flt Protected			0.950			
Satd. Flow (prot)	4457	0	3224	4821	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4457	0	3224	4821	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	10%	5%	4%	0%	0%
Adj. Flow (vph)	707	25	289	1605	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	732	0	289	1605	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	62.0		28.0			
Total Split (%)	68.9%		31.1%			
Maximum Green (s)	57.0		22.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	57.0		22.9	90.0		
Actuated g/C Ratio	0.63		0.25	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.26		0.35	0.33		
Control Delay	17.6		29.0	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	17.6		29.0	0.2		
LOS	B		C	A		
Approach Delay	17.6			4.6		
Approach LOS	B			A		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 32.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	8	120	42	5	367
Future Volume (vph)	25	8	120	42	5	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.966		0.961			
Flt Protected	0.964					0.999
Satd. Flow (prot)	1500	0	3106	0	0	3251
Flt Permitted	0.964					0.999
Satd. Flow (perm)	1500	0	3106	0	0	3251
Link Speed (k/h)	48		50			50
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	14%	9%	5%	25%	7%
Adj. Flow (vph)	27	9	130	46	5	399
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	176	0	0	404
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	55	0	0	49	0	0
Future Volume (vph)	55	0	0	49	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1766	0	0	1625	918	918
Flt Permitted						
Satd. Flow (perm)	1766	0	0	1625	918	918
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	100%	100%	13%	100%	100%
Adj. Flow (vph)	60	0	0	53	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	60	0	0	53	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

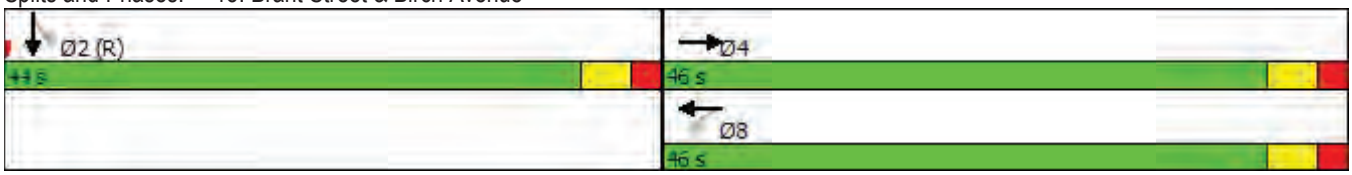
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	24	31	27	32	0	0	0	0	21	208	16
Future Volume (vph)	0	24	31	27	32	0	0	0	0	21	208	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.923									0.990	
Flt Protected					0.978						0.996	
Satd. Flow (prot)	0	1398	0	0	1649	0	0	0	0	0	4466	0
Flt Permitted					0.888						0.996	
Satd. Flow (perm)	0	1398	0	0	1497	0	0	0	0	0	4466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34									15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	36%	10%	4%	13%	0%	0%	0%	0%	16%	10%	13%
Adj. Flow (vph)	0	26	34	29	35	0	0	0	0	23	226	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	64	0	0	0	0	0	266	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		46.0		46.0	46.0					44.0	44.0	
Total Split (%)		51.1%		51.1%	51.1%					48.9%	48.9%	
Maximum Green (s)		40.5		40.5	40.5					38.6	38.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		40.5			40.5						38.6	
Actuated g/C Ratio		0.45			0.45						0.43	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.09			0.10						0.14	
Control Delay		8.2			14.8						7.6	
Queue Delay		0.0			0.0						0.0	
Total Delay		8.2			14.8						7.6	
LOS		A			B						A	
Approach Delay		8.2			14.8						7.6	
Approach LOS		A			B						A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.14			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 27.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue

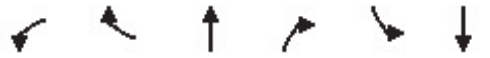


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	25	3	11	13	4	2	11	6	1	7	8
Future Volume (vph)	6	25	3	11	13	4	2	11	6	1	7	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.982			0.955			0.932	
Flt Protected		0.991			0.980			0.995			0.997	
Satd. Flow (prot)	0	1749	0	0	1591	0	0	1651	0	0	1514	0
Flt Permitted		0.991			0.980			0.995			0.997	
Satd. Flow (perm)	0	1749	0	0	1591	0	0	1651	0	0	1514	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	4%	0%	10%	8%	25%	0%	10%	0%	0%	14%	13%
Adj. Flow (vph)	7	27	3	12	14	4	2	12	7	1	8	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	37	0	0	30	0	0	21	0	0	18	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	267	0
Future Volume (vph)	0	0	0	0	267	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt						
Flt Protected						
Satd. Flow (prot)	1837	918	0	0	4558	0
Flt Permitted						
Satd. Flow (perm)	1837	918	0	0	4558	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	51.6			315.9	75.7	
Travel Time (s)	3.9			22.7	5.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	10%	100%
Adj. Flow (vph)	0	0	0	0	290	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	290	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 8.5%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	8	158	32	2	308
Future Volume (vph)	25	8	158	32	2	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.966		0.975			
Flt Protected	0.964					
Satd. Flow (prot)	1462	0	3093	0	0	3194
Flt Permitted	0.964					
Satd. Flow (perm)	1462	0	3093	0	0	3194
Link Speed (k/h)	48		50			50
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.4			17.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	29%	10%	10%	50%	9%
Adj. Flow (vph)	27	9	172	35	2	335
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	207	0	0	337
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.9%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	32	0	0	33
Future Volume (vph)	0	0	32	0	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1837	0	1670	0	0	1670
Flt Permitted						
Satd. Flow (perm)	1837	0	1670	0	0	1670
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	0	0	35	0	0	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	35	0	0	36
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

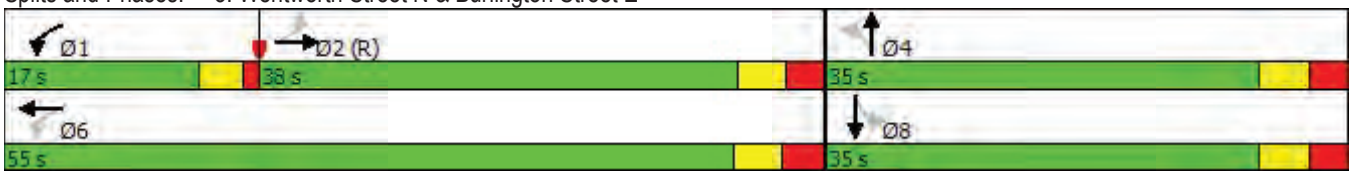
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	636	33	157	648	10	10	7	106	10	12	8
Future Volume (vph)	10	636	33	157	648	10	10	7	106	10	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.993			0.998			0.871			0.963	
Flt Protected	0.950			0.950				0.996			0.984	
Satd. Flow (prot)	1572	3078	0	1572	3161	0	0	2662	0	0	1420	0
Flt Permitted	0.380			0.232				0.939			0.913	
Satd. Flow (perm)	629	3078	0	384	3161	0	0	2510	0	0	1317	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			115			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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 (%)	11%	12%	24%	11%	10%	22%	0%	0%	16%	22%	11%	40%
Adj. Flow (vph)	11	691	36	171	704	11	11	8	115	11	13	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	727	0	171	715	0	0	134	0	0	33	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	38.0	38.0		17.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	42.2%	42.2%		18.9%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	32.0	32.0		13.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	32.0	32.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.36	0.36		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.05	0.66		0.44	0.42			0.15			0.08	
Control Delay	20.0	27.8		13.2	13.0			6.4			17.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.0	27.8		13.2	13.0			6.4			17.5	
LOS	B	C		B	B			A			B	
Approach Delay		27.7			13.1			6.4			17.5	
Approach LOS		C			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 58.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington Street E



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1121	28	251	1226	0	0
Future Volume (vph)	1121	28	251	1226	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.996					
Flt Protected			0.950			
Satd. Flow (prot)	4718	0	3134	4643	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4718	0	3134	4643	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	8					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	0%	8%	8%	0%	0%
Adj. Flow (vph)	1218	30	273	1333	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1248	0	273	1333	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	64.0		26.0			
Total Split (%)	71.1%		28.9%			
Maximum Green (s)	59.0		20.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	59.0		20.9	90.0		
Actuated g/C Ratio	0.66		0.23	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.40		0.38	0.29		
Control Delay	14.3		30.9	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	14.3		30.9	0.2		
LOS	B		C	A		
Approach Delay	14.3			5.4		
Approach LOS	B			A		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	3	134	25	10	236
Future Volume (vph)	30	3	134	25	10	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.989		0.977			
Flt Protected	0.956					0.998
Satd. Flow (prot)	1632	0	3196	0	0	3236
Flt Permitted	0.956					0.998
Satd. Flow (perm)	1632	0	3196	0	0	3236
Link Speed (k/h)	48		48			48
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.7			16.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	0%	7%	5%	22%	7%
Adj. Flow (vph)	33	3	146	27	11	257
Shared Lane Traffic (%)						
Lane Group Flow (vph)	36	0	173	0	0	268
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.9%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	54	0	0	41	0	0
Future Volume (vph)	54	0	0	41	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1655	0	0	1597	918	918
Flt Permitted						
Satd. Flow (perm)	1655	0	0	1597	918	918
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	100%	100%	15%	100%	100%
Adj. Flow (vph)	59	0	0	45	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	0	0	45	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

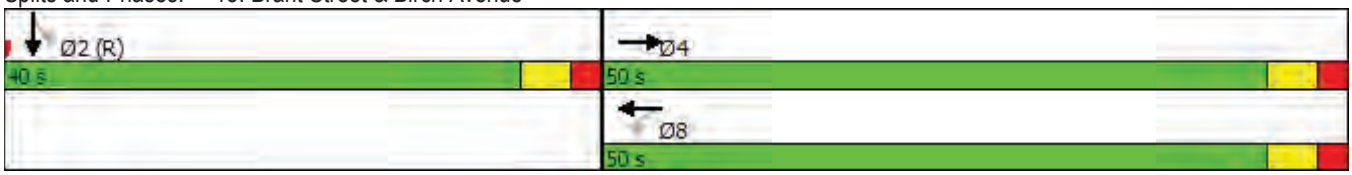
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	13	41	55	30	0	0	0	0	8	216	11
Future Volume (vph)	0	13	41	55	30	0	0	0	0	8	216	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.897									0.993	
Flt Protected					0.969						0.998	
Satd. Flow (prot)	0	1558	0	0	1692	0	0	0	0	0	4745	0
Flt Permitted					0.817						0.998	
Satd. Flow (perm)	0	1558	0	0	1426	0	0	0	0	0	4745	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45									10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	8%	5%	2%	11%	2%	0%	0%	0%	29%	3%	20%
Adj. Flow (vph)	0	14	45	60	33	0	0	0	0	9	235	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	93	0	0	0	0	0	256	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		50.0		50.0	50.0					40.0	40.0	
Total Split (%)		55.6%		55.6%	55.6%					44.4%	44.4%	
Maximum Green (s)		44.5		44.5	44.5					34.6	34.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		44.5			44.5						34.6	
Actuated g/C Ratio		0.49			0.49						0.38	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.07			0.13						0.14	
Control Delay		5.4			13.0						6.2	
Queue Delay		0.0			0.0						0.0	
Total Delay		5.4			13.0						6.2	
LOS		A			B						A	
Approach Delay		5.4			13.0						6.2	
Approach LOS		A			B						A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.14			
Intersection Signal Delay: 7.6		Intersection LOS: A	
Intersection Capacity Utilization 28.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue

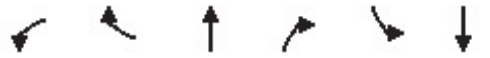


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	20	1	4	23	0	3	5	7	7	4	14
Future Volume (vph)	1	20	1	4	23	0	3	5	7	7	4	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994						0.932			0.925	
Flt Protected		0.998			0.993			0.991			0.985	
Satd. Flow (prot)	0	1655	0	0	1824	0	0	1585	0	0	1673	0
Flt Permitted		0.998			0.993			0.991			0.985	
Satd. Flow (perm)	0	1655	0	0	1824	0	0	1585	0	0	1673	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	11%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%
Adj. Flow (vph)	1	22	1	4	25	0	3	5	8	8	4	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	29	0	0	16	0	0	27	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	313	0
Future Volume (vph)	0	0	0	0	313	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt						
Flt Protected						
Satd. Flow (prot)	1837	918	0	0	4868	0
Flt Permitted						
Satd. Flow (perm)	1837	918	0	0	4868	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	49.2			315.9	75.7	
Travel Time (s)	3.7			22.7	5.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	3%	100%
Adj. Flow (vph)	0	0	0	0	340	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	340	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 9.4%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	42	1	185	32	1	289
Future Volume (vph)	42	1	185	32	1	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.997		0.978			
Flt Protected	0.953					
Satd. Flow (prot)	1664	0	3176	0	0	3232
Flt Permitted	0.953					
Satd. Flow (perm)	1664	0	3176	0	0	3232
Link Speed (k/h)	48		48			48
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.9			17.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	7%	10%	0%	8%
Adj. Flow (vph)	46	1	201	35	1	314
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	0	236	0	0	315
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	32	0	0	44
Future Volume (vph)	0	0	32	0	0	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1837	0	1670	0	0	1670
Flt Permitted						
Satd. Flow (perm)	1837	0	1670	0	0	1670
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	0	0	35	0	0	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	35	0	0	48
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX D

Synchro Outputs – Future Total 2022 Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	527	29	216	973	9	8	10	114	8	3	10
Future Volume (vph)	2	527	29	216	973	9	8	10	114	8	3	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.992			0.999			0.871			0.935	
Flt Protected	0.950			0.950				0.997			0.981	
Satd. Flow (prot)	1745	3180	0	1616	3082	0	0	2747	0	0	1400	0
Flt Permitted	0.268			0.287				0.944			0.904	
Satd. Flow (perm)	492	3180	0	488	3082	0	0	2601	0	0	1290	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			2			124			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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%	8%	24%	8%	13%	25%	0%	0%	12%	14%	33%	22%
Adj. Flow (vph)	2	573	32	235	1058	10	9	11	124	9	3	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	605	0	235	1068	0	0	144	0	0	23	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	36.0	36.0		19.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	40.0%	40.0%		21.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	30.0	30.0		15.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	30.0	30.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.33	0.33		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.01	0.57		0.51	0.64			0.16			0.05	
Control Delay	20.5	26.9		13.9	16.5			6.2			15.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.5	26.9		13.9	16.5			6.2			15.0	
LOS	C	C		B	B			A			B	
Approach Delay		26.9			16.1			6.2			15.0	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	0.2	44.2		19.2	63.9			1.2			1.4	
Queue Length 95th (m)	1.8	60.8		31.7	84.0			7.5			6.7	
Internal Link Dist (m)		101.0			692.7			191.5			67.4	
Turn Bay Length (m)	60.0			50.0								
Base Capacity (vph)	164	1064		464	1672			922			423	
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	0.01	0.57		0.51	0.64			0.16			0.05	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 67.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington St E/Burlington Street E

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	650	23	283	1477	0	0
Future Volume (vph)	650	23	283	1477	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.995					
Flt Protected			0.950			
Satd. Flow (prot)	4457	0	3224	4821	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4457	0	3224	4821	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	10%	5%	4%	0%	0%
Adj. Flow (vph)	707	25	308	1605	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	732	0	308	1605	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	62.0		28.0			
Total Split (%)	68.9%		31.1%			
Maximum Green (s)	57.0		22.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	57.0		22.9	90.0		
Actuated g/C Ratio	0.63		0.25	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.26		0.38	0.33		
Control Delay	17.6		29.3	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	17.6		29.3	0.2		
LOS	B		C	A		
Approach Delay	17.6			4.9		
Approach LOS	B			A		
Queue Length 50th (m)	31.6		22.6	0.0		
Queue Length 95th (m)	45.4		34.0	0.0		
Internal Link Dist (m)	692.7			106.8	218.7	
Turn Bay Length (m)			125.0			
Base Capacity (vph)	2826		820	4821		
Starvation Cap Reductn	0		0	0		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.26		0.38	0.33		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 32.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	28	9	120	63	10	367
Future Volume (vph)	28	9	120	63	10	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.966		0.948			
Flt Protected	0.964					0.999
Satd. Flow (prot)	1500	0	3074	0	0	3243
Flt Permitted	0.964					0.999
Satd. Flow (perm)	1500	0	3074	0	0	3243
Link Speed (k/h)	48		50			50
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	14%	9%	5%	25%	7%
Adj. Flow (vph)	30	10	130	68	11	399
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	198	0	0	410
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 27.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	60	0	0	91	0	1
Future Volume (vph)	60	0	0	91	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	1766	0	0	1625	918	781
Flt Permitted						
Satd. Flow (perm)	1766	0	0	1625	918	781
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.70	0.70	0.92	0.70	0.70
Heavy Vehicles (%)	4%	100%	100%	13%	100%	100%
Adj. Flow (vph)	65	0	0	99	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	99	0	1
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

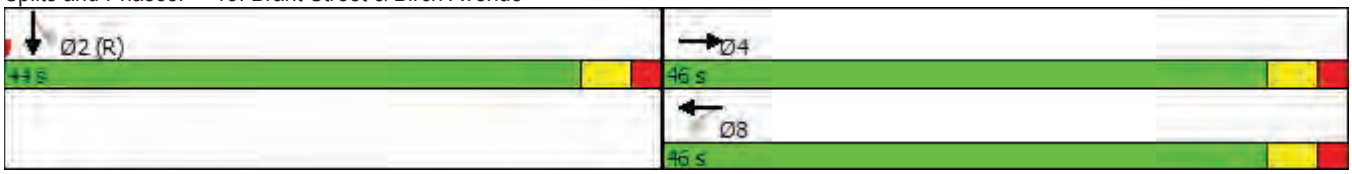
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 14.8%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	24	35	27	32	0	0	0	0	21	208	33
Future Volume (vph)	0	24	35	27	32	0	0	0	0	21	208	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.920									0.981	
Flt Protected					0.978						0.996	
Satd. Flow (prot)	0	1402	0	0	1649	0	0	0	0	0	4419	0
Flt Permitted					0.887						0.996	
Satd. Flow (perm)	0	1402	0	0	1496	0	0	0	0	0	4419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38									36	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	36%	10%	4%	13%	0%	0%	0%	0%	16%	10%	13%
Adj. Flow (vph)	0	26	38	29	35	0	0	0	0	23	226	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	64	0	0	64	0	0	0	0	0	285	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		46.0		46.0	46.0					44.0	44.0	
Total Split (%)		51.1%		51.1%	51.1%					48.9%	48.9%	
Maximum Green (s)		40.5		40.5	40.5					38.6	38.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		40.5			40.5						38.6	
Actuated g/C Ratio		0.45			0.45						0.43	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.10			0.10						0.15	
Control Delay		7.9			14.8						7.4	
Queue Delay		0.0			0.0						0.0	
Total Delay		7.9			14.8						7.4	
LOS		A			B						A	
Approach Delay		7.9			14.8						7.4	
Approach LOS		A			B						A	
Queue Length 50th (m)		2.4			6.2						15.3	
Queue Length 95th (m)		9.3			13.3						23.1	
Internal Link Dist (m)		133.8			82.5			51.7			218.7	
Turn Bay Length (m)												
Base Capacity (vph)		651			673						1915	
Starvation Cap Reductn		0			0						0	
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.10			0.10						0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.15			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 27.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue

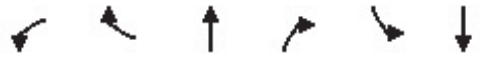


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	25	29	53	13	4	5	11	11	1	7	8
Future Volume (vph)	6	25	29	53	13	4	5	11	11	1	7	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.935			0.993			0.944			0.932	
Flt Protected		0.995			0.963			0.991			0.997	
Satd. Flow (prot)	0	1681	0	0	1591	0	0	1650	0	0	1514	0
Flt Permitted		0.995			0.963			0.991			0.997	
Satd. Flow (perm)	0	1681	0	0	1591	0	0	1650	0	0	1514	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	4%	0%	10%	8%	25%	0%	10%	0%	0%	14%	13%
Adj. Flow (vph)	7	27	32	58	14	4	5	12	12	1	8	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	76	0	0	29	0	0	18	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.5%		ICU Level of Service A	
Analysis Period (min) 15			

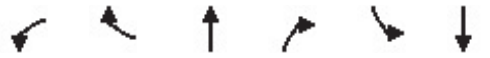
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	6	0	0	271	0
Future Volume (vph)	0	6	0	0	271	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt		0.850				
Flt Protected						
Satd. Flow (prot)	1837	781	0	0	4558	0
Flt Permitted						
Satd. Flow (perm)	1837	781	0	0	4558	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	51.6			315.9	75.7	
Travel Time (s)	3.9			22.7	5.7	
Peak Hour Factor	0.70	0.70	0.92	0.92	0.92	0.70
Heavy Vehicles (%)	0%	100%	0%	0%	10%	100%
Adj. Flow (vph)	0	9	0	0	295	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	9	0	0	295	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	27	8	179	49	2	311
Future Volume (vph)	27	8	179	49	2	311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.968		0.968			
Flt Protected	0.963					
Satd. Flow (prot)	1466	0	3071	0	0	3194
Flt Permitted	0.963					
Satd. Flow (perm)	1466	0	3071	0	0	3194
Link Speed (k/h)	48		50			50
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.4			17.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	29%	10%	10%	50%	9%
Adj. Flow (vph)	29	9	195	53	2	338
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	248	0	0	340
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	8	32	17	68	33
Future Volume (vph)	2	8	32	17	68	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.894		0.945			
Flt Protected	0.989					0.965
Satd. Flow (prot)	1624	0	1638	0	0	1726
Flt Permitted	0.989					0.965
Satd. Flow (perm)	1624	0	1638	0	0	1726
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.70	0.70	0.92	0.70	0.70	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	3	11	35	24	97	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	59	0	0	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

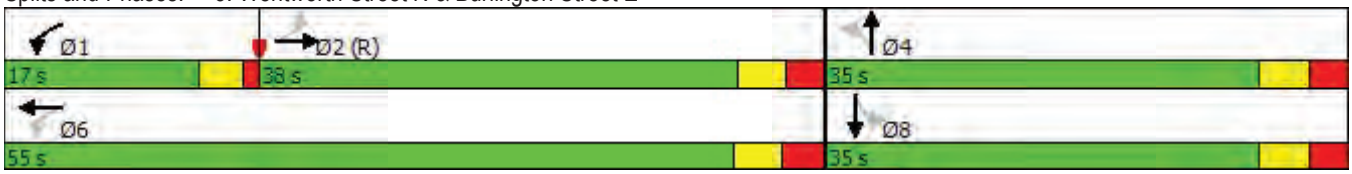
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.2%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	637	36	157	648	10	15	7	106	10	12	8
Future Volume (vph)	10	637	36	157	648	10	15	7	106	10	12	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.992			0.998			0.876			0.963	
Flt Protected	0.950			0.950				0.994			0.984	
Satd. Flow (prot)	1572	3073	0	1572	3161	0	0	2683	0	0	1420	0
Flt Permitted	0.380			0.230				0.929			0.912	
Satd. Flow (perm)	629	3073	0	381	3161	0	0	2508	0	0	1316	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			3			115			9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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 (%)	11%	12%	24%	11%	10%	22%	0%	0%	16%	22%	11%	40%
Adj. Flow (vph)	11	692	39	171	704	11	16	8	115	11	13	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	731	0	171	715	0	0	139	0	0	33	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	38.0	38.0		17.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	42.2%	42.2%		18.9%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	32.0	32.0		13.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	32.0	32.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.36	0.36		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.05	0.67		0.44	0.42			0.16			0.08	
Control Delay	20.0	27.8		13.2	13.0			6.8			17.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.0	27.8		13.2	13.0			6.8			17.5	
LOS	B	C		B	B			A			B	
Approach Delay		27.7			13.1			6.8			17.5	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	1.2	54.8		13.4	36.0			1.4			2.8	
Queue Length 95th (m)	4.8	74.2		23.3	48.5			7.7			9.3	
Internal Link Dist (m)		101.0			692.7			191.5			67.4	
Turn Bay Length (m)	60.0			50.0								
Base Capacity (vph)	223	1097		387	1715			886			430	
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	0.05	0.67		0.44	0.42			0.16			0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 58.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington Street E



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1121	29	261	1226	0	0
Future Volume (vph)	1121	29	261	1226	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.996					
Flt Protected			0.950			
Satd. Flow (prot)	4718	0	3134	4643	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4718	0	3134	4643	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	0%	8%	8%	0%	0%
Adj. Flow (vph)	1218	32	284	1333	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1250	0	284	1333	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	64.0		26.0			
Total Split (%)	71.1%		28.9%			
Maximum Green (s)	59.0		20.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	59.0		20.9	90.0		
Actuated g/C Ratio	0.66		0.23	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.40		0.39	0.29		
Control Delay	14.3		31.1	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	14.3		31.1	0.2		
LOS	B		C	A		
Approach Delay	14.3			5.6		
Approach LOS	B			A		
Queue Length 50th (m)	47.9		21.4	0.0		
Queue Length 95th (m)	63.7		32.6	0.0		
Internal Link Dist (m)	692.7			106.8	218.7	
Turn Bay Length (m)			125.0			
Base Capacity (vph)	3096		727	4643		
Starvation Cap Reductn	0		0	0		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.40		0.39	0.29		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 9.4		Intersection LOS: A	
Intersection Capacity Utilization 39.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	8	134	37	13	236
Future Volume (vph)	53	8	134	37	13	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.982		0.968			
Flt Protected	0.959					0.997
Satd. Flow (prot)	1631	0	3170	0	0	3228
Flt Permitted	0.959					0.997
Satd. Flow (perm)	1631	0	3170	0	0	3228
Link Speed (k/h)	48		48			48
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.7			16.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	0%	7%	5%	22%	7%
Adj. Flow (vph)	58	9	146	40	14	257
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	0	186	0	0	271
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.2%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	99	0	1	64	0	0
Future Volume (vph)	99	0	1	64	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.999		
Satd. Flow (prot)	1655	0	0	1579	918	918
Flt Permitted				0.999		
Satd. Flow (perm)	1655	0	0	1579	918	918
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.70	0.70	0.92	0.70	0.70
Heavy Vehicles (%)	11%	100%	100%	15%	100%	100%
Adj. Flow (vph)	108	0	1	70	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	0	71	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

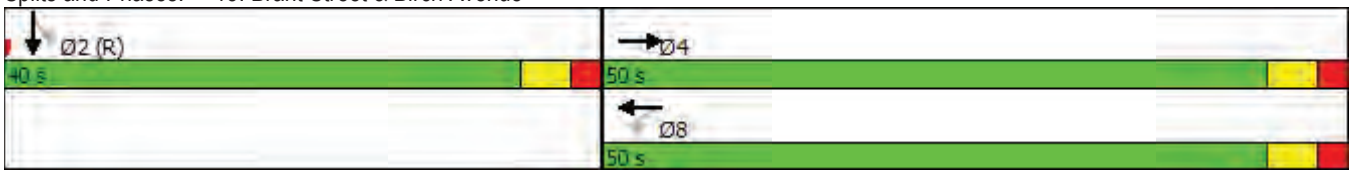
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 8.5%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	13	68	55	30	0	0	0	0	8	218	20
Future Volume (vph)	0	13	68	55	30	0	0	0	0	8	218	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.886									0.988	
Flt Protected					0.969						0.998	
Satd. Flow (prot)	0	1543	0	0	1692	0	0	0	0	0	4697	0
Flt Permitted					0.803						0.998	
Satd. Flow (perm)	0	1543	0	0	1402	0	0	0	0	0	4697	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		74									19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	8%	5%	2%	11%	2%	0%	0%	0%	29%	3%	20%
Adj. Flow (vph)	0	14	74	60	33	0	0	0	0	9	237	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	88	0	0	93	0	0	0	0	0	268	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		50.0		50.0	50.0					40.0	40.0	
Total Split (%)		55.6%		55.6%	55.6%					44.4%	44.4%	
Maximum Green (s)		44.5		44.5	44.5					34.6	34.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		44.5			44.5						34.6	
Actuated g/C Ratio		0.49			0.49						0.38	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.11			0.13						0.15	
Control Delay		4.4			13.0						5.9	
Queue Delay		0.0			0.0						0.0	
Total Delay		4.4			13.0						5.9	
LOS		A			B						A	
Approach Delay		4.4			13.0						5.9	
Approach LOS		A			B						A	
Queue Length 50th (m)		1.2			8.3						12.4	
Queue Length 95th (m)		8.3			16.6						12.3	
Internal Link Dist (m)		133.8			82.5			51.7			218.7	
Turn Bay Length (m)												
Base Capacity (vph)		800			693						1817	
Starvation Cap Reductn		0			0						0	
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.11			0.13						0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.15			
Intersection Signal Delay: 7.1		Intersection LOS: A	
Intersection Capacity Utilization 28.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue

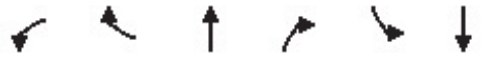


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	20	15	29	23	0	30	5	52	7	4	14
Future Volume (vph)	1	20	15	29	23	0	30	5	52	7	4	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.945						0.919			0.925	
Flt Protected		0.999			0.973			0.983			0.985	
Satd. Flow (prot)	0	1633	0	0	1787	0	0	1531	0	0	1673	0
Flt Permitted		0.999			0.973			0.983			0.985	
Satd. Flow (perm)	0	1633	0	0	1787	0	0	1531	0	0	1673	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	11%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%
Adj. Flow (vph)	1	22	16	32	25	0	33	5	57	8	4	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	0	0	57	0	0	95	0	0	27	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.5%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	6	0	0	340	2
Future Volume (vph)	0	6	0	0	340	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt		0.850			0.999	
Flt Protected						
Satd. Flow (prot)	1837	781	0	0	4827	0
Flt Permitted						
Satd. Flow (perm)	1837	781	0	0	4827	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	49.2			315.9	75.7	
Travel Time (s)	3.7			22.7	5.7	
Peak Hour Factor	0.70	0.70	0.92	0.92	0.92	0.70
Heavy Vehicles (%)	0%	100%	0%	0%	3%	100%
Adj. Flow (vph)	0	9	0	0	370	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	9	0	0	373	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	16.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	60	1	197	41	1	312
Future Volume (vph)	60	1	197	41	1	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.998		0.974			
Flt Protected	0.953					
Satd. Flow (prot)	1665	0	3161	0	0	3232
Flt Permitted	0.953					
Satd. Flow (perm)	1665	0	3161	0	0	3232
Link Speed (k/h)	48		48			48
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.9			17.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	7%	10%	0%	8%
Adj. Flow (vph)	65	1	214	45	1	339
Shared Lane Traffic (%)						
Lane Group Flow (vph)	66	0	259	0	0	340
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.4%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	18	72	32	9	36	44
Future Volume (vph)	18	72	32	9	36	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.892		0.963			
Flt Protected	0.990					0.975
Satd. Flow (prot)	1622	0	1649	0	0	1708
Flt Permitted	0.990					0.975
Satd. Flow (perm)	1622	0	1649	0	0	1708
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.70	0.70	0.92	0.70	0.70	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	26	103	35	13	51	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	0	48	0	0	99
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.1%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX E

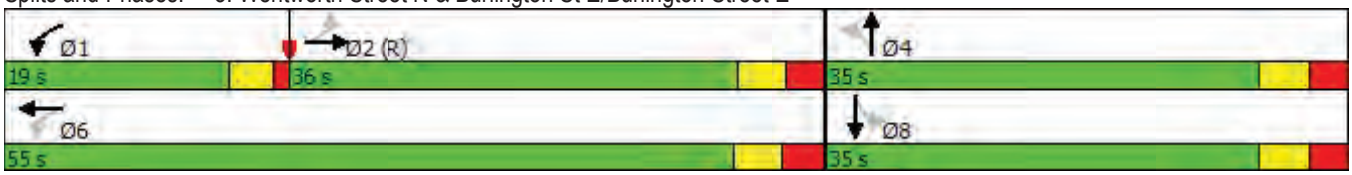
Synchro Outputs – Future Background 2027 Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	582	26	239	1073	10	7	11	126	9	4	11
Future Volume (vph)	2	582	26	239	1073	10	7	11	126	9	4	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.994			0.999			0.869			0.938	
Flt Protected	0.950			0.950				0.997			0.981	
Satd. Flow (prot)	1745	3192	0	1616	3082	0	0	2737	0	0	1401	0
Flt Permitted	0.240			0.254				0.946			0.900	
Satd. Flow (perm)	441	3192	0	432	3082	0	0	2597	0	0	1286	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			2			137			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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%	8%	24%	8%	13%	25%	0%	0%	12%	14%	33%	22%
Adj. Flow (vph)	2	633	28	260	1166	11	8	12	137	10	4	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	661	0	260	1177	0	0	157	0	0	26	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	36.0	36.0		19.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	40.0%	40.0%		21.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	30.0	30.0		15.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	30.0	30.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.33	0.33		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.01	0.62		0.59	0.70			0.17			0.06	
Control Delay	20.5	28.1		15.7	18.0			6.0			15.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.5	28.1		15.7	18.0			6.0			15.0	
LOS	C	C		B	B			A			B	
Approach Delay		28.0			17.6			6.0			15.0	
Approach LOS		C			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 71.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington St E/Burlington Street E



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	718	26	294	1631	0	0
Future Volume (vph)	718	26	294	1631	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.995					
Flt Protected			0.950			
Satd. Flow (prot)	4457	0	3224	4821	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4457	0	3224	4821	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	10%	5%	4%	0%	0%
Adj. Flow (vph)	780	28	320	1773	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	808	0	320	1773	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	62.0		28.0			
Total Split (%)	68.9%		31.1%			
Maximum Green (s)	57.0		22.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	57.0		22.9	90.0		
Actuated g/C Ratio	0.63		0.25	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.29		0.39	0.37		
Control Delay	18.6		29.5	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	18.6		29.5	0.2		
LOS	B		C	A		
Approach Delay	18.6			4.7		
Approach LOS	B			A		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	27	9	133	46	5	405
Future Volume (vph)	27	9	133	46	5	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.965		0.962			
Flt Protected	0.964					0.999
Satd. Flow (prot)	1499	0	3109	0	0	3252
Flt Permitted	0.964					0.999
Satd. Flow (perm)	1499	0	3109	0	0	3252
Link Speed (k/h)	48		50			50
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	14%	9%	5%	25%	7%
Adj. Flow (vph)	29	10	145	50	5	440
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	0	195	0	0	445
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	61	0	0	54	0	0
Future Volume (vph)	61	0	0	54	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1766	0	0	1625	918	918
Flt Permitted						
Satd. Flow (perm)	1766	0	0	1625	918	918
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	100%	100%	13%	100%	100%
Adj. Flow (vph)	66	0	0	59	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	66	0	0	59	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

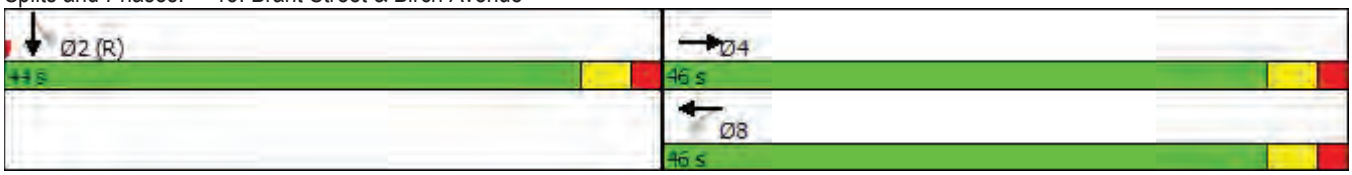
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	26	35	30	36	0	0	0	0	23	229	18
Future Volume (vph)	0	26	35	30	36	0	0	0	0	23	229	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.922									0.990	
Flt Protected					0.978						0.996	
Satd. Flow (prot)	0	1399	0	0	1650	0	0	0	0	0	4466	0
Flt Permitted					0.880						0.996	
Satd. Flow (perm)	0	1399	0	0	1485	0	0	0	0	0	4466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38									16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	36%	10%	4%	13%	0%	0%	0%	0%	16%	10%	13%
Adj. Flow (vph)	0	28	38	33	39	0	0	0	0	25	249	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	72	0	0	0	0	0	294	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		46.0		46.0	46.0					44.0	44.0	
Total Split (%)		51.1%		51.1%	51.1%					48.9%	48.9%	
Maximum Green (s)		40.5		40.5	40.5					38.6	38.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		40.5			40.5						38.6	
Actuated g/C Ratio		0.45			0.45						0.43	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.10			0.11						0.15	
Control Delay		8.0			14.9						7.5	
Queue Delay		0.0			0.0						0.0	
Total Delay		8.0			14.9						7.5	
LOS		A			B						A	
Approach Delay		8.0			14.9						7.5	
Approach LOS		A			B						A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.15			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 27.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue

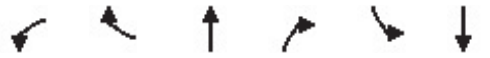


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	28	4	12	14	5	2	12	7	1	8	9
Future Volume (vph)	7	28	4	12	14	5	2	12	7	1	8	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.980			0.953			0.932	
Flt Protected		0.991			0.981			0.996			0.998	
Satd. Flow (prot)	0	1747	0	0	1586	0	0	1650	0	0	1514	0
Flt Permitted		0.991			0.981			0.996			0.998	
Satd. Flow (perm)	0	1747	0	0	1586	0	0	1650	0	0	1514	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	4%	0%	10%	8%	25%	0%	10%	0%	0%	14%	13%
Adj. Flow (vph)	8	30	4	13	15	5	2	13	8	1	9	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	33	0	0	23	0	0	20	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	295	0
Future Volume (vph)	0	0	0	0	295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt						
Flt Protected						
Satd. Flow (prot)	1837	918	0	0	4558	0
Flt Permitted						
Satd. Flow (perm)	1837	918	0	0	4558	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	51.6			315.9	75.7	
Travel Time (s)	3.9			22.7	5.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	10%	100%
Adj. Flow (vph)	0	0	0	0	321	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	321	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 9.0%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	28	9	174	35	2	340
Future Volume (vph)	28	9	174	35	2	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.966		0.975			
Flt Protected	0.964					
Satd. Flow (prot)	1462	0	3093	0	0	3195
Flt Permitted	0.964					
Satd. Flow (perm)	1462	0	3093	0	0	3195
Link Speed (k/h)	48		50			50
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.4			17.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	29%	10%	10%	50%	9%
Adj. Flow (vph)	30	10	189	38	2	370
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	227	0	0	372
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.8%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	35	0	0	36
Future Volume (vph)	0	0	35	0	0	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1837	0	1670	0	0	1670
Flt Permitted						
Satd. Flow (perm)	1837	0	1670	0	0	1670
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	0	0	38	0	0	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	38	0	0	39
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

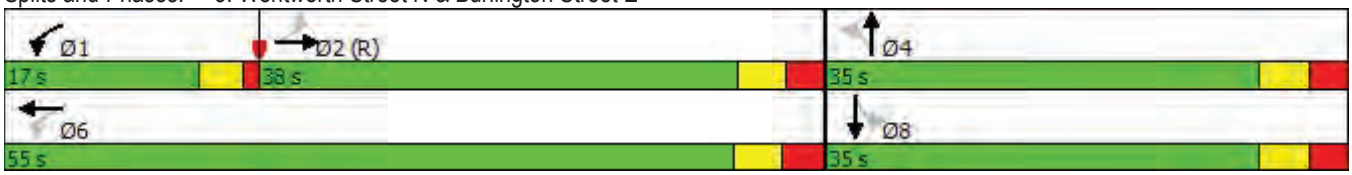
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	703	36	173	715	11	11	7	117	11	14	9
Future Volume (vph)	11	703	36	173	715	11	11	7	117	11	14	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.993			0.998			0.870			0.964	
Flt Protected	0.950			0.950				0.996			0.984	
Satd. Flow (prot)	1572	3078	0	1572	3161	0	0	2657	0	0	1423	0
Flt Permitted	0.353			0.195				0.938			0.910	
Satd. Flow (perm)	584	3078	0	323	3161	0	0	2502	0	0	1316	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			127			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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 (%)	11%	12%	24%	11%	10%	22%	0%	0%	16%	22%	11%	40%
Adj. Flow (vph)	12	764	39	188	777	12	12	8	127	12	15	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	803	0	188	789	0	0	147	0	0	37	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	38.0	38.0		17.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	42.2%	42.2%		18.9%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	32.0	32.0		13.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	32.0	32.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.36	0.36		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.06	0.73		0.52	0.46			0.16			0.09	
Control Delay	20.3	29.8		14.8	13.6			6.2			17.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.3	29.8		14.8	13.6			6.2			17.6	
LOS	C	C		B	B			A			B	
Approach Delay		29.7			13.8			6.2			17.6	
Approach LOS		C			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 19.9		Intersection LOS: B	
Intersection Capacity Utilization 63.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington Street E



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1238	31	277	1353	0	0
Future Volume (vph)	1238	31	277	1353	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.996					
Flt Protected			0.950			
Satd. Flow (prot)	4718	0	3134	4643	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4718	0	3134	4643	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	8					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	0%	8%	8%	0%	0%
Adj. Flow (vph)	1346	34	301	1471	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1380	0	301	1471	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	64.0		26.0			
Total Split (%)	71.1%		28.9%			
Maximum Green (s)	59.0		20.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	59.0		20.9	90.0		
Actuated g/C Ratio	0.66		0.23	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.45		0.41	0.32		
Control Delay	15.3		31.4	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	15.3		31.4	0.2		
LOS	B		C	A		
Approach Delay	15.3			5.5		
Approach LOS	B			A		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 9.8		Intersection LOS: A	
Intersection Capacity Utilization 41.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	4	148	27	11	261
Future Volume (vph)	34	4	148	27	11	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.987		0.977			
Flt Protected	0.957					0.998
Satd. Flow (prot)	1632	0	3195	0	0	3236
Flt Permitted	0.957					0.998
Satd. Flow (perm)	1632	0	3195	0	0	3236
Link Speed (k/h)	48		48			48
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.7			16.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	0%	7%	5%	22%	7%
Adj. Flow (vph)	37	4	161	29	12	284
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	0	190	0	0	296
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 25.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	60	0	0	46	0	0
Future Volume (vph)	60	0	0	46	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1655	0	0	1597	918	918
Flt Permitted						
Satd. Flow (perm)	1655	0	0	1597	918	918
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	11%	100%	100%	15%	100%	100%
Adj. Flow (vph)	65	0	0	50	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	0	50	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

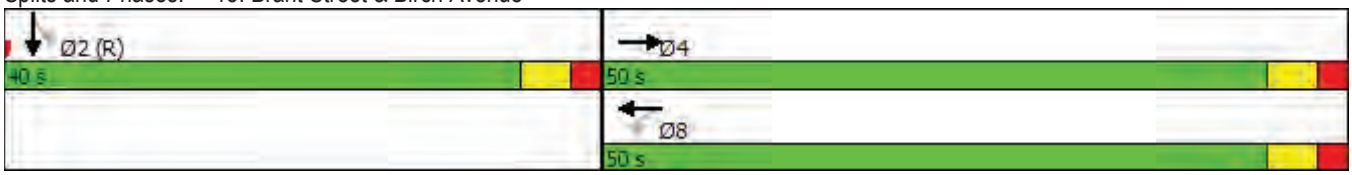
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	14	45	61	33	0	0	0	0	8	239	12
Future Volume (vph)	0	14	45	61	33	0	0	0	0	8	239	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.897									0.993	
Flt Protected					0.969						0.998	
Satd. Flow (prot)	0	1559	0	0	1692	0	0	0	0	0	4750	0
Flt Permitted					0.809						0.998	
Satd. Flow (perm)	0	1559	0	0	1413	0	0	0	0	0	4750	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49									9	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	8%	5%	2%	11%	2%	0%	0%	0%	29%	3%	20%
Adj. Flow (vph)	0	15	49	66	36	0	0	0	0	9	260	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	64	0	0	102	0	0	0	0	0	282	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		50.0		50.0	50.0					40.0	40.0	
Total Split (%)		55.6%		55.6%	55.6%					44.4%	44.4%	
Maximum Green (s)		44.5		44.5	44.5					34.6	34.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		44.5			44.5						34.6	
Actuated g/C Ratio		0.49			0.49						0.38	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.08			0.15						0.15	
Control Delay		5.3			13.1						6.3	
Queue Delay		0.0			0.0						0.0	
Total Delay		5.3			13.1						6.3	
LOS		A			B						A	
Approach Delay		5.3			13.1						6.3	
Approach LOS		A			B						A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.15			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 29.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue

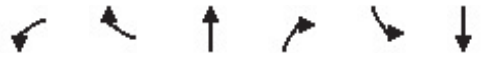


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	22	1	5	26	0	4	6	8	8	5	15
Future Volume (vph)	1	22	1	5	26	0	4	6	8	8	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995						0.939			0.928	
Flt Protected		0.998			0.992			0.990			0.985	
Satd. Flow (prot)	0	1656	0	0	1822	0	0	1606	0	0	1679	0
Flt Permitted		0.998			0.992			0.990			0.985	
Satd. Flow (perm)	0	1656	0	0	1822	0	0	1606	0	0	1679	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	11%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%
Adj. Flow (vph)	1	24	1	5	28	0	4	7	9	9	5	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	26	0	0	33	0	0	20	0	0	30	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.4%		ICU Level of Service A	
Analysis Period (min) 15			

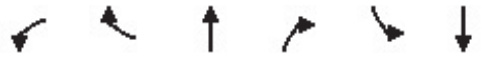
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	346	0
Future Volume (vph)	0	0	0	0	346	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt						
Flt Protected						
Satd. Flow (prot)	1837	918	0	0	4868	0
Flt Permitted						
Satd. Flow (perm)	1837	918	0	0	4868	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	49.2			315.9	75.7	
Travel Time (s)	3.7			22.7	5.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	100%	0%	0%	3%	100%
Adj. Flow (vph)	0	0	0	0	376	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	376	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	10.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	46	1	205	35	1	319
Future Volume (vph)	46	1	205	35	1	319
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.997		0.978			
Flt Protected	0.953					
Satd. Flow (prot)	1664	0	3177	0	0	3232
Flt Permitted	0.953					
Satd. Flow (perm)	1664	0	3177	0	0	3232
Link Speed (k/h)	48		48			48
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.9			17.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	7%	10%	0%	8%
Adj. Flow (vph)	50	1	223	38	1	347
Shared Lane Traffic (%)						
Lane Group Flow (vph)	51	0	261	0	0	348
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.5%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	35	0	0	48
Future Volume (vph)	0	0	35	0	0	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1837	0	1670	0	0	1670
Flt Permitted						
Satd. Flow (perm)	1837	0	1670	0	0	1670
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	0	0	38	0	0	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	38	0	0	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 13.3%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX F

Synchro Outputs – Future Total 2027 Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	582	31	239	1074	10	8	11	126	9	4	11
Future Volume (vph)	2	582	31	239	1074	10	8	11	126	9	4	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.992			0.999			0.870			0.938	
Flt Protected	0.950			0.950				0.997			0.981	
Satd. Flow (prot)	1745	3181	0	1616	3082	0	0	2742	0	0	1401	0
Flt Permitted	0.240			0.250				0.945			0.899	
Satd. Flow (perm)	441	3181	0	425	3082	0	0	2599	0	0	1284	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			2			137			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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%	8%	24%	8%	13%	25%	0%	0%	12%	14%	33%	22%
Adj. Flow (vph)	2	633	34	260	1167	11	9	12	137	10	4	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	667	0	260	1178	0	0	158	0	0	26	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	36.0	36.0		19.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	40.0%	40.0%		21.1%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	30.0	30.0		15.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	30.0	30.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.33	0.33		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.01	0.63		0.59	0.70			0.17			0.06	
Control Delay	20.5	28.2		15.8	18.0			6.0			15.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.5	28.2		15.8	18.0			6.0			15.0	
LOS	C	C		B	B			A			B	
Approach Delay		28.2			17.6			6.0			15.0	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	0.2	50.1		21.6	74.5			1.3			1.6	
Queue Length 95th (m)	1.8	68.2		35.2	97.9			7.8			7.2	
Internal Link Dist (m)		101.0			692.7			191.5			67.4	
Turn Bay Length (m)	60.0			50.0								
Base Capacity (vph)	147	1064		439	1672			930			421	
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	0.01	0.63		0.59	0.70			0.17			0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 19.9		Intersection LOS: B	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington St E/Burlington Street E

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	718	26	311	1631	0	0
Future Volume (vph)	718	26	311	1631	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.995					
Flt Protected			0.950			
Satd. Flow (prot)	4457	0	3224	4821	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4457	0	3224	4821	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	10%	5%	4%	0%	0%
Adj. Flow (vph)	780	28	338	1773	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	808	0	338	1773	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	62.0		28.0			
Total Split (%)	68.9%		31.1%			
Maximum Green (s)	57.0		22.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	57.0		22.9	90.0		
Actuated g/C Ratio	0.63		0.25	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.29		0.41	0.37		
Control Delay	18.6		29.8	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	18.6		29.8	0.2		
LOS	B		C	A		
Approach Delay	18.6			5.0		
Approach LOS	B			A		
Queue Length 50th (m)	36.5		25.1	0.0		
Queue Length 95th (m)	50.9		37.1	0.0		
Internal Link Dist (m)	692.7			106.8	218.7	
Turn Bay Length (m)			125.0			
Base Capacity (vph)	2826		820	4821		
Starvation Cap Reductn	0		0	0		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.29		0.41	0.37		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	10	133	67	10	405
Future Volume (vph)	30	10	133	67	10	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.966		0.950			
Flt Protected	0.964					0.999
Satd. Flow (prot)	1500	0	3079	0	0	3245
Flt Permitted	0.964					0.999
Satd. Flow (perm)	1500	0	3079	0	0	3245
Link Speed (k/h)	48		50			50
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	14%	9%	5%	25%	7%
Adj. Flow (vph)	33	11	145	73	11	440
Shared Lane Traffic (%)						
Lane Group Flow (vph)	44	0	218	0	0	451
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

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

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	66	0	0	96	0	1
Future Volume (vph)	66	0	0	96	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850
Flt Protected						
Satd. Flow (prot)	1766	0	0	1625	918	781
Flt Permitted						
Satd. Flow (perm)	1766	0	0	1625	918	781
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.70	0.70	0.92	0.70	0.70
Heavy Vehicles (%)	4%	100%	100%	13%	100%	100%
Adj. Flow (vph)	72	0	0	104	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	0	104	0	1
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

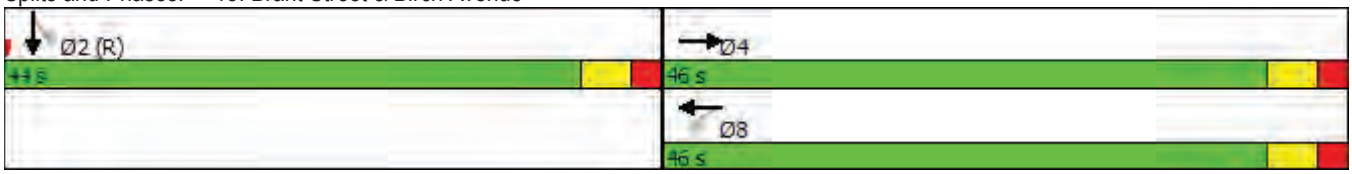
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	26	39	30	36	0	0	0	0	23	229	35
Future Volume (vph)	0	26	39	30	36	0	0	0	0	23	229	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.919									0.982	
Flt Protected					0.978						0.996	
Satd. Flow (prot)	0	1402	0	0	1650	0	0	0	0	0	4424	0
Flt Permitted					0.879						0.996	
Satd. Flow (perm)	0	1402	0	0	1483	0	0	0	0	0	4424	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42									35	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	36%	10%	4%	13%	0%	0%	0%	0%	16%	10%	13%
Adj. Flow (vph)	0	28	42	33	39	0	0	0	0	25	249	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	0	0	72	0	0	0	0	0	312	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		46.0		46.0	46.0					44.0	44.0	
Total Split (%)		51.1%		51.1%	51.1%					48.9%	48.9%	
Maximum Green (s)		40.5		40.5	40.5					38.6	38.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		40.5			40.5						38.6	
Actuated g/C Ratio		0.45			0.45						0.43	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.11			0.11						0.16	
Control Delay		7.7			15.0						7.3	
Queue Delay		0.0			0.0						0.0	
Total Delay		7.7			15.0						7.3	
LOS		A			B						A	
Approach Delay		7.7			15.0						7.3	
Approach LOS		A			B						A	
Queue Length 50th (m)		2.6			7.0						16.9	
Queue Length 95th (m)		9.8			14.7						24.7	
Internal Link Dist (m)		133.8			82.5			51.7			218.7	
Turn Bay Length (m)												
Base Capacity (vph)		654			667						1917	
Starvation Cap Reductn		0			0						0	
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.11			0.11						0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.16			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 27.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	28	30	54	14	5	5	12	12	1	8	9
Future Volume (vph)	7	28	30	54	14	5	5	12	12	1	8	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Frt		0.937			0.991			0.943			0.932	
Flt Protected		0.994			0.964			0.992			0.998	
Satd. Flow (prot)	0	1682	0	0	1587	0	0	1649	0	0	1514	0
Flt Permitted		0.994			0.964			0.992			0.998	
Satd. Flow (perm)	0	1682	0	0	1587	0	0	1649	0	0	1514	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	4%	0%	10%	8%	25%	0%	10%	0%	0%	14%	13%
Adj. Flow (vph)	8	30	33	59	15	5	5	13	13	1	9	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	71	0	0	79	0	0	31	0	0	20	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

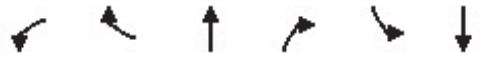
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	6	0	0	299	0
Future Volume (vph)	0	6	0	0	299	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt		0.850				
Flt Protected						
Satd. Flow (prot)	1837	781	0	0	4558	0
Flt Permitted						
Satd. Flow (perm)	1837	781	0	0	4558	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	51.6			315.9	75.7	
Travel Time (s)	3.9			22.7	5.7	
Peak Hour Factor	0.70	0.70	0.92	0.92	0.92	0.70
Heavy Vehicles (%)	0%	100%	0%	0%	10%	100%
Adj. Flow (vph)	0	9	0	0	325	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	9	0	0	325	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	9	195	52	2	343
Future Volume (vph)	30	9	195	52	2	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.969		0.968			
Flt Protected	0.963					
Satd. Flow (prot)	1468	0	3071	0	0	3195
Flt Permitted	0.963					
Satd. Flow (perm)	1468	0	3071	0	0	3195
Link Speed (k/h)	48		50			50
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.4			17.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	29%	10%	10%	50%	9%
Adj. Flow (vph)	33	10	212	57	2	373
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	0	269	0	0	375
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.9%		ICU Level of Service A	
Analysis Period (min) 15			



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	8	35	17	68	36
Future Volume (vph)	2	8	35	17	68	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.894		0.948			
Flt Protected	0.989					0.966
Satd. Flow (prot)	1624	0	1641	0	0	1725
Flt Permitted	0.989					0.966
Satd. Flow (perm)	1624	0	1641	0	0	1725
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.70	0.70	0.92	0.70	0.70	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	3	11	38	24	97	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	14	0	62	0	0	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

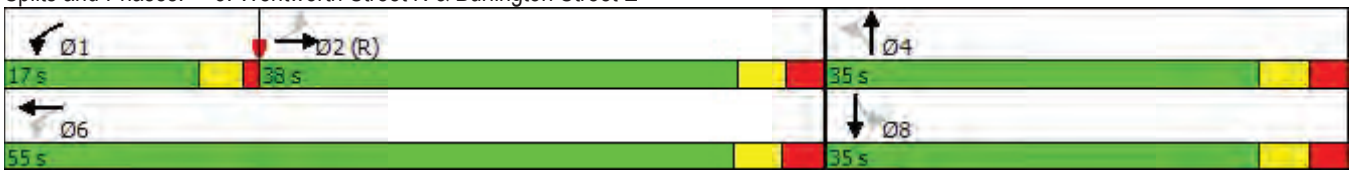
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.3%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	704	39	173	715	11	16	7	117	11	14	9
Future Volume (vph)	11	704	39	173	715	11	16	7	117	11	14	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.992			0.998			0.875			0.964	
Flt Protected	0.950			0.950				0.994			0.984	
Satd. Flow (prot)	1572	3074	0	1572	3161	0	0	2677	0	0	1423	0
Flt Permitted	0.353			0.193				0.929			0.909	
Satd. Flow (perm)	584	3074	0	319	3161	0	0	2502	0	0	1315	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			3			127			10	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		125.0			716.7			215.5			91.4	
Travel Time (s)		9.0			51.6			15.5			6.6	
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 (%)	11%	12%	24%	11%	10%	22%	0%	0%	16%	22%	11%	40%
Adj. Flow (vph)	12	765	42	188	777	12	17	8	127	12	15	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	807	0	188	789	0	0	152	0	0	37	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)		3.3			3.3			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		9.5	37.2		35.0	35.0		35.0	35.0	
Total Split (s)	38.0	38.0		17.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	42.2%	42.2%		18.9%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	32.0	32.0		13.0	48.8		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.3	3.3		3.0	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		1.0	2.9		2.7	2.7		2.7	2.7	
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	6.2			6.0			6.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Walk Time (s)	7.0	7.0			15.0		11.0	11.0		11.0	11.0	
Flash Dont Walk (s)	16.0	16.0			16.0		18.0	18.0		18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	32.0	32.0		51.0	48.8			29.0			29.0	
Actuated g/C Ratio	0.36	0.36		0.57	0.54			0.32			0.32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.06	0.74		0.52	0.46			0.17			0.09	
Control Delay	20.3	29.9		14.9	13.6			6.5			17.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	20.3	29.9		14.9	13.6			6.5			17.6	
LOS	C	C		B	B			A			B	
Approach Delay		29.8			13.8			6.5			17.6	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	1.4	62.6		14.9	40.9			1.5			3.2	
Queue Length 95th (m)	5.1	84.1		25.6	54.7			8.0			9.9	
Internal Link Dist (m)		101.0			692.7			191.5			67.4	
Turn Bay Length (m)	60.0			50.0								
Base Capacity (vph)	207	1097		361	1715			892			430	
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	0.06	0.74		0.52	0.46			0.17			0.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 19.9		Intersection LOS: B	
Intersection Capacity Utilization 63.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Wentworth Street N & Burlington Street E

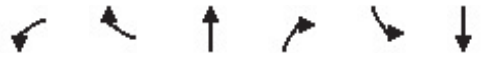


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1238	32	287	1353	0	0
Future Volume (vph)	1238	32	287	1353	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	125.0		0.0	0.0
Storage Lanes		0	2		0	0
Taper Length (m)			15.0		15.0	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	1.00
Frt	0.996					
Flt Protected			0.950			
Satd. Flow (prot)	4718	0	3134	4643	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	4718	0	3134	4643	0	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9					
Link Speed (k/h)	50			50	50	
Link Distance (m)	716.7			130.8	242.7	
Travel Time (s)	51.6			9.4	17.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	0%	8%	8%	0%	0%
Adj. Flow (vph)	1346	35	312	1471	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1381	0	312	1471	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	6.6			6.6	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane	Yes					
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Turn Type	NA		Prot	NA		
Protected Phases	2		4	2 4		
Permitted Phases						
Minimum Split (s)	47.0		15.1			
Total Split (s)	64.0		26.0			
Total Split (%)	71.1%		28.9%			
Maximum Green (s)	59.0		20.9			
Yellow Time (s)	3.7		3.7			
All-Red Time (s)	1.3		1.4			
Lost Time Adjust (s)	0.0		0.0			
Total Lost Time (s)	5.0		5.1			
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	30.0					
Flash Dont Walk (s)	12.0					
Pedestrian Calls (#/hr)	0					
Act Effct Green (s)	59.0		20.9	90.0		
Actuated g/C Ratio	0.66		0.23	1.00		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
v/c Ratio	0.45		0.43	0.32		
Control Delay	15.3		31.6	0.2		
Queue Delay	0.0		0.0	0.0		
Total Delay	15.3		31.6	0.2		
LOS	B		C	A		
Approach Delay	15.3			5.7		
Approach LOS	B			A		
Queue Length 50th (m)	55.8		23.7	0.0		
Queue Length 95th (m)	72.2		35.7	0.0		
Internal Link Dist (m)	692.7			106.8	218.7	
Turn Bay Length (m)			125.0			
Base Capacity (vph)	3096		727	4643		
Starvation Cap Reductn	0		0	0		
Spillback Cap Reductn	0		0	0		
Storage Cap Reductn	0		0	0		
Reduced v/c Ratio	0.45		0.43	0.32		

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Pretimed			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 9.9		Intersection LOS: A	
Intersection Capacity Utilization 41.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Birch Avenue & Burlington Street E



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	57	9	148	39	14	261
Future Volume (vph)	57	9	148	39	14	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.981		0.969			
Flt Protected	0.959					0.997
Satd. Flow (prot)	1630	0	3173	0	0	3229
Flt Permitted	0.959					0.997
Satd. Flow (perm)	1630	0	3173	0	0	3229
Link Speed (k/h)	48		48			48
Link Distance (m)	104.2		236.6			215.5
Travel Time (s)	7.8		17.7			16.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	0%	7%	5%	22%	7%
Adj. Flow (vph)	62	10	161	42	15	284
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	203	0	0	299
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.7%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	105	0	1	69	0	0
Future Volume (vph)	105	0	1	69	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.999		
Satd. Flow (prot)	1655	0	0	1580	918	918
Flt Permitted				0.999		
Satd. Flow (perm)	1655	0	0	1580	918	918
Link Speed (k/h)	48			48	48	
Link Distance (m)	77.1			157.8	61.8	
Travel Time (s)	5.8			11.8	4.6	
Peak Hour Factor	0.92	0.70	0.70	0.92	0.70	0.70
Heavy Vehicles (%)	11%	100%	100%	15%	100%	100%
Adj. Flow (vph)	114	0	1	75	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	0	0	76	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.3	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

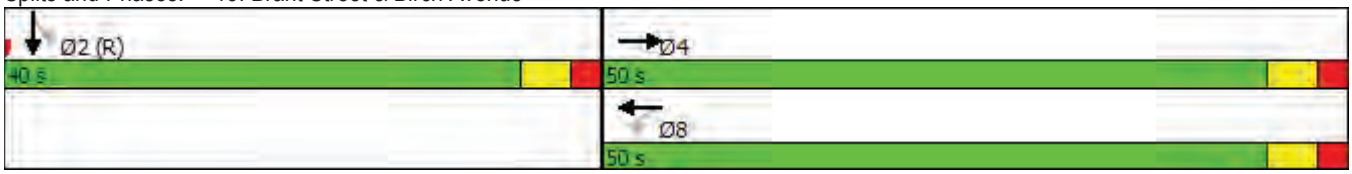
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 8.9%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	14	72	61	33	0	0	0	0	8	241	21
Future Volume (vph)	0	14	72	61	33	0	0	0	0	8	241	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	0.0		150.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	15.0			15.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.91
Frt		0.887									0.988	
Flt Protected					0.969						0.998	
Satd. Flow (prot)	0	1544	0	0	1692	0	0	0	0	0	4703	0
Flt Permitted					0.795						0.998	
Satd. Flow (perm)	0	1544	0	0	1388	0	0	0	0	0	4703	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		78									18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		157.8			106.5			75.7			242.7	
Travel Time (s)		11.4			7.7			5.5			17.5	
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%	8%	5%	2%	11%	2%	0%	0%	0%	29%	3%	20%
Adj. Flow (vph)	0	15	78	66	36	0	0	0	0	9	262	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	0	102	0	0	0	0	0	294	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						2	
Permitted Phases				8						2		
Minimum Split (s)		32.5		32.5	32.5					23.4	23.4	
Total Split (s)		50.0		50.0	50.0					40.0	40.0	
Total Split (%)		55.6%		55.6%	55.6%					44.4%	44.4%	
Maximum Green (s)		44.5		44.5	44.5					34.6	34.6	
Yellow Time (s)		3.3		3.3	3.3					3.3	3.3	
All-Red Time (s)		2.2		2.2	2.2					2.1	2.1	
Lost Time Adjust (s)		0.0			0.0						0.0	
Total Lost Time (s)		5.5			5.5						5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		17.0		17.0	17.0					7.0	7.0	
Flash Dont Walk (s)		10.0		10.0	10.0					11.0	11.0	
Pedestrian Calls (#/hr)		0		0	0					0	0	
Act Effct Green (s)		44.5			44.5						34.6	
Actuated g/C Ratio		0.49			0.49						0.38	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.12			0.15						0.16	
Control Delay		4.3			13.2						6.0	
Queue Delay		0.0			0.0						0.0	
Total Delay		4.3			13.2						6.0	
LOS		A			B						A	
Approach Delay		4.3			13.2						6.0	
Approach LOS		A			B						A	
Queue Length 50th (m)		1.3			9.2						12.1	
Queue Length 95th (m)		8.5			17.9						12.8	
Internal Link Dist (m)		133.8			82.5			51.7			218.7	
Turn Bay Length (m)												
Base Capacity (vph)		802			686						1819	
Starvation Cap Reductn		0			0						0	
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.12			0.15						0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.16			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 29.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 15: Brant Street & Birch Avenue

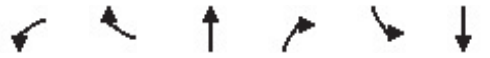


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	22	15	30	26	0	31	6	53	8	5	15
Future Volume (vph)	1	22	15	30	26	0	31	6	53	8	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.947						0.921			0.928	
Flt Protected		0.999			0.974			0.983			0.985	
Satd. Flow (prot)	0	1632	0	0	1789	0	0	1537	0	0	1679	0
Flt Permitted		0.999			0.974			0.983			0.985	
Satd. Flow (perm)	0	1632	0	0	1789	0	0	1537	0	0	1679	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		103.4			96.5			111.2			105.1	
Travel Time (s)		7.8			7.2			8.3			7.9	
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%	11%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%
Adj. Flow (vph)	1	24	16	33	28	0	34	7	58	9	5	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	41	0	0	61	0	0	99	0	0	30	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)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.9%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	373	2
Future Volume (vph)	0	0	0	0	373	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Frt					0.999	
Flt Protected						
Satd. Flow (prot)	1837	918	0	0	4830	0
Flt Permitted						
Satd. Flow (perm)	1837	918	0	0	4830	0
Link Speed (k/h)	48			50	48	
Link Distance (m)	49.2			315.9	75.7	
Travel Time (s)	3.7			22.7	5.7	
Peak Hour Factor	0.70	0.70	0.92	0.92	0.92	0.70
Heavy Vehicles (%)	0%	100%	0%	0%	3%	100%
Adj. Flow (vph)	0	0	0	0	405	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	408	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.3			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	10.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	64	1	217	44	1	342
Future Volume (vph)	64	1	217	44	1	342
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.998		0.975			
Flt Protected	0.953					
Satd. Flow (prot)	1665	0	3165	0	0	3232
Flt Permitted	0.953					
Satd. Flow (perm)	1665	0	3165	0	0	3232
Link Speed (k/h)	48		48			48
Link Distance (m)	118.1		172.4			236.6
Travel Time (s)	8.9		12.9			17.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	7%	10%	0%	8%
Adj. Flow (vph)	70	1	236	48	1	372
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	0	284	0	0	373
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.4%		ICU Level of Service A	
Analysis Period (min) 15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	18	72	35	9	36	48
Future Volume (vph)	18	72	35	9	36	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.892		0.966			
Flt Protected	0.990					0.976
Satd. Flow (prot)	1622	0	1651	0	0	1706
Flt Permitted	0.990					0.976
Satd. Flow (perm)	1622	0	1651	0	0	1706
Link Speed (k/h)	48		48			48
Link Distance (m)	48.3		26.1			111.2
Travel Time (s)	3.6		2.0			8.3
Peak Hour Factor	0.70	0.70	0.92	0.70	0.70	0.92
Heavy Vehicles (%)	0%	0%	10%	0%	0%	10%
Adj. Flow (vph)	26	103	38	13	51	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	129	0	51	0	0	103
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.3		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.3%		ICU Level of Service A	
Analysis Period (min) 15			

APPENDIX G

Synchro Outputs – Future Improvements 2027 Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	28	15	54	14	5	5	12	12	1	8	9
Future Volume (vph)	7	28	15	54	14	5	5	12	12	1	8	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
Hourly flow rate (vph)	8	30	16	59	15	5	5	13	13	1	9	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	54	79	31	20
Volume Left (vph)	8	59	5	1
Volume Right (vph)	16	5	13	10
Hadj (s)	-0.11	0.29	-0.15	-0.07
Departure Headway (s)	4.0	4.4	4.1	4.2
Degree Utilization, x	0.06	0.10	0.04	0.02
Capacity (veh/h)	884	812	847	835
Control Delay (s)	7.2	7.8	7.2	7.3
Approach Delay (s)	7.2	7.8	7.2	7.3
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	20.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	22	15	30	26	0	31	6	53	8	5	15
Future Volume (vph)	1	22	15	30	26	0	31	6	53	8	5	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	24	16	33	28	0	34	7	58	9	5	16

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	41	61	99	30
Volume Left (vph)	1	33	34	9
Volume Right (vph)	16	0	58	16
Hadj (s)	-0.12	0.11	-0.14	-0.26
Departure Headway (s)	4.1	4.3	4.0	4.0
Degree Utilization, x	0.05	0.07	0.11	0.03
Capacity (veh/h)	840	805	866	877
Control Delay (s)	7.3	7.7	7.5	7.1
Approach Delay (s)	7.3	7.7	7.5	7.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.5		
Level of Service	A		
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX H

Parking Demand Survey Memorandum

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Memorandum

To/Attention	Eric Czerniak	**Date**	May 21, 2019
From	Gary Yeung	**Project No**	115096
cc	Scott Johnston		
Subject	Parking Demand & Supply Review		

Introduction

IBI Group has been retained by the City of Hamilton to conduct a parking demand and supply review to aid in the design and environmental assessment study of the new Maintenance and Storage Facility (MSF).

A parking supply approach was developed with findings summarized in this memorandum. The analysis includes a review of the parking demand at the existing Mountain Transit Centre (MTC) facility and a comparison of the employee numbers between the MSF and MTC.

Employee Comparison

Currently, the MTC is the only transit operations and maintenance facility within the City of Hamilton. The MTC employs a total of 762 staffs with details summarized in Exhibit 1.

Exhibit 1: Total Number of Employees between MTC and MSF

Description	MTC*	MSF**	*Difference*
Operations	574	640	+66
Transit IT Costs	5	0	-5
Director of Transit	3	1	-2
Customer Experience & Innovation	8	0	-8
Planning & Infrastructure	16	0	-16
Support Services	15	36	+21
ATS Service Manager	9	0	-9
Transit Maintenance	132	140	+8
Total:	***762***	***817***	***+55***

**MTC values accounts for Full-Time Equivalence*
***Some departments will remain at MTC*

Employee numbers for MTC were provided by the City as part of the 2019 budget. MSF values correspond to the total number of employees taken from the final Space Program (Version 7). These values show that the two facilities are comparable in terms of staff size, therefore, parking supply should also be comparable.

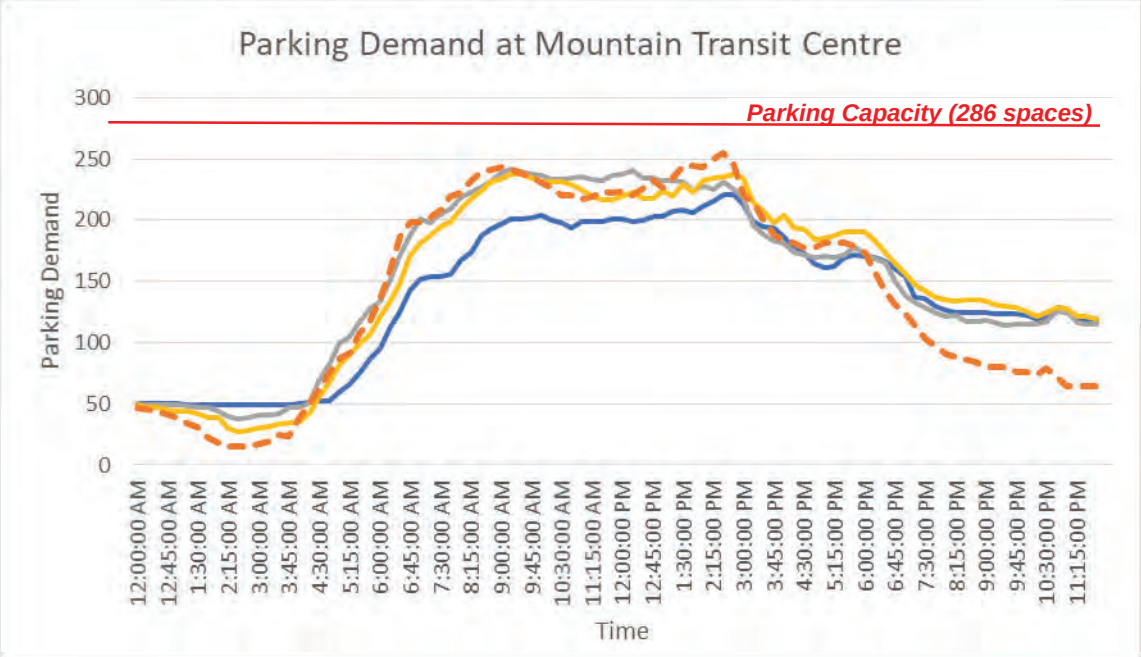
Eric Czerniak – May 21, 2019

Parking Supply and Demand Review

As stated in the *Future Transit Facility Needs Assessment* technical memo submitted to the City, parking space ratios for facility planning typically fall between 0.5 to 0.7 spaces per employee. This parking demand ratio is dependent on several factors including location of the facility, availability of transit service, and shift times. With 762 employees, the MTC currently supplies a total of 286 parking spaces for employees, plus an additional 68 spaces for visitors and commuters at the park-and-ride lot (354 spaces total). This represents a ratio of 0.465 inclusive of the park-and-ride spaces. Despite adding all of the park-and-ride spaces, the ratio is relatively low in comparison (<0.5) and suggest that parking is currently undersupplied at MTC.

To determine the current utilization of MTC, two turning movement counts (TMC) were completed, one for the north and one for the south employee lot. The TMCs capture inbound and outbound vehicle movements which translate to employees parking and leaving. As approved by City of Hamilton staff, the TMC was completed on March 19th (Tuesday) from 12 AM to 12 AM the following day. Furthermore, the City also provided access card data which counts employees' entrance and exit times to/from the parking lots. Only Tuesday, Wednesday and Thursday data were used for the analysis as it is more representative of a typical work week. The parking demands are summarized below in Exhibit 2.

Exhibit 2: Existing Parking Utilization of Mountain Transit Centre



As shown above, a maximum of 255 spaces were occupied on the Tuesday. This represents a maximum utilization rate of 89%, which occurred at approximately 3 PM in the afternoon. This behaviour is expected as operators are needed on the bus before the PM peak for the background traffic (4-6 PM). The result of this analysis shows that the existing site is close to/at capacity. Therefore, the existing low parking ratio of 0.465 seems justified at this location.

For the purpose of determining parking supply of MSF, the above ratio was recalculated to a value of 0.375 (286 spaces / 762 employees) to exclude the park-and-ride spaces. This is to ensure that ratio applied to the final space program employee numbers will not oversupply

parking at MSF as it will not have a park-and-ride facility. It is noted, however that visitors will need to be re-added in later calculations.

As mentioned previously, parking demand is dependent on other factors such as facility location and availability of transit. There are some uncertainty with solely using the 0.375 ratio as the new MSF facility is located closer to the downtown area, whereas the MTC location lies outside the City and out of the way for vehicular traffic, contributing to higher parking demand. Also, the new MSF does not have a park-and-ride facility on site which would better accommodate commuters to take transit to work. Due to these considerations, it is difficult to determine how much the ratio needs to be increased. Therefore, for the design purposes, the approach taken was to apply the MTC parking ratio to the MSF employee numbers and to make additional adjustments as outlined below:

- Based on a background review of similar facilities, it was determined that 15 visitor spaces is sufficient for day-to-day operation. This is to account for visitors that were originally omitted in 0.375 ratio.
- City staff agreed that an additional 10 spaces should be included for supervisor vehicles.
- To design for full build-out conditions, an additional 45 parking spots was added. This symbolizes growth for future employees that will occupy planned vacant office space.
- A supply buffer of 25 additional spaces (approximately 5-10% of supply) was added to accommodate daily demand fluctuations, particularly during the shift change times.

Following this approach, a total of 402 spaces is the recommended minimum parking requirement for MSF, with a parking ratio of 0.492 (402 spaces / 817 employees). Comparing to the typical range, this ratio suggest that parking provision is sustainable and is align with City's goals and objectives by providing minimum parking supply, thereby limiting single occupant vehicles trips. A summary of the parking supply calculation is provided in Exhibit 3.

Exhibit 3: Parking Supply Calculation for MSF

Description	Value / Calculation	# of spaces
Employee (817 total staff)	817 x 0.375	307 (rounded)
Visitor parking	+15	322
Supervisor vehicles	+10	332
Future Growth	+45	377
Supply Buffer	+25	402
Total Parking Supply	**-**	***402 (10 barrier-free)***

**As per Zoning By-law 05-200, barrier-free requirements – minimum 2 spaces + 2% of the total number of required parking spaces.*

Conclusion & Recommendation

In conclusion, it is recommended that the new Maintenance and Storage Facility should provide a minimum of 402 parking spaces, 10 of which are barrier-free. These values should be taken into consideration in determining the final parking design of this facility.