770-774 Bronson Avenue

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

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13 Markham Avenue
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PN: 2020-64

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1 Screening

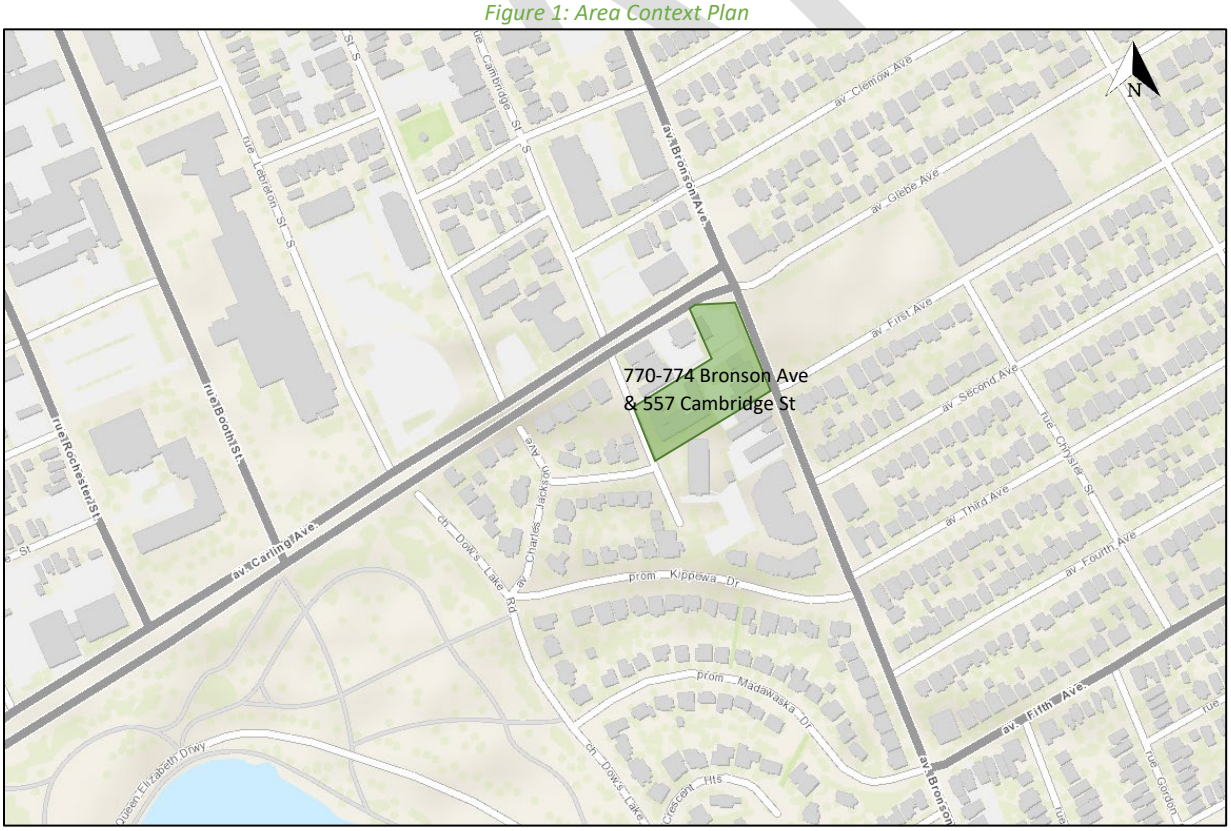
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component. This report accompanies a zoning by-law amendment/site plan application.

2 Existing and Planned Conditions

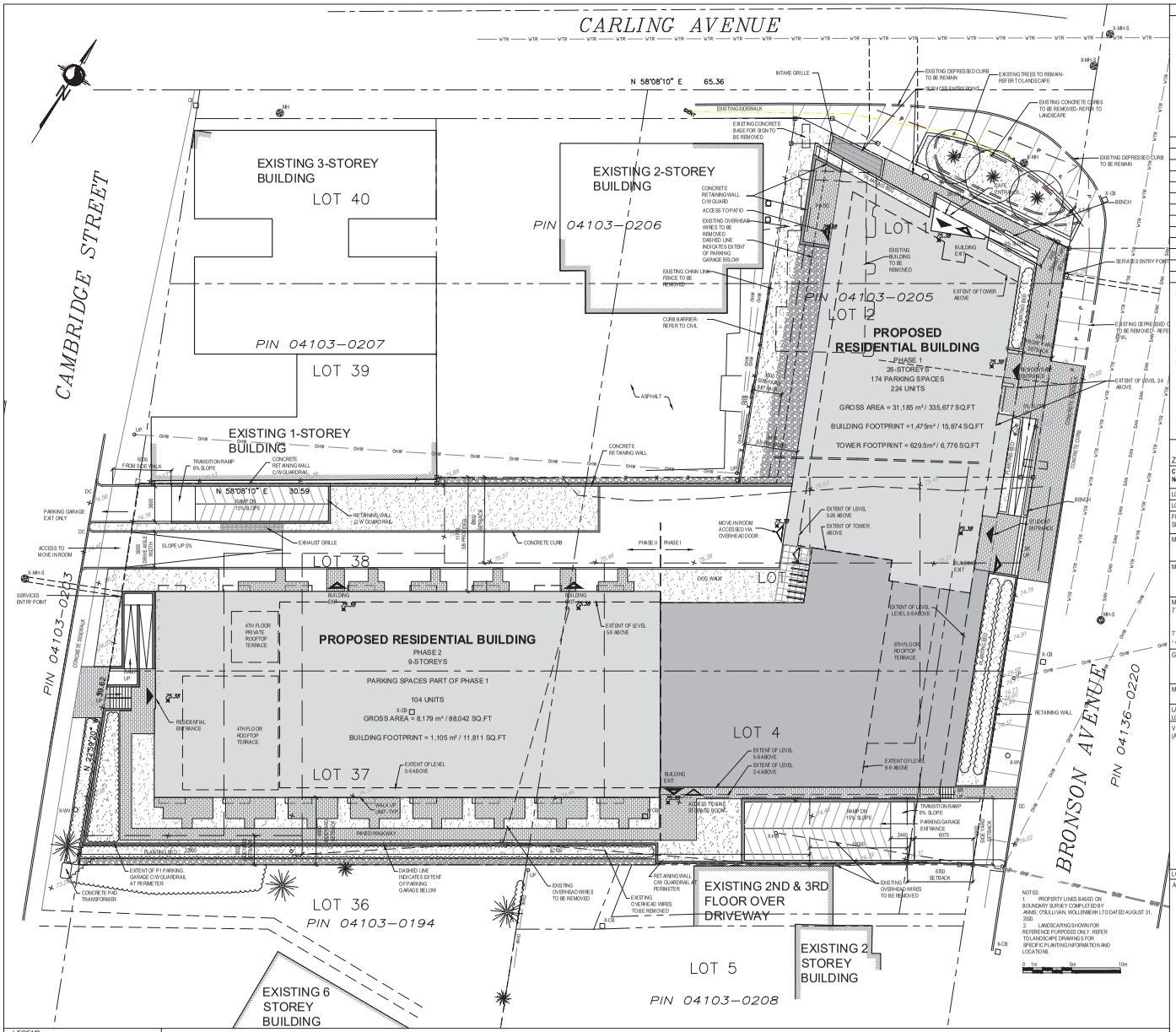
2.1 Proposed Development

The subject property, located at 770-774 Bronson Avenue and 557 Cambridge Street, is zoned as Arterial Mainstreet (AM10[2373], AM1[2003] S296) and is currently undeveloped. The proposed mixed-use development includes a 26-storey residential building on a nine-storey podium, on the northern leg of the property comprising 153 apartment dwelling units and 71 student housing dwelling units to be built-out by 2024, connecting to a nine-storey residential building on the western leg, comprising 104 apartment units to be built-out by 2025. The site is located along both the Bronson Traditional Mainstreet and Carling Arterial Mainstreet design priority corridors. The plan proposes use of an existing full-moves access onto Bronson Avenue and an outlet onto Cambridge Street both accessing underground parking with 174 vehicle parking stalls and 348 bicycle parking stalls and additionally proposes an access adjacent to the outlet onto Cambridge Street, separated by a median, accessing a move-in room. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



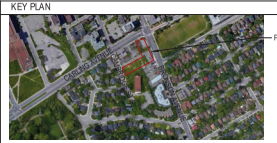
Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 15, 2020



LEGEND

SOFT LANDSCAPING
UNIT PAVERS REFER TO LANDSCAPE
ASPHALT PAVING
RIVERSTONE REFER TO LANDSCAPE
EXISTING BUILDING ELEMENT TO BE REMOVED
EXISTING FENCE
PRIVACY FENCE
LOT LINE
SETBACK LINE
EXISTING TREE TO REMAIN (REFER TO LANDSCAPE DRAWINGS)
NEW TREE (REFER TO LANDSCAPE DRAWINGS)
NEW SHRUBS (REFER TO LANDSCAPE DRAWINGS)
NEW EVERGREEN SHRUB (REFER TO LANDSCAPE DRAWINGS)
EXISTING GROUND ELEVATION (TO DETERMINE EXISTING AVERAGE GRADE)
NEW GROUND ELEVATION REFER TO CIVIL
FIRE DEPARTMENT CONNECTION
DESIGNATED BUILDING ENTRANCE / EXIT
FIRE HYDRANT. REFER TO CIVIL
CATCH BASIN
MANHOLE
FLOOR DRAIN
UTILITY POLE
OVERHEAD UTILITY WIRES
UNDERGROUND POWER
LIGHT STANDARD
NOTE 'X-E' INDICATES EXISTING TO REMAIN
DEPRESSED CURB
TRAFFIC SIGNAL POST

KEY PLAN



PROPERTY DESCRIPTION

26-STOREY MIXED-USE RESIDENTIAL BUILDING

CITY OF OTTAWA PIN NUMBER	04103 0205, 04103 0125, 04 103 0215
MUNICIPAL ADDRESS	770-774 Bronson Avenue & 557 Cambridge Street

PART OF LOTS 1 & 2, ALL OF LOTS 3, 4, 37, & PART OF LOT 38, REGISTERED PLAN 28

SITE INFORMATION

LOT AREA:	4953 m²
LOT FRONTAGE:	64.02 m
LOT DEPTH:	101.5 m

BUILDING INFORMATION

FLOOR AREA:	2,570.5m² (27,669SF) P1- 1,473.2m² (15,858SF) + P2 - 1,104m² (11,811SF)
GROSS AREA:	39,364m² (423,779 SF)
PROPOSED USE:	MIXED-USE RESIDENTIAL, HIGH-RISE

UNIT BREAKDOWN

LVL 1:	13 UNITS
LVL 2-4:	72 UNITS
LVL 5:	18 UNITS
LVL 6-7:	38 UNITS
LVL 8-9:	34 UNITS
LVL 10-26:	153 UNITS
TOTAL:	328 UNITS

	PHASE 1 (224 UNITS TOTAL)		PHASE 2 (104 UNITS TOTAL)	
	STUDENT	RESIDENTIAL	STUDENT	RESIDENTIAL
FLOOR 1:	0	0	0	1 - STUDIO, 11 - 1BD, 1 - 2BD, 0 - 3BD
FLOORS 2-4:	9 - 2BD, 12 - 3BD, 9 - 4BD	0	0	3 - STUDIO, 30 - 1BD, 6 - 2BD, 3 - 3BD
FLOORS 5:	1 - 2BD, 6 - 3 BD, 2 - 4BD	0	0	1 - STUDIO, 6 - 1BD, 2 - 2BD, 0 - 3BD
FLOORS 6-7:	2 - 2BD, 12 - 3 BD, 4 - 4BD	0	0	2 - STUDIO, 14 - 1BD, 4 - 2BD, 0 - 3BD
FLOORS 8-9:	2 - 2BD, 8 - 4 BD, 4 - 4BD	0		2 - STUDIO, 14 - 1BD, 4 - 2BD, 0 - 3BD
FLOORS 10-26:	0	102 - 1BD, 51 - 2 BD		
TOTAL	71	153	0	104

ZONING TABLE

770 Bronson - AM10 [2373]
774 Bronson & 554 Cambridge - AM1 [2003] S296

CITY OF OTTAWA ZONING BY-LAW No. 2008-250	REQUIRED	PROPOSED
LOT AREA	NO MINIMUM	
LOT WIDTH	NO MINIMUM	
FRONT YARD AND CORNER SETBACK	3m	3m ALONG BRONSON AVE. 3m ALONG CARLING AVE.
MINIMUM INTERIOR SIDE YARD SETBACK	ABUTTING RESIDENTIAL ZONE- 3m (LOT 37 - URBAN EXCEPTION 2003) ALL OTHER CASES: 0m	5.69m ALONG WEST OF PHASE 1 11.7m ALONG NORTH OF PHASE 2
MINIMUM REAR YARD SETBACK	RESIDENTIAL USE BUILDING - 7.5m CASE OF BACK TO BACK LOTS - NO MINIMUM	0m
MAXIMUM BUILDING HEIGHT 770 BRONSON - AM 10 [2373] 774 BRONSON & 554 CAMBRIDGE - AM1 [2003], SCHEDULE 296	30m BUT IN NO CASE GREATER THAN 9 STOREYS, OR AS SHOWN ON ZONING MAP (BY-LAW 2015-45) VARIES (SCHEDULE 296)	TOWER 82.2m PODIUM +/- 30m
GROUND FLOOR HEIGHT/GLAZING	MINIMUM OF 50% OF THE SURFACE AREA OF THE GROUND FLOOR FACADE, MEASURED FROM AVERAGE GRADE TO A HEIGHT OF 4.5m	ALONG BRONSON AVE.- 59% ALONG CARLING AVE.- 54%
MAXIMUM FLOOR SPACE INDEX	NONE (AM10 [2373], 3.0 (AM1 [2003])	7.2
LANDSCAPE PROVISIONS FOR PARKING LOTS	N/A	N/A
VEHICLE PARKING REQUIREMENTS (AREA X, SCHEDULE 1A)	RESIDENTIAL: 0.5 /UNIT AFTER FIRST 12 UNITS RESIDENTIAL VISITOR: 0.1/UNIT AFTER FIRST 12 UNITS PHASE 1 [121 SPACES REQUIRED] STUDENT: [29 SPACES] RESIDENTIAL: [70 SPACES] VISITOR- STUDENT: [8 SPACES] VISITOR- RESIDENTIAL: [14 SPACES] PHASE 2 [52 SPACES REQUIRED] RESIDENTIAL: [42 SPACES] VISITOR: [10 SPACES] TOTAL PARKING REQUIRED= [173 SPACES]	RESIDENTIAL PROVIDED: [152 SPACES] VISITOR: [22 SPACES] TOTAL PARKING PROVIDED= [174 SPACES]
LOADING	RESIDENTIAL USE: NONE REQUIRED	N/A
AMENITY AREA REQUIREMENTS	6m² PER DWELLING UNIT (MIN. 50% OF THE REQUIRED TOTAL AMENITY AREA TO BE COMMUNAL AND AT LEAST ONE AREA OF MIN. 54m²) 6m² PER UNIT OF EACH DWELLING UNIT: PHASE 1- 6 X 224= [1,344m²] PHASE 2- 6 X 104= [624m²] TOTAL AMENITY REQUIRED= 1968 m² 50% COMMUNAL REQUIRED = 984 m²	TOTAL AMENITY PROVIDED= 2642 m² TOTAL PHASE 1: [1614m²] TOTAL PHASE 2: [1027m²] PHASE 1-BALCONIES/TERRACES LVL 1- 38m² LVL 11-16 - 60.2m² PHASE 2-BALCONIES/TERRACES LVL 2-4: 210m² LVL 5- 28m² LVL 6-7: 98 m² LVL 8-9: 98m² PHASE 1- COMMUNAL LVL 1: 799m² LVL 8 TERRACE: 71m² ROOF TERRACE: 109m² PHASE 2- COMMUNAL LVL 1: 418m² LVL 5 TERRACE: 184m²
BICYCLE PARKING SPACES	0.5/DWELLING UNIT= 328 X 0.5 [164 SPACES REQUIRED]	TOTAL PROVIDED= [342 SPACES + 6 VISITORS]

No.	Date	Emission / Object
1	2020-10-13	FOR COORD
2	2020-12-10	FOR COORD
3	2021-01-14	FOR COORD
4	2021-02-15	FOR COORD
5	2021-02-18	FOR COORD
-	---	---
-	---	---

Ingénieur / Engineer (Mécanique & Électricité / Mechanical & Electrical)

Ingénieur / Engineer (Structure / Structure)

Architecte / Architect (paysagiste / Landscape)

Gino J. Aiello landscape architect www.GJALA.com
GINO@GJALA.com (613) 858 1345
110 Delsbury Road Unit #91 | Ottawa, Ontario | K2T0C2

Ingénieur / Engineer (Civil / Civil)

Client / Client

KATASA GROUPE ● DÉVELOPPEMENT

Architecte / Architect — Collectif d'architectes / Architects Collective

fig. 1
30 St. Saint-Antoine #3, Montréal QC H4C 1A8
T. 514 861-0123

fig. 2
190 Somerset St W #208, Ottawa ON K2P 0J4
T. 613 869-6123

www.figurr.ca

Sceau / Seal

Note:
L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement le soussigné de toutes erreurs ou omissions.
Contractor to field verify all information on drawings and site and immediately report any errors or omissions to the undersigned.

Projet / Project

26 STOREY APARTMENT BUILDING

770-774 Bronson Avenue & 557 Cambridge Street
Ottawa, ON

Titre / Title

SITE PLAN

Dessiné par / Drawn by	No. projet / Project number	
RD	2025	
Vérifié par / Verified by	No. dessin / Drawing number	Révision / Revision
RC		0
Échelle / Scale		
AS SHOWN		
Date de création du dessin / Drawing creation date		
2020/10/09		A105

2.2 Existing Conditions

2.2.1 Area Road Network

Carling Avenue: Carling Avenue is a City of Ottawa arterial road with a divided six-lane urban cross-section including sidewalks on both sides of the road. The outside lanes are shared transit-bike priority lanes and on-street parking is prohibited within the study area on both sides of the road. The transit lane on the south side of Carling Avenue additionally permits tour bus parking at specified times of year. The posted speed limit is 60 km/h and the Ottawa Official Plan reserves a 44.5 metre right of way within the study area. Carling Avenue is a truck route.

Bronson Avenue: Bronson Avenue is a City of Ottawa arterial road with a four-lane urban cross-section including sidewalks on both sides of the road. Within the study area, stopping regulations alternate between no stopping and stopping prohibited from 7:00 – 9:00am, and 3:30 – 5:30pm during weekdays. The parking regulations during weekdays alternate between no parking and parking prohibited between 9:00am and 3:00 pm. The posted speed limit is 50 km/h and the Ottawa Official Plan reserves a 23.0 metre right of way within the study area. Bronson Avenue is a truck route.

Booth Street: Booth Street is a City of Ottawa major collector road with a two-lane urban cross-section including sidewalks on both sides of the road. On-street parking is permitted on both sides of the road, approximately 30 metres north of Carling Avenue. The unposted speed limit is 50 km/h and the measured right of way is 20.0 metres within the study area. Booth Street is a truck route.

Fifth Avenue: Fifth Avenue is a City of Ottawa collector road with a two shared-lane urban cross-section including sidewalks on both sides of the road. On-Street parking is permitted on the north side of the road, beyond approximately 90 metres east of Bronson Avenue. The posted speed limit is 40 km/h and the measured right of way is 20.0 metres within the study area.

Cambridge Street: Cambridge Street is a City of Ottawa local road with a two-lane urban cross-section including sidewalks on both sides of the road. North of Carling Avenue, on-street parking is permitted on both sides of the road between 7:00am and 6:00pm, (no parking is allowed between December 1st and March 31st). On-street parking is permitted on the east side of the road, and is permitted on the west side of the road from 7:00am and 7:00pm between Carling Avenue and Frederick Place. The unposted speed limit is 50 km/h and the measured right of way is 20.0 metres within the study area.

Powell Avenue: Powell Avenue is a City of Ottawa local road with a two-lane urban cross-section and sidewalks on both sides of the road. On-street parking is permitted on north side of the road west of Bronson Avenue, and on alternating sides of the road to the east. The unposted speed limit is 50 km/h and the measured right of way is 18.0 metres east of Bronson Avenue, and between 14.0 metres and 14.5 metres to the west within the study area.

Glebe Avenue: Glebe Avenue is an eastbound City of Ottawa one-way local road with sidewalks on both sides of the street and eastbound and westbound bike lanes on the south side of the road. On-street parking is permitted on the south side of the road, the posted speed limit is 40 km/h and the measured right of way width is 18.0 metres within the study area.

Madawaska Drive: Madawaska Drive is a City of Ottawa local road with a two-lane urban cross-section and sidewalks on both sides of the street. On-street parking is permitted on both sides of the road, the posted speed limit is 40 km/h and the measured right of way width is 16.0 metres within the study area.

2.2.2 Existing Intersections

The existing study area intersections within 400 metres of the site have been summarized below:

Carling Avenue at Booth Street	The intersection of Carling Avenue at Booth Street is a signalized T-intersection. The southbound approach consists of an auxiliary right-turn lane and a left-turn lane. The eastbound approach consists of an auxiliary left turn lane, two through lanes, and a shared transit/cycle priority lane, and the westbound approach consists of two through lanes and a shared right-turn/transit/cycle priority lane. Westbound U-turns are prohibited at this intersection.
Carling Avenue at Cambridge Street	The intersection of Carling Avenue at Cambridge street is an unsignalized intersection, stop-controlled on the minor approaches. The minor northbound and the southbound approaches each consist of a right-turn lane with the Carling Avenue median preventing through or left-turn movements. The eastbound approach consists of two through lanes and a shared through/right-turn lane, and the westbound approach consists of two through lanes and a shared right-turn/transit/cycle priority lane. No turn restrictions were noted.
Bronson Avenue at Powell Avenue	The intersection of Bronson Avenue at Powell Avenue is a signalized intersection. The northbound and southbound approaches each consist of a shared left-turn/though lane and a shared through/right-turn lane. The eastbound and the westbound approaches each consist of a shared all-movements lane. No turn restrictions were noted.
Bronson Avenue at Carling Avenue / Glebe Avenue	The intersection of Bronson Avenue at Carling Avenue/Glebe Avenue is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane, a left-turn lane, and a shared through/right-turn lane and the southbound approach consists of a through lane and a shared through/right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a shared movement left-turn/through lane, and a right-turn lane and the east leg is inbound only. Southbound left turns are prohibited at this intersection.
Bronson Avenue at Fifth Avenue / Madawaska Drive	The intersection of Bronson Avenue at Fifth Avenue/Madawaska Drive is a signalized intersection. The northbound and southbound approaches each consist of a shared left-turn/through lane and a shared through/right-turn lane, and the eastbound and westbound approaches each consist of a shared all-movements lane. Northbound left turns are prohibited between 7:00am and 9:00am for all but authorized vehicles and bicycles.

2.2.3 Existing Driveways

Along Cambridge Street, a driveway to a private laneway is present directly across from the proposed site access and three driveways to single detached dwellings are on the west side of Cambridge Street and a drop off loop accessing parking to a mid-rise residential building south of the site. Along Bronson Avenue, driveways to residential and commercial land uses are present on both sides of the road within 200 metres of the proposed site access.

2.2.4 Cycling and Pedestrian Facilities

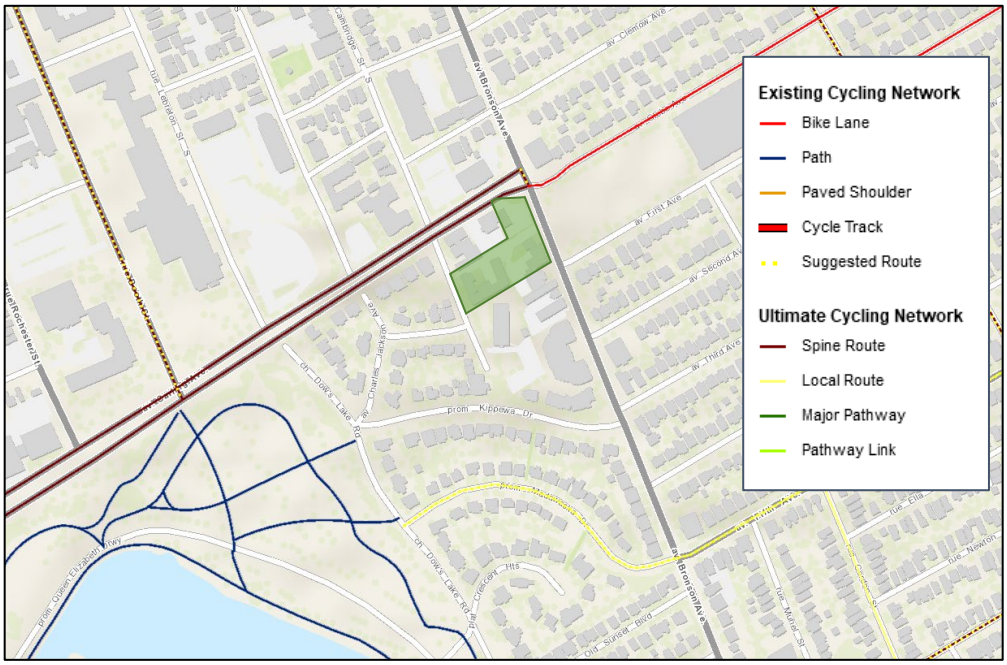
Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities. Sidewalks are provided along both sides of all study area roads. Cycling facilities include separated bike lanes on Glebe

Avenue and cycling paths in the Commissioners Park. In the Ultimate cycling network, Carling Avenue and Booth Street are spine routes and Madawaska Drive/Fifth Avenue is a local route.

Figure 3: Study Area Pedestrian Facilities

Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 8, 2020

Figure 4: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 8, 2020

Additionally, the collected intersection counts presented in Section 2.2.7 provide existing pedestrian and cyclist demands at the five study area intersections for both AM and PM peak hours. Figure 5 illustrates the existing pedestrian volumes and Figure 6 illustrates the existing cyclist volumes within the study area.

Figure 5: Existing Pedestrian Volumes

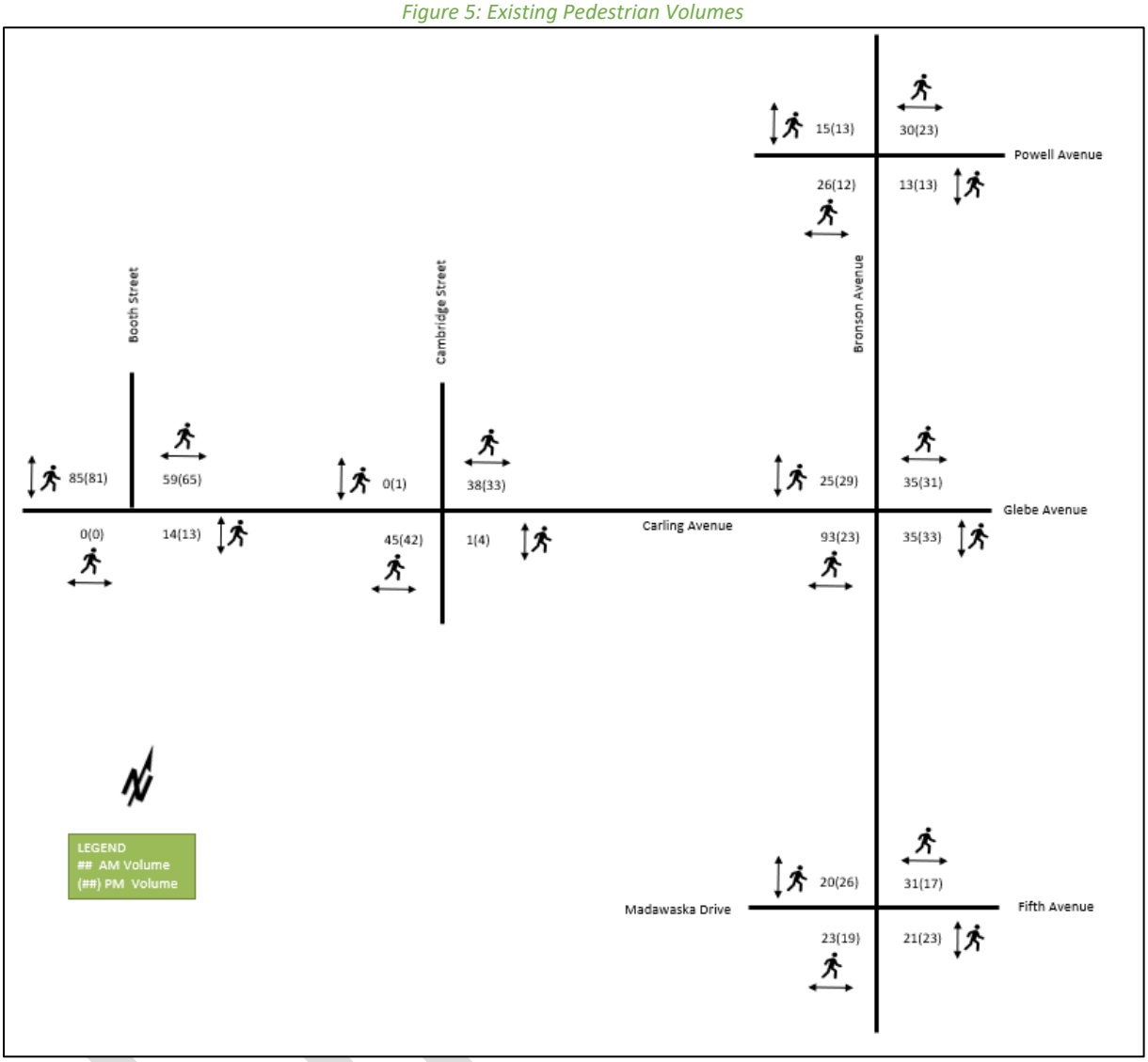
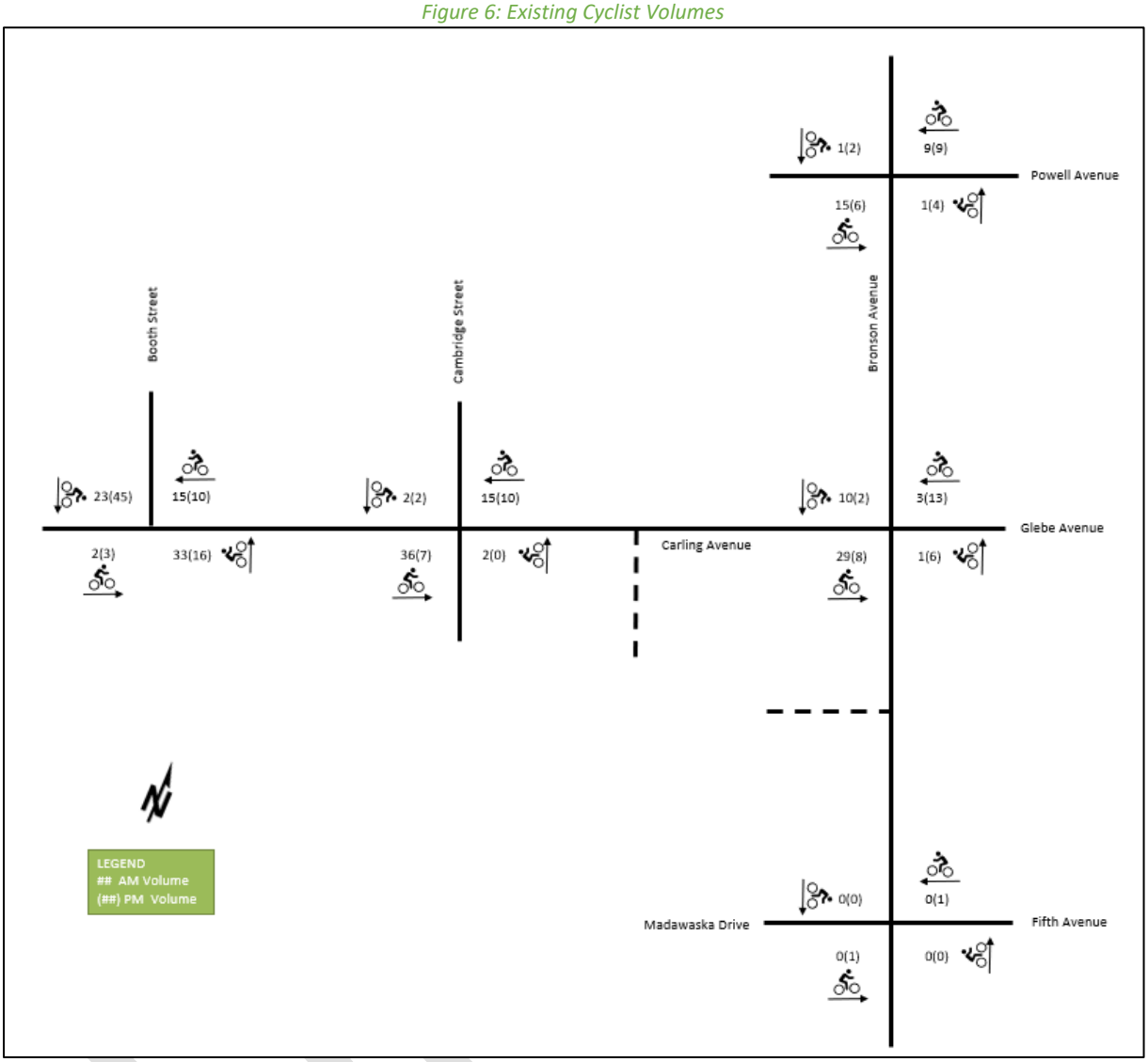


Figure 6: Existing Cyclist Volumes



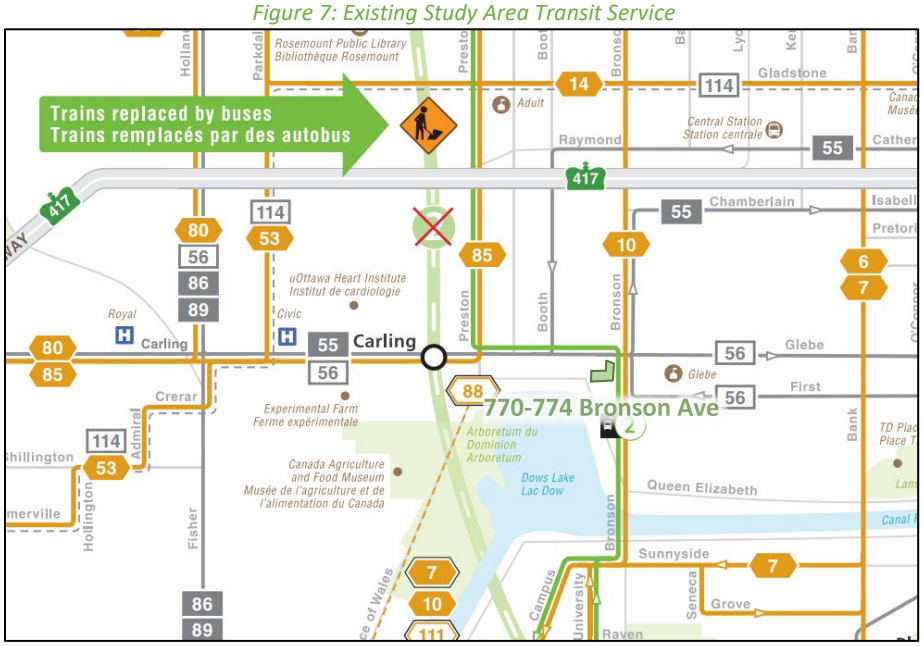
2.2.5 Existing Transit

Within the study area, route #2, 55, and 56 run along Carling Avenue. Route #55 also runs along Booth Street. At Bronson Avenue and Carling Avenue intersection, route #2 turns south and runs along Bronson Avenue, while route #56 continues running east along Glebe Avenue. Route #10 also runs along Bronson Avenue within vicinity of the subject site and the southbound route has a stop that is located within the existing site access. At the time of this report, due to construction, Line 2 LRT had been substituted with bus service. The frequencies of the routes within proximity to the site are:

- Route #2 – 7-10 minute service during peak hours, 10-12-minute service all day
- Route #55 – 15-minute service all day and 30-minute service after 7:00pm
- Route #56 – Operating during peak hours only, 15-minute service in peak direction, 30-minute service in off-peak direction
- Route #10 – 15-minute service all day, 30-minute service after 7:00pm

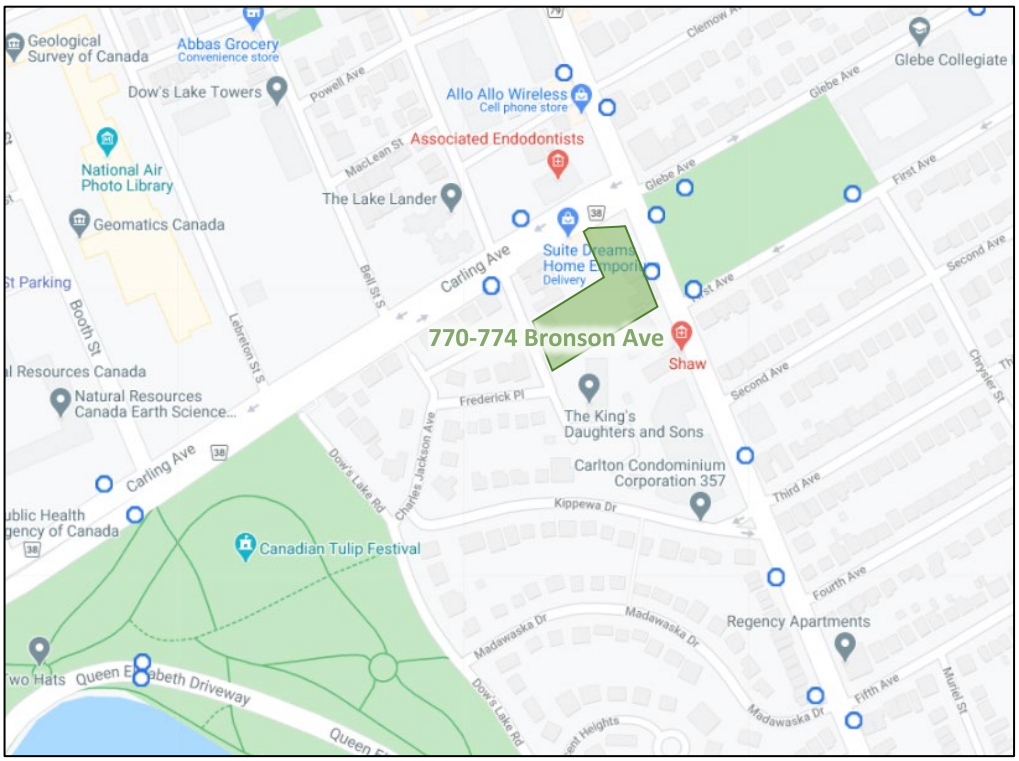
Figure 7 illustrates the transit system map in the study area and Figure 8 illustrates nearby transit stops.

Figure 7: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: October 8, 2020

Figure 8: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: October 8, 2020

2.2.6 Existing Area Traffic Management Measures

On-street parking is prevalent on local roads throughout the study area, bulb-outs are notably found on Cambridge Street at Carling Avenue, mid-block narrowing with alternating parking is found on Powell Avenue, direction control prevents inbound access to Clemow Avenue from Bronson Avenue, an extensive high-visibility gateway

surface treatment is found on Glebe Avenue at Bronson Avenue, a radar speed driver feedback sign on Bronson Avenue southbound and a right-in/right-out island is found on Kippewa Drive at Bronson Avenue.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing study area intersections. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date
Carling Avenue at Booth Street	Thursday, September 12, 2019 Tuesday, July 26, 2016
Carling Avenue at Cambridge Street	Thursday, May 17, 2018
Bronson Avenue at Powell Avenue	Thursday, August 8, 2019 Friday, August 28, 2015
Bronson Avenue at Carling Avenue/Glebe Avenue	Thursday, September 12, 2019 Wednesday, January 10, 2018
Bronson Avenue at Fifth Avenue/Madawaska Drive	Wednesday, January 10, 2018

The volumes within the counts provide are all subject to a number of construction projects that impact that direct applicability of them for the purposes of evaluating as typical conditions and forecasting to future horizons. The long-term construction along Highway 417 and the Bronson rehabilitation and reconstructions have altered the typical travel patterns along Bronson Avenue and Carling Avenue. For example, travel in both directions along Bronson Avenue have been affected, which would put greater demand along Carling Avenue, Booth Street and Powell Avenue. Given these impacts, the counts have been balanced with historic counts to normalize the operations and reflect more typical conditions.

Figure 9 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and HCM 2010 average delay for unsignalized intersections. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 9: Existing Traffic Counts

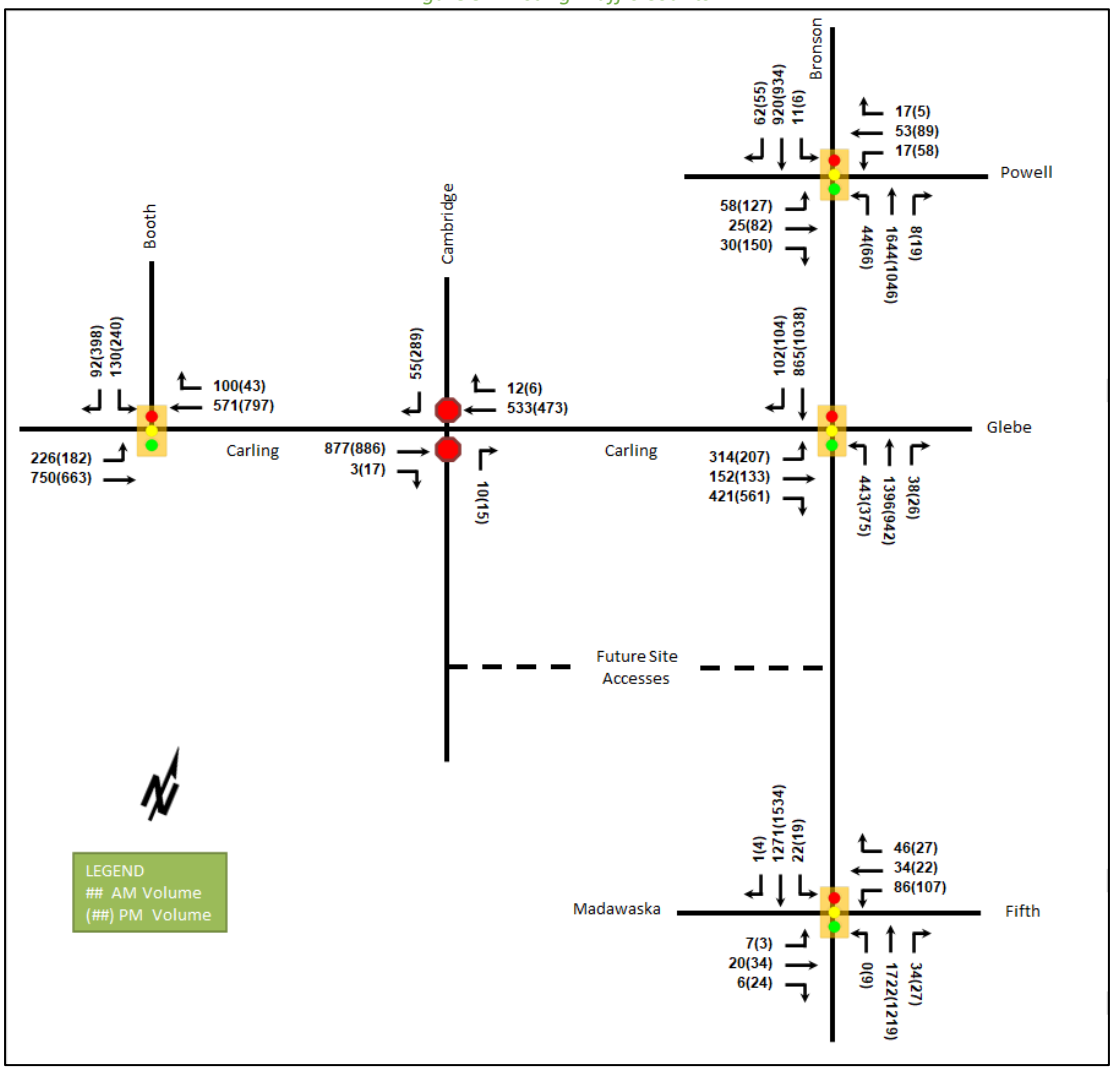


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Carling Avenue at Booth Street *Signalized*	EBL	C	0.80	65.2	82.0	E	0.93	**100.7**	**#97.9**
	EBT	A	0.40	11.9	60.4	A	0.35	10.9	52.7
	WBT/R	A	0.42	27.2	60.1	A	0.42	43.8	91.9
	SBL	A	0.32	37.1	45.1	B	0.63	50.0	90.0
	SBR	A	0.24	7.9	13.1	**F**	**1.09**	**105.2**	**#169.3**
	Overall	**A**	**0.47**	**25.3**	-	**C**	**0.71**	**50.0**	-
Bronson Avenue at Powell Avenue *Signalized*	EB	B	0.70	59.5	40.9	**F**	**1.22**	**163.9**	**#183.2**
	WB	A	0.45	44.5	31.9	A	0.60	53.2	63.2
	NB	D	0.86	36.1	m42.1	C	0.77	21.4	144.5
	SB	A	0.49	6.2	61.7	A	0.54	12.4	87.3
	Overall	**C**	**0.83**	**27.0**	-	**D**	**0.90**	**39.2**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Carling Avenue Street ***Signalized***	EBL	C	0.77	56.7	**#93.8**	B	0.66	51.7	76.2
	EBL/T	C	0.74	53.5	**#92.5**	B	0.63	49.0	77.0
	EBR	C	0.74	28.4	103.4	**F**	**1.08**	**92.1**	**#243.2**
	NBL	C	0.75	37.9	m54.0	D	0.84	62.9	**m#78.6**
	NBT/R	**F**	**1.39**	**204.8**	**#553.6**	D	0.87	28.9	m230.5
	SBT/R	D	0.81	31.4	**#156.3**	C	0.75	20.6	m111.4
	Overall	**F**	**1.33**	**101.5**	**-**	**F**	**1.03**	**42.5**	**-**
Bronson Avenue at Fifth Avenue / Madawaska Drive ***Signalized***	EB	A	0.14	32.6	14.1	A	0.29	39.1	24.9
	WB	C	0.79	63.1	57.8	E	0.95	**106.6**	**#87.3**
	NB	C	0.80	13.6	182.0	A	0.58	7.2	80.1
	SB	B	0.68	5.5	41.6	C	0.73	7.0	m75.4
	Overall	**C**	**0.80**	**14.2**	**-**	**C**	**0.77**	**12.9**	**-**
Carling Avenue at Cambridge Street ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-
	NBR	B	0.03	14.2	0.8	B	0.04	14.6	0.8
	SBR	B	0.10	11.3	2.3	C	0.48	15.3	19.5
	Overall	**A**	**-**	**0.5**	**-**	**A**	**-**	**2.8**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 0.90
m = metered queue
# = queue exceeds storage or mid-block length

The intersection of Carling Avenue and Booth Street shows capacity issues in the PM peak hour, with the eastbound left movement exhibiting high delays and extended queuing as well as the southbound right movement showing as being over capacity with high delays and extended queueing. The southbound right movement's capacity issues are presently exacerbated by the high number of pedestrians using the west crossing the access the eastbound bus stop located on the south side of Carling Avenue. With planned future improvements, impacts from this interaction should be reduced.

During the PM peak hour, the eastbound right at the intersection of Bronson Avenue and Powell Avenue shows as being over capacity. The volume of eastbound left-turning movements impacts performance at this intersection, and if the eastbound approach had an auxiliary left-turn lane and a through/right lane, the v/cs of these lanes would be 0.73 and 0.72 respectively without excessive delay or queuing. Furthermore, during 2019, construction on Bronson Avenue North of Powell Avenue may have resulted in detour volumes in the flow of traffic, thus the operations at this intersection may be slightly better in reality than captured and modelled.

At the intersection of Bronson Avenue and Carling Avenue, during the AM peak hour the eastbound left, the eastbound left/through, the northbound through/right and the southbound through/right movements all exhibit extended queuing and the northbound through/right movement and the overall intersection additionally showing as being over capacity with high delays. Under the previous intersection approach configuration (a northbound auxiliary left-turn lane, a through lane, and a through/right-turn lane) the overall intersection v/c would have been 0.96. During the PM peak hour, the northbound left and eastbound right movement exhibit extended queuing, with the eastbound right movement additionally showing as being over capacity with high delays, and the overall intersection shows as being over capacity.

2.2.8 Collision Analysis

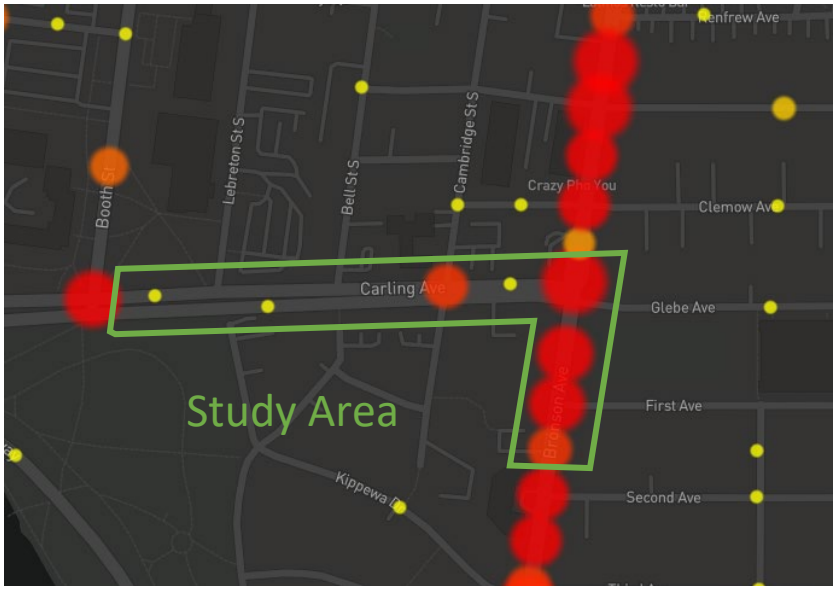
Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network. Table 3 summarizes the collisions

types and conditions in the study area, Figure 10 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2014-2018

		Number	%
Total Collisions		**107**	**100%**
Classification	**Fatality**	1	1%
	Non-Fatal Injury	18	17%
	Property Damage Only	88	82%
Initial Impact Type	**Approaching**	1	1%
	Angled	20	19%
	Rear end	35	33%
	Sideswipe	40	37%
	Turning Movement	5	5%
	SMV Unattended	1	1%
	SMV Other	5	5%
Road Surface Condition	**Dry**	78	73%
	Wet	19	18%
	Loose Snow	6	6%
	Slush	1	1%
	Packed Snow	1	1%
	Ice	2	2%
Pedestrian Involved		3	3%
Cyclists Involved		0	0%

Figure 10: Study Area Collision Records – Representation of 2014-2016



Source: https://maps.bikeottawa.ca/collisions/ Accessed: October 14, 2020

Table 4: Summary of Collision Locations, 2014-2018

Intersections / Segments	Number	%
	107	**100%**
Cambridge St @ Carling Ave	5	5%
Bronson Ave @ Carling Ave/Glebe Ave	53	50%
Bronson Ave @ First Ave	19	18%
Carling Ave btwn Booth St & Cambridge St S	1	1%
Carling Ave btwn Cambridge St S & Bronson Ave	2	2%
Bronson Ave btwn Clemow Ave & Carling Ave	7	7%
Bronson Ave btwn Carling Ave & First Ave	13	12%
Bronson Ave btwn First Ave & Second Ave	7	7%

Within the study area, the intersections of Bronson Avenue at Carling Avenue/Glebe Avenue, and Bronson Avenue at First Avenue as well as the segment of Bronson Avenue between Carling Avenue and First Avenue are noted to have experienced higher collisions than other locations. Table 7, Table 5, and Table 6 summarize the collision types and conditions for each of the locations mentioned above.

Table 5: Bronson Ave @ Carling Ave/Glebe Ave Collision Summary

		Number	%
Total Collisions		**53**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	8	15%
	Property Damage Only	45	85%
Initial Impact Type	**Angle**	6	11%
	Rear end	19	36%
	Sideswipe	22	42%
	Turning Movement	2	4%
	SMV Other	4	8%
Road Surface Condition	**Dry**	38	72%
	Wet	9	17%
	Loose Snow	4	8%
	Slush	1	2%
	Packed Snow	1	2%
Pedestrian Involved		2	4%
Cyclists Involved		0	0%

The Bronson Avenue at Carling Avenue/Glebe Avenue intersection had a total of 53 collisions during the 2014-2018 time period, with 45 involving property damage only and the remaining eight having non-fatal injuries. The collision types are most represented by sideswipe with 22 collisions, rear end with 19 collisions, angled with six collisions, SMV other with four collisions, and turning movement with two collisions. Rear end collisions are generally represented at congested intersections, and sideswipe collisions may be influenced by northbound vehicles caught in the left-turn trap changing lanes to continue through at the intersection. Weather conditions are not considered to impact collisions at this location.

Table 6: Bronson Ave @ First Ave Collision Summary

		Number	%
Total Collisions		**19**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	3	16%
	Property Damage Only	16	84%
	Angle	10	53%

		Number	%
Total Collisions		**19**	**100%**
Initial Impact Type	**Rear end**	1	5%
	Sideswipe	5	26%
	Turning Movement	3	16%
Road Surface Condition	**Dry**	11	58%
	Wet	5	26%
	Loose Snow	2	11%
	Ice	1	5%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Bronson Avenue at Frist Avenue intersection had a total of 19 collisions during the 2014-2018 time period, with 16 involving property damage only and the remaining three having non-fatal injuries. The collision types are most represented by angled with ten, followed by sideswipe with five, turning movement with three, and rear end with one. Angled collisions may be influenced by eastbound right-turning vehicles pushing gaps in the traffic stream, and restricted sight lines on the westbound approach. Conditions could be improved once the corner property redevelops. Weather conditions may influence collisions at this location.

Table 7: Bronson Avenue btwn Carling Ave & First Ave Collision Summary

		Number	%
Total Collisions		**13**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	1	8%
	Property Damage Only	12	92%
Initial Impact Type	**Angle**	1	8%
	Rear end	4	31%
	Sideswipe	7	54%
	SMV Unattended	1	8%
Road Surface Condition	**Dry**	11	85%
	Wet	2	15%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The segment of Bronson Avenue between Carling Avenue and First Avenue had a total of 13 collisions during the 2014-2018 time period, with 12 involving property damage only and the remaining one having non-fatal injuries. The collision types are most represented by sideswipe with seven collisions, followed by rear end with four, angled with one, and SMV unattended with one. Sideswipe collisions may be influenced by northbound vehicles caught in the left-turn trap changing lanes to continue through at Carling Avenue and Bronson Avenue. Weather conditions are not considered to influence collisions at this location.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

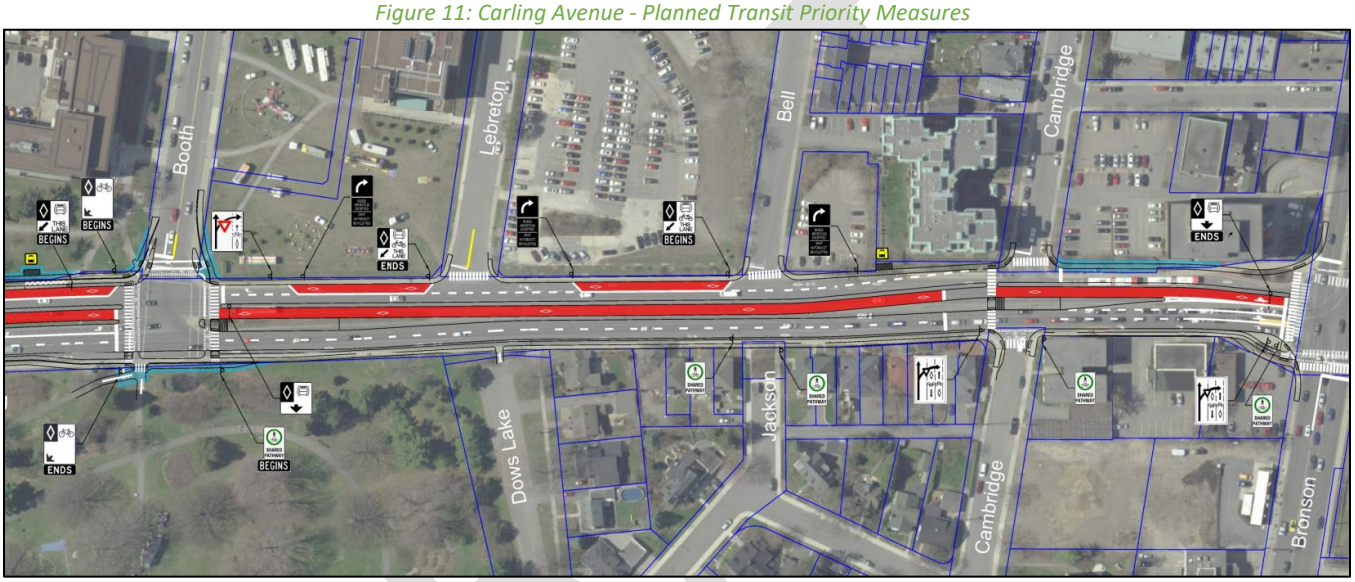
The subject development is located in the Glebe-Dow's Lake neighborhood. Currently, there are no Community Design Plans or Secondary Plans associated with this neighborhood.

Within the Transportation Master Plan, the Rapid Transit and Transit Priority Network's Affordable Network diagram shows isolated transit priority measures on Carling Avenue, east of Booth Street, and Bronson Avenue, south of Carling Street. Furthermore, continuous transit-dedicated lanes would be extended on Carling Avenue,

past Booth Street and towards Edgeworth Avenue. As a result, Carling Avenue will become a major east-west transit link, connecting the study area to western neighborhoods as well as major transit anchor points in future horizons.

The Carling Avenue Transit Priority Measures project includes detailed plans outlining the transit infrastructure proposed along the route. Within the study area, this includes changes to lane configuration at Carling Avenue and Bronson Avenue intersection as well as modifications to Carling Avenue cross-section. The exact timing of the Transit Priority implementation within the study area is not clear, with areas west of the study area slated for implementation by 2023, but the measures to the east have been confirmed by City staff as being implemented after 2031. The proposed plan of the Transit Priority Measures in the vicinity of the site can be seen in Figure 11 and is excerpted from the Carling Avenue Transit Priority Measures Open House from February of 2017.

Figure 11: Carling Avenue - Planned Transit Priority Measures



Source: Carling Avenue Transit Priority Measures Open House (February 2017)

Further, plans are in place to improve operational performance of Highway 417 and Bronson Avenue interchange, to the north of the subject site. As part of this project, the vehicle storage of the eastbound off-ramp at Bronson Avenue will increase.

The proposed development is also located in the Bronson Traditional Mainstreet Design Priority Area. However, currently no transportation projects are ongoing or planned in the vicinity of the subject site.

2.3.2 Other Study Area Developments

567 Cambridge Street

The proposed development application includes a site plan for an addition of a six-storey apartment building with 58 units to an already-existing six-storey apartment building with 70 units (Novatech 2017). No TIA was included as part of this application.

265 Carling Avenue

The proposed development application includes a 20-storey mixed-use building. As part of this development, 168 retirement units, a 1,160 square foot pharmacy and 1,206 square foot hair salon. The development is anticipated to generate 24 new two-way AM peak hour and 36 new two-way PM peak hour auto trips (Parsons 2019).

289 Carling Avenue
The proposed development application includes a site plan for 40 residential units with office support spaces totalling in 1000 square metres of gross floor area. The trip generation trigger was not met at this property, and the traffic generation was deemed have a minimal impact on network intersections (CGH 2019).

7 McLean Street
The proposed development application includes a site plan for a three-storey apartment building, with 7 units and a gross floor area of 600 square metres. No TIA was included as part of this application.

144 Renfrew Avenue
The proposed development application includes a site plan for a three-storey mixed use building. The building will have a total gross floor area of 972 square metres and include commercial use on ground floor and 14 residential units on upper floor. One parking space is proposed as part of this development and no TIA was included as part of this application.

536 Rochester Street
The proposed development application includes a zoning by-law amendment permitting the conversion of existing dwelling use into a restaurant use with seating for approximately 20 customers. No new parking spaces are proposed as part of this zoning by-law amendment. The projected trip generation for this development is 6 PM peak hour vehicle trips (Novatech 2018).

552 Booth Street
The proposed development application includes a zoning by-law amendment permitting the construction of five buildings with approximately 1000 residential units. The proposed development also includes five existing heritage buildings which will consist of retail and office uses and add up to approximately 142,000 square feet (Parsons 2018). The forecasting report for this development is not yet available on the City's online development application search tool and thus, the projected trip generation of this development is unknown at this point in time.

450 Rochester Road
The proposed development application includes an official plan amendment permitting the construction of mixed-use development. This development will include 540 residential units, a 21,550 square foot grocery store, a 12,210 square foot liquor store, 15,062 square feet of retail on the ground floor and a total 10,360 square feet of retail on second and third floors. The development is anticipated to generate 80 new two-way AM peak hour and 75 new two-way PM peak hour auto trips (Parsons 2019).

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Bronson Avenue at:
  - Site Access
  - Powell Avenue
  - Carling Avenue/Glebe Avenue
  - Fifth Avenue/Madawaska Drive
- Carling Avenue at:
  - Booth Street

    - Cambridge Street
- Cambridge Street at Site Access

The boundary roads will be Bronson Avenue and Carling Avenue and screenline 28, while not considered within this TIA, intersects Carling Avenue at Trillium Pathway.

3.2 Time Periods

As the proposed development is composed entirely of residential units the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2025. As a result, the full build-out plus five years horizon year is 2030.

4 Exemption Review

Table 8 summarizes the exemptions for this TIA.

Table 8: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt – trip generation in AM1 and AM10 zoning will not exceed 200 additional person-trips

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle and person trip rates for the high-rise residential building using the TRANS Trip Generation Study Report (2009) and for the student housing component for Off-Campus Student Apartment average rate from the ITE Trip Generation Manual 10th Edition (2017). As the ITE source rates are provided in vehicle trips alone, conversion to person trips is required via the City-prescribed adjustment factor of 1.28. Table 9 summarizes the person trip rates for the proposed land uses.

Table 9: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
High-rise Apartments	222 (TRANS)	AM	0.24	0.65
		PM	0.27	0.68
Off-Campus Student Apartments	225 (ITE)	AM	0.16	0.20
		PM	0.30	0.38

Using the above Person Trip rates, the total person trip generation has been estimated. Table 10 below illustrates the total person trip generation for the High-rise Apartment dwelling units and Off-Campus Student Apartment rooms.

Table 10: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
High-rise Apartments	257	40	127	167	108	67	175
Student Apartments	218	12	32	44	40	43	83

Using the most recent National Capital Region Origin-Destination survey (OD Survey), the existing mode shares for Ottawa Inner have been determined and compared to various modes share breakdowns identified by City Staff as potential interpretations of the data. Finally, a mode share breakdown is provided for the unique land use where the residential housing is purposed for students. Given the provision of a university bus pass and students having lower access to private auto travel, the transit mode has been increased for this component of the development by 10%. Table 11 summarizes these modal shares.

Table 11: Mode Shares

Travel Mode	Ottawa Inner (average)	Ottawa Inner (AM from/within)	Ottawa Inner (PM to/within)	Proposed Student Housing
Auto Driver	40%	35%	35%	25%
Auto Passenger	10%	10%	10%	10%
Transit	25%	20%	20%	30%
Cycling	5%	5%	5%	5%
Walking	20%	30%	30%	30%
Total	100%	100%	100%	100%

Using the above mode share targets for the AM/PM periods for the high-rise component, and the student housing targets for its respective component, and from the person trip rates, the person trips by mode have been projected. Table 12 summarizes the trip generation by mode.

Table 12: Trip Generation by Mode

Travel Mode	Res. Mode Share	Student Mode Share	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Auto Driver	35%	25%	17	52	69	48	34	82
Auto Passenger	10%	10%	5	16	21	15	11	26
Transit	20%	30%	12	35	46	34	26	60
Cycling	5%	5%	3	8	10	7	5	13
Walking	30%	30%	16	48	63	44	33	78
Total	**100%**	**100%**	**52**	**159**	**211**	**148**	**110**	**258**

As shown above, 69 AM and 82 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.2 Trip Distribution

To understand the travel of the subject development, the OD Survey has been reviewed to determine the residential travel patterns for the study area's district, which were applied based on the build-out of Ottawa Inner. Table 13 below summarizes the distributions.

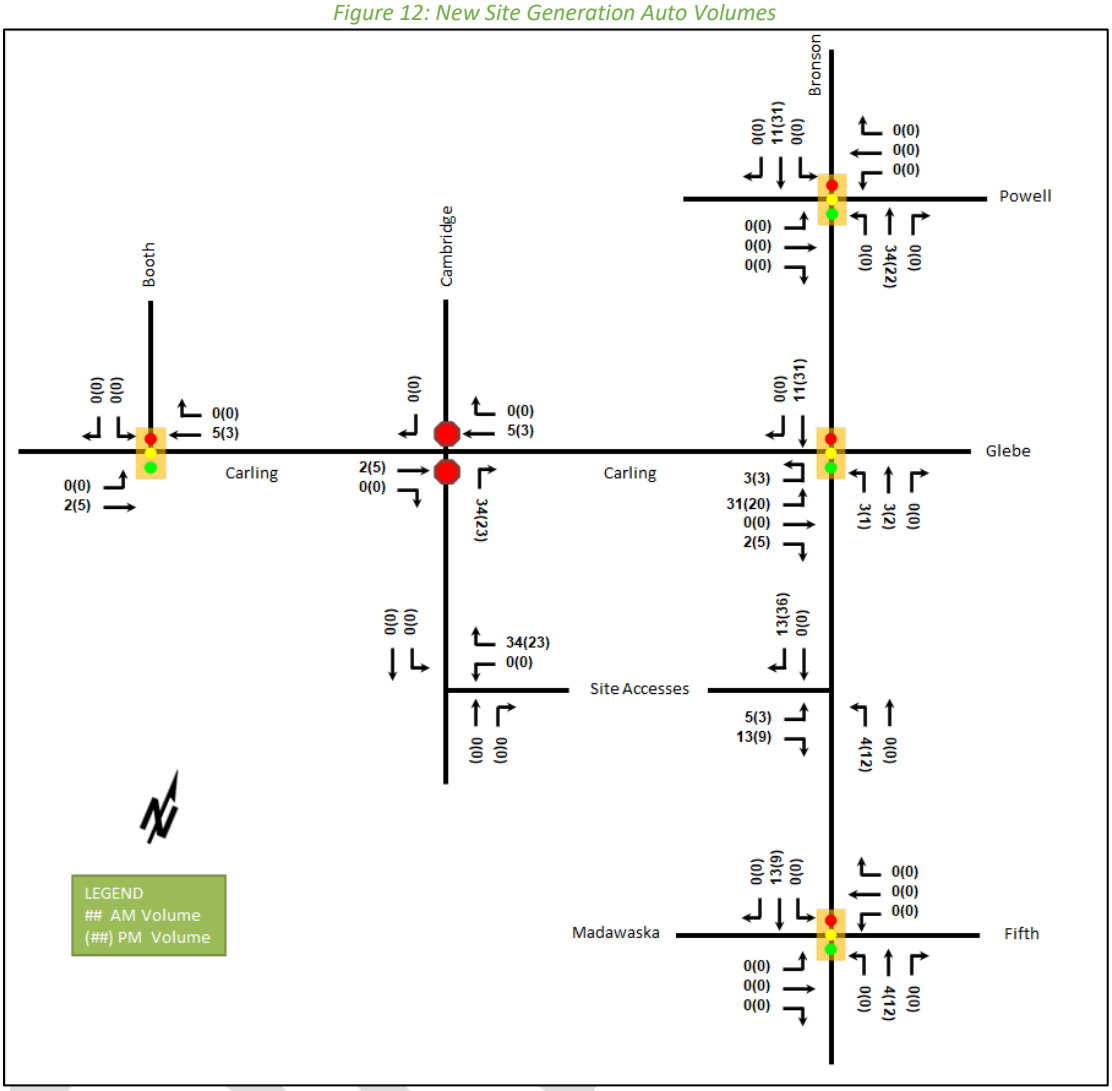
Table 13: OD Survey Distribution – Ottawa Inner

To/From	Residential % of Trips	Via
North	35%	Bronson Ave
South	25%	Bronson Ave
East	20%	Bronson Ave (North)
West	20%	10% Carling Ave, 10% Bronson Ave (North)
Total	100%	-

5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the Study Area road network. Figure 12 illustrates the new site generated volumes.

Figure 12: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. None of the planned improvements are currently scheduled to be completed by the 2030 horizon, which is the furthest horizon analyzed in this TIA.

6.2 Background Growth

A review of the background projections from the City's TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. Table 14 summarizes the results of the model, and the projections are provided in Appendix E. To account for the change in volumes across intersections, the segments of Powell Avenue to the east and west of Bronson Avenue and the segments of Bronson Avenue to the north and south of Carling Avenue will be analyzed and grown as separate entities.

Table 14: TRANS Regional Model Projections – Study Area Growth Rates

Street	Direction Growth Percentage 2011 to 2031		Direction Growth Percentage Existing to 2031	
	Eastbound	**Westbound**	**Eastbound**	**Westbound**
Powell (E)	-2.59%	-1.11%	-0.93%	-13.24%
Powell (W)	5.22%	-	11.27%	-0.54%
Carling	0.94%	0.94%	4.56%	3.51%
Madawaska	N/A	N/A	18.96%	14.30%
Fifth	1.34%	-1.13%	2.57%	-4.97%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Booth	-0.39%	0.68%	5.67%	4.16%
Cambridge	-	-	-	10.48%
Bronson (N)	0.95%	1.22%	-1.19%	1.48%
Bronson (S)	0.44%	1.06%	-0.44%	3.08%

Growth rates from the existing horizon will be peak-directionally applied to appropriate links' mainline volumes and major turning movements, rounded to the nearest 0.25%.

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 6.2) include:

- 265 Carling Avenue
- 536 Rochester Street
- 450 Rochester Road

The developments at 567 Cambridge Street, 289 Carling Avenue, 7 McLean Street, and 144 Renfrew Avenue are considered to be negligible and will be accounted for though the background growth rates, and no TIA is currently available for the development at 552 Booth Street. The background development volumes within the study area have been provided in Appendix F.

7 Demand Rationalization

7.1 2025 Future Background Operations

Figure 13 illustrates the 2025 background volumes and Table 15 summarizes the 2025 background intersection operations. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and HCM average delay for unsignalized intersections. The synchro worksheets for the 2025 future background horizon are provided in Appendix G.

Figure 13: 2025 Future Background Volumes

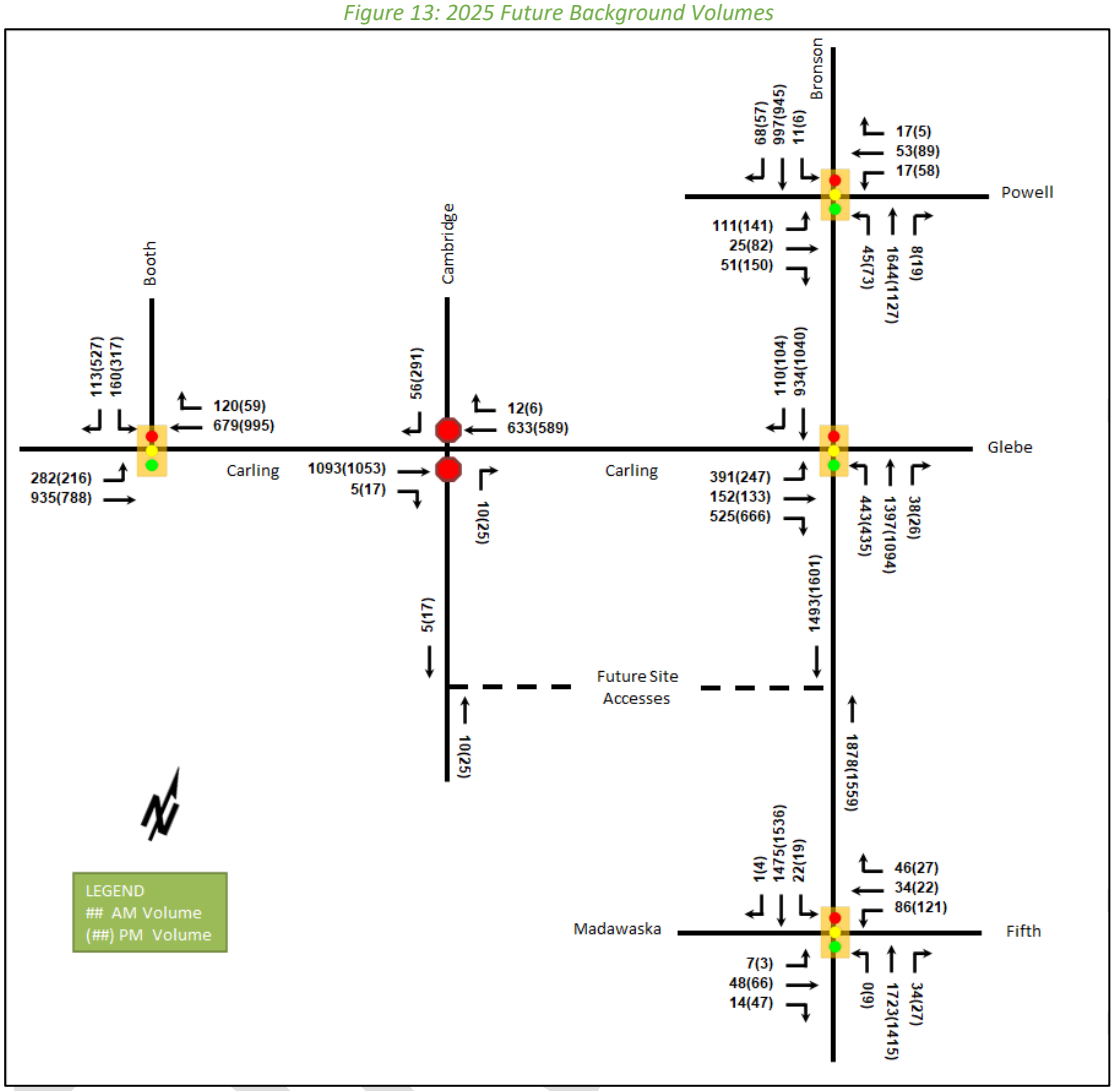


Table 15: 2025 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Carling Avenue at Booth Street *Signalized*	EBL	D	0.84	67.3	**#93.1**	E	0.99	**114.8**	**#106.4**
	EBT	A	0.45	12.5	70.3	A	0.37	11.2	57.1
	WBT/R	A	0.46	28.8	65.0	A	0.48	40.0	102.0
	SBL	A	0.36	37.8	49.8	C	0.74	56.0	108.8
	SBR	A	0.26	7.8	13.6	**F**	**1.33**	**198.1**	**#224.2**
	Overall	**A**	**0.53**	**26.5**	-	**D**	**0.84**	**68.2**	-
Bronson Avenue at Powell Avenue *Signalized*	EB	D	0.86	74.9	**#71.3**	**F**	**1.14**	**135.9**	**#167.9**
	WB	A	0.33	38.5	29.0	A	0.52	49.1	55.9
	NB	C	0.80	15.8	m48.2	C	0.73	19.9	34.6
	SB	A	0.49	7.2	59.1	A	0.49	11.6	75.9
	Overall	**D**	**0.81**	**17.0**	-	**D**	**0.84**	**34.2**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Carling Avenue Street ***Signalized***	EBL	D	0.87	68.3	**#102.4**	C	0.78	61.8	m74.3
	EBL/T	D	0.82	61.8	**#98.4**	C	0.74	56.8	m75.2
	EBR	D	0.89	43.3	109.4	**F**	**1.23**	**149.1**	**#212.9**
	NBL	B	0.68	36.2	50.8	C	0.75	53.9	**m#83.2**
	NBT/R	**F**	**1.22**	**136.7**	**#478.8**	D	0.87	27.4	**m#250.0**
	SBT/R	C	0.76	28.1	**#148.9**	B	0.68	18.6	m79.7
	Overall	**F**	**1.22**	**75.1**	**-**	**F**	**1.04**	**52.7**	**-**
Bronson Avenue at Fifth Avenue / Madawaska Drive ***Signalized***	EB	A	0.27	35.9	22.7	A	0.49	49.2	41.9
	WB	C	0.75	59.6	51.3	**F**	**1.19**	**180.5**	**#97.0**
	NB	C	0.71	10.4	141.7	A	0.60	7.4	85.7
	SB	B	0.68	5.6	50.3	B	0.66	6.2	m67.6
	Overall	**C**	**0.72**	**11.2**	**-**	**C**	**0.75**	**17.3**	**-**
Carling Avenue at Cambridge Street ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-
	NBR	C	0.03	15.1	0.8	C	0.07	15.3	1.5
	SBR	B	0.09	11.5	2.3	C	0.46	15.3	18.0
	Overall	**A**	**-**	**0.4**	**-**	**A**	**-**	**2.4**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

During both the AM and PM peak hours, existing capacity issues at the study area intersections are exacerbated by area growth. The operational changes from the existing conditions are noted below.

The intersection of Carling Avenue and Booth Street is forecasted to exhibit extended queuing on the eastbound left movement during the AM peak hour and this movement is forecasted to be at capacity during the PM peak hour.

Similarly, the intersection of Bronson Avenue and Powell Avenue, the eastbound movement is forecasted to exhibit extended queuing during the AM peak hour.

Operational issues are forecasted to persist at the intersection of Bronson Avenue and Carling Avenue, and specifically, during the PM peak hour, the northbound through/right movement is forecasted to exhibit extended queuing and the eastbound right movement is forecasted to see its v/c, queuing and delays worsen at this horizon.

The intersection of Bronson Avenue at Fifth Avenue/Madawaska drive is forecasted to see the westbound movement become over capacity during the PM peak hour due to area growth.

7.2 2030 Future Background Operations

Figure 14 illustrates the 2030 background volumes and Table 16 summarizes the 2030 background intersection operations. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and HCM average delay for unsignalized intersections. The synchro worksheets for the 2030 future background horizon are provided in Appendix H.

Figure 14: 2030 Future Background Volumes

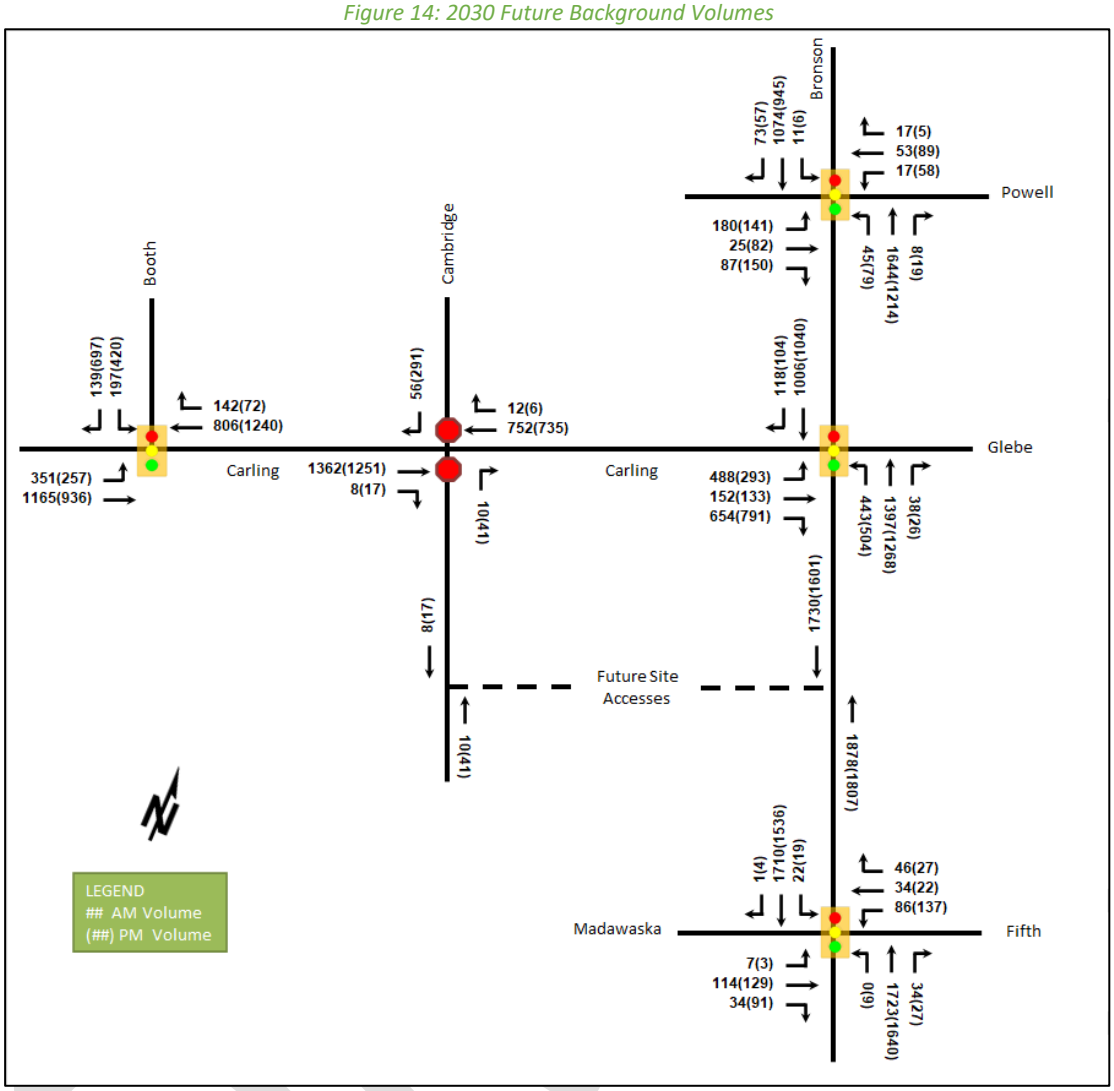


Table 16: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Carling Avenue at Booth Street *Signalized*	EBL	E	0.93	78.3	**#134.2**	**F**	**1.18**	**165.9**	**#131.4**
	EBT	A	0.57	14.2	95.6	A	0.44	12.0	71.1
	WBT/R	A	0.59	32.6	79.3	A	0.59	43.7	m126.6
	SBL	A	0.44	39.6	60.6	E	0.99	**88.1**	**#172.2**
	SBR	A	0.31	7.5	15.0	**F**	**1.82**	**407.4**	**#328.8**
	Overall	**C**	**0.64**	**29.9**	-	**F**	**1.10**	**119.3**	-
Bronson Avenue at Powell Avenue *Signalized*	EB	**F**	**1.23**	**172.4**	**#127.6**	**F**	**1.14**	**135.9**	**#167.9**
	WB	A	0.30	37.5	29.0	A	0.52	49.1	55.9
	NB	D	0.83	31.6	m60.0	C	0.80	30.3	m119.8
	SB	A	0.54	8.3	66.0	A	0.49	11.6	75.9
	Overall	**E**	**0.91**	**36.1**	-	**D**	**0.89**	**38.5**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Carling Avenue ***Signalized***	EBL	E	0.96	**83.4**	**#127.7**	D	0.84	64.7	m77.0
	EBL/T	E	0.93	75.6	**#126.5**	C	0.80	58.9	m76.8
	EBR	E	0.97	55.4	**#206.0**	**F**	**1.46**	**244.8**	**m#265.0**
	NBL	A	0.56	29.5	50.8	D	0.90	63.5	**m#103.4**
	NBT/R	**F**	**1.25**	**147.0**	**#479.1**	**F**	**1.02**	**68.1**	**m#426.6**
	SBT/R	E	0.95	44.5	**m#162.6**	B	0.68	18.6	m79.4
	Overall	**F**	**1.26**	**84.1**	**-**	**F**	**1.23**	**86.9**	**-**
Bronson Avenue at Fifth Avenue / Madawaska Drive ***Signalized***	EB	A	0.54	44.3	47.1	E	0.94	**94.7**	**#101.1**
	WB	D	0.88	79.3	**#63.6**	**F**	**2.78**	**859.7**	**#128.3**
	NB	C	0.73	11.6	141.7	B	0.69	9.0	114.4
	SB	C	0.80	8.8	m193.4	B	0.67	7.0	m71.5
	Overall	**D**	**0.81**	**14.6**	**-**	**F**	**1.03**	**56.8**	**-**
Carling Avenue at Cambridge Street ***Unsignalized***	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-
	NBR	C	0.03	17.5	0.8	C	0.13	17.8	3.0
	SBR	B	0.10	12.2	2.3	C	0.51	17.7	21.8
	Overall	**A**	**-**	**0.4**	**-**	**A**	**-**	**2.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

During both the AM and PM peak hours, the study area intersection operations are forecasted to degrade from the existing and 2025 future background conditions with area growth. The operational changes from the 2025 background conditions are noted below.

The intersection of Carling Avenue and Booth Street during the PM peak hour is forecasted to see the eastbound left movement become over capacity with longer delays and further extended queues, the southbound left movement is forecasted to see high delays and extended queues with the movement at capacity, and the southbound right movement is forecasted to see v/c, delay, and queuing degrade, with the overall intersection over capacity at this horizon. The eastbound left-turn can be reduced to a v/c of 1.00 with an additional 3 seconds allocated to the protected phase.

The intersection of Bronson Avenue and Powell Avenue during the AM peak hour shows the eastbound movement as over capacity with high delays and further extended queuing, where operations are forecasted to resemble existing PM peak hour conditions on this movement.

The intersection of Bronson Avenue and Carling Avenue during the AM peak hour shows the eastbound left movement experience high delay and the eastbound right movement exhibit extended queuing, where all movements but the northbound left (LOS A) and northbound through/right (LOS F) operate with LOS E at this horizon. During the PM peak hour at this intersection, the northbound through/right movement is over capacity with further extended queuing, capacity issues worsen for the eastbound right movement, and high average delay at the overall intersection.

The intersection of Bronson Avenue and Fifth Avenue/Madawaska Drive is forecasted to exhibit extended queuing on the westbound movement during the AM peak hour, and during the PM peak hour the overall intersection is over capacity with the westbound movement seeing capacity issues deteriorate. The decreasing operations are a result of the growth along Madawaska Drive towards Bronson Avenue, which is assumed to be cut through from Queen Elizabeth Drive. If this movement is to be permitted in the future background conditions, additional time

in the form of a protected westbound left-turn phase may address capacity concerns at the intersection, although may subsequently result in additional traffic utilizing this route. The intersection should be monitored by City staff.

The planned improvement of transit in the study area may mitigate some of the area capacity issues once implemented. The City will need to review the Carling Avenue improvements within the new TMP and the impacts on the surrounding area to continue the mode share shifts to transit.

7.3 Modal Share Sensitivity

Capacity constraints are noted to be present at the intersections of Bronson Avenue and Carling Avenue and Bronson Avenue and Powell Avenue. The development is anticipated to have a fraction of the net traffic increase on the surrounding network (e.g. eastbound Carling Avenue will see an approximately 230 vehicle increase by 2030 from background growth, and the development is forecasted to produce 70 total two-way auto trips during the AM peak). As the background conditions operate in a similar manner to the existing conditions, the sensitivity of additional auto trips from the propose development is anticipated to have minimal impacts. Regardless of the sensitivity, transportation demand management measures will be required to further reinforce the target modal splits until such time the City expands the bus lanes along Carling Avenue. No further rationalization of the proposed modal shares is considered to be required.

7.4 Network Demand Rationalization

The network volumes illustrate a number of background constraints along Bronson Avenue and Carling Avenue. Specifically, the following locations are noted to have capacity constraints in the existing or are forecasted to become constrained by 2030:

- Booth Street:
  - Southbound right-turn at Carling Avenue during the PM peak
- Bronson Avenue:
  - Northbound through/right-turn at Carling during the AM and PM peaks
- Carling Avenue:
  - Eastbound left-turn at Booth Street during the PM peak
  - Eastbound right-turn at Bronson Avenue during the PM peak
- Fifth Avenue:
  - Westbound approach at Bronson Avenue during the PM peak
- Powell Avenue:
  - Eastbound approach at Bronson Avenue during the PM peak

The volumes forecast on Booth Street will at the roadway capacity by 2030, as shown in the existing and background volume figures. The use of Booth Street as an alternate route to a signalized intersection on Carling Avenue, and its connection under Highway 417 make Booth Street a key connection in the area. The redevelopment of the area will also contribute to the near capacity volumes, although no factor has been applied to assess a potential reduction of the existing trips as travel along the corridor becomes more congested with local volumes. A reduction of approximately 130 vehicles from the southbound right-turn would reduce the v/c of the movement to 1.00. It is also noted that the volumes may reflect higher than normal turning movements as drivers have avoided the long-term construction along Highway 417, including various overpass replacements, widening and pre-widening projects, and the City's Jackie Holzman Bridge. The volumes may naturally reduce as travel patterns normalize and the barriers to previous routes have been removed. This intersection can be monitored by the City for operational adjustments, reviewed during the transit priority projects, and through adjacent developments applications to provide local improvements.

The volumes along Bronson Avenue are consistent with a 4-lane arterial roadway and, as shown at the adjacent intersections, can be supported. The northbound through/right-turn has be constrained by the re-allocation of the second through lane to a left-turn lane by the City. The City's change in lane arrangement effectively keepings the left-turn queue within a designated left-turn lane and eliminates the spill back previous experienced at this intersection into the through lanes. As this is an operational choice by the City, no further rationalization of the volumes on Bronson Avenue is required.

Carling Avenue eastbound left-turn at Booth Street is noted in Section 7.2 to require an additional 3 seconds or more to reduce the v/c to 1.00 or lower. The eastbound right-turn at Bronson Avenue is currently over capacity and will continue to be a primary movement for the eastbound approach. Given the existing and 2030 future background volumes, the City will need to provide alternative routes or reduce the auto demand along Carling Avenue by 290 vehicles to maintain existing operations. With the completion of the Highway 417 projects, a shift of volumes to the southbound approach on Bronson Avenue may be realized and use the residual capacity for southbound travel.

The Fifth Avenue westbound approach constraints at Bronson Avenue are a result of the City's TRANS growth forecasts on Madawaska Drive, presumably from cut through traffic from Queen Elizabeth Driveway. The westbound left-turn movement will have limited gaps to turn in this growth is realized. Any growth along Madawaska Drive will compromise the westbound approach and will need to be restricted from cutting through in the future.

The eastbound approach of Powell Avenue at Bronson Avenue is used as a cut through route from Highway 417 to Bronson Avenue using the Rochester Street off-ramp and traveling via Orangeville Street to Bell Street to Powell Avenue. Alternatively, some vehicles also detour via Plymouth Street to Cambridge Street to avoid Bell Street congestion or cut into the extended queueing along Powell Avenue. With the completion of the Highway 417 projects, a shift of volumes to the Bronson Avenue off-ramp may be realized and remove both the left-turn and right-turn movements from Powell Avenue. The further improvements along Chamberlain Street may also contribute to a shifting of these volumes as the Highway 417 off-ramp and intersection on Bronson Avenue is improved.

Overall, Powell Avenue, Booth Street and Madawaska Drive should be monitored by the City to determine if the travel patterns normalize as the Highway 417 construction activities have been completed and once Covid conditions are lifted. If the volumes do not shift to routes with residual capacity (e.g. eastbound right-turn on Carling Avenue to southbound through on Bronson Avenue), then the City will need to pursue additional modal shift programs to ease the forecasted burden and maintain existing volumes in the area.

8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a mixed-use building with vehicle parking located underground and bicycle parking, located both on the ground floor and underground. Hard surface connections are provided between proposed building entrances on each side of the building, which connect to surrounding pedestrian facilities. The bus stop along Bronson Avenue will be shifted north of the proposed access and be in proximity to the main entrance, although given the limited right-of-way for expansion to City standards it will remain as a post and sign.

8.2 Circulation and Access

Vehicle access is proposed through a full-movement access onto Bronson Avenue and a one-way outbound onto Cambridge Street. A move-in access is proposed in parallel with the one-way outbound garage access, and would function as a two-way access with limited volumes.

Garbage storage is internal to the building, and collection will occur along Cambridge Street. Emergency services are assumed to be able to access the site via the three public rights of way.

9 Parking

9.1 Parking Supply

The site proposes a total of 174 vehicle parking spaces, and 348 bicycle parking spaces, including six bike spaces for visitors.

As all parking is located underground, the by-law requirement for parking is 138 vehicle spaces for tenants (64 for apartment units in phase 1, 42 for apartment units in phase 2, and 32 for student units in phase 1), 32 vehicle spaces for visitors (14 for apartment units in phase 1, ten for apartment units in phase 2, and eight for student units in phase 1), and 164 bicycle parking spaces (77 for apartment units in phase 1, 52 for apartment units in phase 2, and 35 for student units in phase 1).

The total minimum total parking vehicle parking is 170 which is being met, and the minimum total bicycle parking is more than doubled by the proposed development.

10 Boundary Street Design

Table 17 summarizes the MMLOS analysis for the boundary streets of Cambridge Street, Carling Avenue, and Bronson Avenue. The existing and future conditions for both streets will be the same and are considered in one row. The boundary street analysis is based on the policy area of "Within 300m of a school" for the segments of Carling Avenue and Bronson Avenue, as they are within this distance Glebe Collegiate Institute, and for the land use designation of "General Urban Area" for the segment of Cambridge Street. The MMLOS worksheets has been provided in Appendix I.

Table 17: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Cambridge Street	C	C	A	D	N/A	N/A	N/A	N/A
Carling Avenue	F	A	F	C	D	D	A	D
Bronson Avenue	F	A	E	D	D	D	A	D

Carling Avenue and Bronson Avenue do not meet the pedestrian and cycling MMLOS targets. As is typical throughout the city, the operating speeds and volumes along arterials prevent any sidewalk configuration from meeting targets. Bicycle LOS is limited by mixed traffic conditions as the shared bike/transit lane on Carling Avenue terminates upstream of the site frontage and becomes a right-turn lane, and Bronson Avenue does not have dedicated cycling facilities. To meet targets Carling Avenue and Bronson Avenue would each require at minimum a curbside bike lane to meet the BLOS targets. The remaining MMLOS targets are being met.

11 Access Intersections Design

11.1 Location and Design of Access

The proposed access will be located at the southern limits of the 774 Bronson Avenue parcel and consist of a 6.0-metre two-way full-movement access onto Bronson Avenue. The existing access on Cambridge Street will be expanded to permit the move-in location and consists of a 3.6-metre outbound lane and 3.6-metre full-movement move-in access separated by an approximate 1.0-metre median.

The existing driveway at the north limit of the 774 Bronson Avenue parcel and 770 Bronson Avenue will be removed and reinstated as full height curb.

Due to the proximity of the Bronson Avenue access to the southern property limits, and the less than 2.0-metre separation of the Cambridge Street accesses, private approach by-law exemptions will be required. In addition, the ramp for the underground parking on Cambridge Street is located within 6.0 metres of the property line and will require a private approach by-law exemption. A 6.0 metre setback from the sidewalk has been provide.

11.2 Intersection Control

The site access intersections are assumed to be stop controlled on the minor approach with Bronson Avenue and Cambridge Street operating under free-flow conditions.

11.3 Access Intersection Design

11.3.1 2025 Future Total Access Intersection Operations

The 2025 future total intersection volumes are illustrated in Figure 15 and the access intersection operations are summarized below in Table 18. The level of service is based on HCM average delay for unsignalized intersections. The synchro worksheets have been provided in Appendix J.

Figure 15: 2025 Future Total Volumes

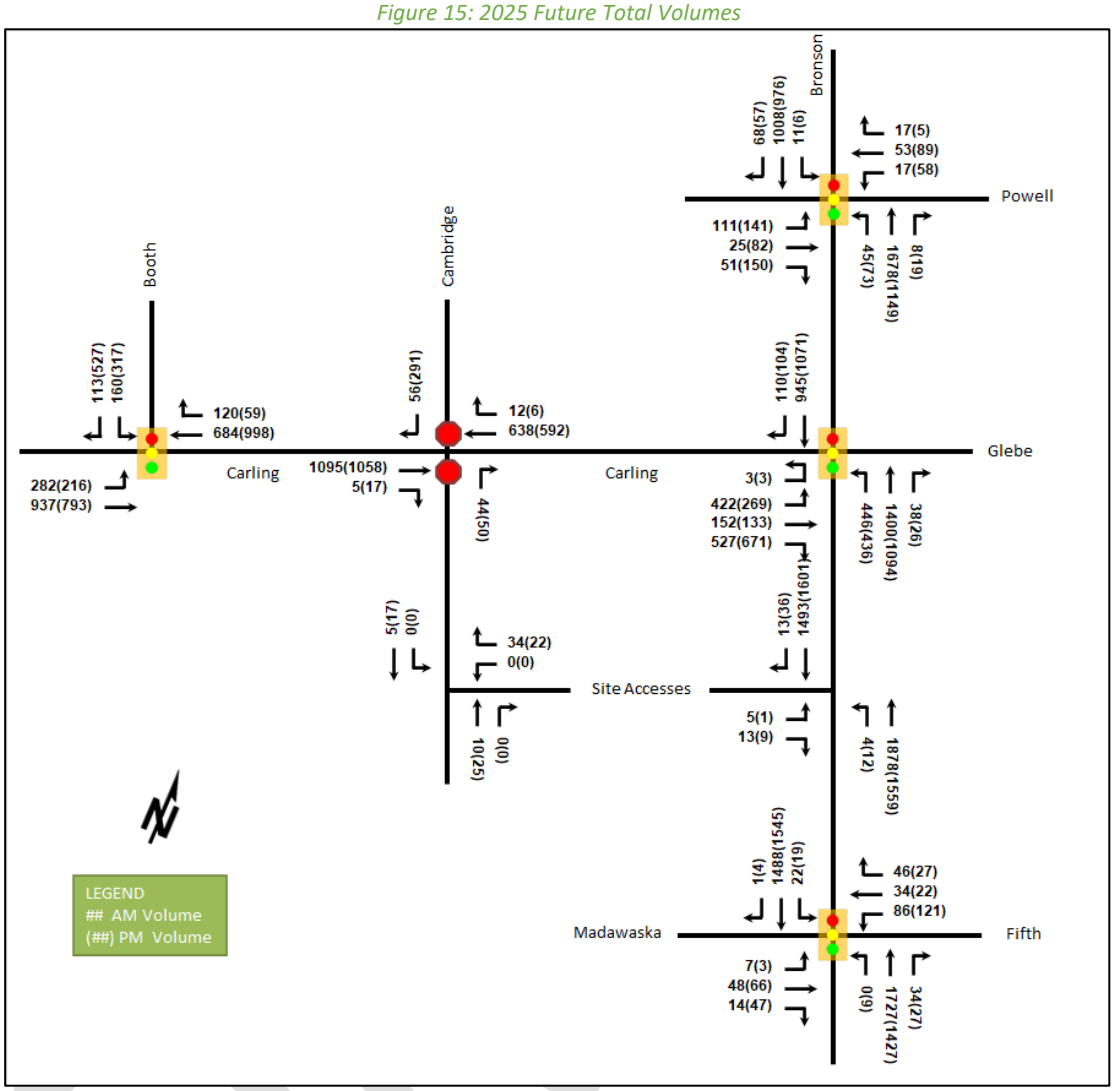


Table 18: 2025 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Cambridge Street at Site Access *Signalized*	WBL/R	A	0.03	8.5	0.8	A	0.02	8.5	0.8
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**5.9**	**-**	**A**	**-**	**3.0**	**-**
Bronson Avenue at Site Access *Signalized*	EBL/R	**F**	**0.23**	**63.5**	**6.0**	**F**	**0.17**	**66.8**	**4.5**
	NBL/T	B	0.01	13.2	0.0	B	0.03	14.5	0.8
	SBL/T	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.3**	**-**	**A**	**-**	**1.1**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

The Cambridge Street site access is forecasted to perform well at both peak hours at the 2025 future total horizon.

The northbound queues from the Bronson Avenue and Carling Avenue intersection are forecasted to spill back beyond the site access. As such, it is assumed that available gaps for outbound left-turning vehicles at the Bronson Avenue site access only be permitted through "courtesy gaps" and be limited to 5 or fewer during the peak hours.

The eastbound approach is anticipated to operate with an average delay of over one minute at both peak hours, where if there were no left-turning vehicles in the traffic stream the lane would operate with a delay of 15.6 seconds in the AM and 16.6 in the PM.

11.3.2 2030 Future Total Access Intersection Operations

The 2030 future total intersection volumes are illustrated in Figure 16 and the access intersection operations are summarized below in Table 19. The level of service is based on HCM average delay for unsignalized intersections. The synchro worksheets have been provided in Appendix K.

Figure 16: 2030 Future Total Volumes

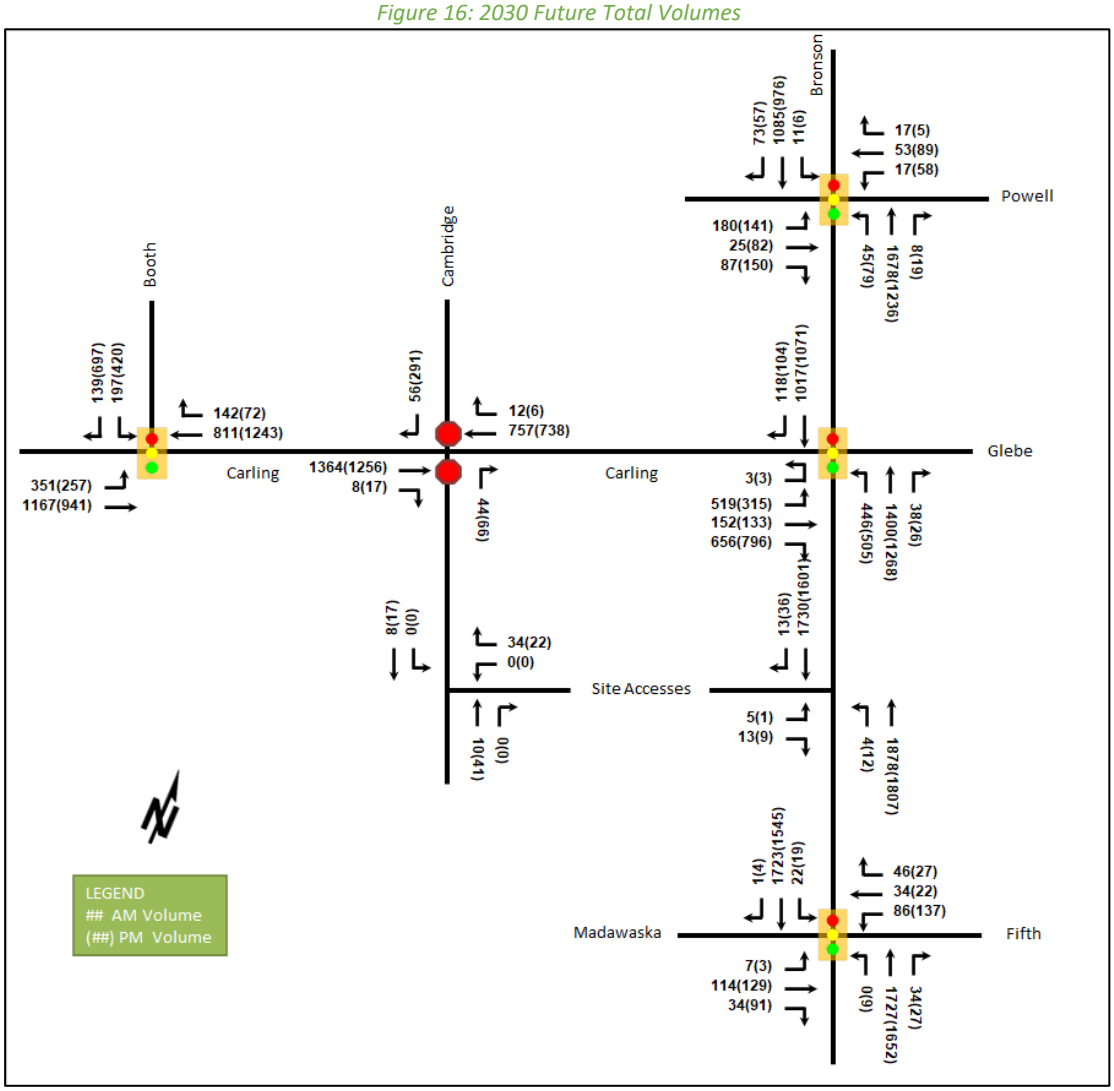


Table 19: 2030 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Cambridge Street at Site Access *Signalized*	WBL/R	A	0.03	8.5	0.8	A	0.02	8.6	0.8
	NBT/R	-	-	-	-	-	-	-	-
	SBL/T	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**5.6**	**-**	**A**	**-**	**2.4**	**-**
Bronson Avenue at Site Access *Signalized*	EBL/R	**F**	**0.32**	**97.2**	**8.3**	**F**	**0.16**	**63.8**	**4.5**
	NBL/T	C	0.01	15.2	0.0	B	0.03	14.5	0.8
	SBL/T	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.5**	**-**	**A**	**-**	**0.3**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

The access intersections at the 2030 future total horizon are forecasted to perform similarly to the 2025 future total horizon. The eastbound left movement is subject to the same constraints noted above, where with the growth forecasted on Bronson Avenue, average delays on the order of one-to-two minutes are expected. Similarly, to the 2025 access intersection operations, if there were no left-turning vehicles in the traffic stream the lane would operate with a delay of 17.8 seconds in the AM and 16.6 in the PM. No new capacity issues are noted.

11.3.3 Access Intersection MMLOS

The access intersections are not signalized and therefore no access intersection MMLOS analysis has been performed.

11.3.4 Recommended Design Elements

The access locations will be designed as typical private approaches, with depressed curbs and sidewalks per City standards. The private approach by-law exemptions noted previously will be required.

12 Transportation Demand Management

12.1 Context for TDM

The mode shares used within the TIA represent the unmodified district shares for the traditional residential component, with a 10% shift toward transit for the student housing component. Overall, the mode shares are likely to be achieved, and supporting TDM measures should be provided to further shift mode shares toward transit, walking, and cycling.

The subject site is within the Carling Arterial Mainstreet and Bronson Traditional Mainstreet Design Priority Areas.

Total bedrooms within the development are estimated as 186 one-bedroom/bachelor units, 82 two-bedroom units, 41 three-bedroom units, and 19 four-bedroom units for a total of 549 bedrooms, where 71 of the units (218 bedrooms) are student housing. No age restrictions are noted.

12.2 Need and Opportunity

The subject site has been assumed to rely equally on auto travel as active modes for the apartment units and on a higher transit share for the student units.

If targets are not met, the largest concentrated impacts will be on the eastbound left-turn movement at the intersection of Bronson Avenue and Carling Avenue, which is at capacity at the 2030 future total horizon during the AM peak hour and has residual capacity during the PM peak hour.

As such, a supportive TDM program should be provided to help ensure the auto mode share does not exceed the district averages, and to help steer further modal shift. It is noted that transit priority on Carling Avenue after 2031 may additionally shift mode share towards transit outside of the examined horizons.

12.3 TDM Program

The "suite of post occupancy TDM measures" has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix L. The key TDM measures recommended include:

- Designate an internal TDM program coordinator
- Display local area maps with walking cycling routes, and transit schedules and route maps at entrances
- Inclusion of a 6-month Presto card for first time apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Unbundle parking cost from or rental costs
- Provide a multimodal travel option information package to new residents

The recommendation for the inclusion of a Presto pass would not apply to the student housing, where these tenants will have access to a university bus pass.

13 Neighbourhood Traffic Management

The proposed development will connect to the arterial road network at Bronson Avenue and at Carling Avenue via Cambridge Street, which is a local road. The forecasted volumes along Cambridge Street between the site access and Carling Avenue is in the range of 520-830 two-way vehicles per day based upon a conservative 10:1 daily total to peak hour ratio. These volumes are below the TIA Guidelines threshold of 1,000 vehicles per day and thus no further examination is required.

14 Transit

14.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 20 summarizes the transit trip generation.

Table 20: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Transit	20%-30%	12	35	46	34	26	60

The proposed development is anticipated to generate an additional 46 AM peak hour transit trips and 60 PM peak hour transit trips. Of these trips, 35 outbound AM trips and 34 inbound PM trips are anticipated. From the trip distribution found in Section 5.2 these values can be further broken down.

Site-generated outbound AM peak hour trips break down to 12 trips to the north, nine trips to the south, and seven trips to each the east and west and site-generated inbound PM peak hour trips break down to 12 trips from the north, eight trips from the south, and seven trips from each the east and west. Northbound and southbound trips can be made via the route #10, and eastbound and westbound trips can be made via route #55 and 56 which additionally connect with Line 1 and Line 2 LRT. The north-south route #10 would see an increase of ridership averaged as two-to-three riders per bus per route, assuming no transit trips access the LRT at Carling O-Train Station, approximately 850 metres walk from the Cambridge Street site access, either via the west bus routes or by walking. The east-west routes would see an increase in ridership as an averaged 1-2 trips per bus per route.

Each route may require at most one single higher capacity bus (e.g. articulated) across each peak hour to service the entire route.

14.2 Transit Priority

No transit priority is required explicitly for this study as the transit priority lanes on Carling Avenue are to be installed after the horizons analyzed within this TIA.

15 Network Intersection Design

15.1 Network Intersection Control

No change to the existing signalized control is recommended for the network intersections.

15.2 Network Intersection Design

15.2.1 2025 Future Total Network Intersection Operations

The 2025 future total network intersection operations are summarized below in Table 21. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and HCM average delay for unsignalized intersections. The synchro worksheets have been provided in Appendix H.

Table 21: 2025 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Carling Avenue at Booth Street *Signalized*	EBL	D	0.84	67.3	**#93.1**	E	0.99	**114.8**	**#106.4**
	EBT	A	0.45	12.5	70.4	A	0.37	11.2	57.5
	WBT/R	A	0.47	28.9	65.4	A	0.48	41.5	102.1
	SBL	A	0.36	37.8	49.8	C	0.74	56.0	108.8
	SBR	A	0.26	7.8	13.6	**F**	**1.33**	**198.1**	**#224.2**
	Overall	**A**	**0.53**	**26.5**	-	**D**	**0.84**	**68.6**	-
Bronson Avenue at Powell Avenue *Signalized*	EB	D	0.86	74.9	**#71.3**	**F**	**1.14**	**135.9**	**#167.9**
	WB	A	0.33	38.5	29.0	A	0.52	49.1	55.9
	NB	D	0.82	20.7	m52.3	C	0.75	21.7	136.4
	SB	A	0.49	7.3	59.8	A	0.51	11.8	79.3
	Overall	**D**	**0.83**	**19.7**	-	**D**	**0.86**	**34.7**	-
Bronson Avenue at Carling Avenue *Signalized*	EBL	E	0.91	73.7	**#110.8**	D	0.84	68.5	**m#84.1**
	EBL/T	D	0.87	66.8	**#109.0**	C	0.76	58.6	m80.2
	EBR	D	0.89	42.6	110.1	**F**	**1.25**	**156.3**	**#217.6**
	NBL	B	0.68	36.2	51.3	C	0.78	55.7	**m#83.5**
	NBT/R	**F**	**1.23**	**140.5**	**#480.5**	D	0.88	29.3	**m#251.2**
	SBT/R	C	0.78	28.8	**#151.8**	B	0.70	18.9	m84.7
	Overall	**F**	**1.23**	**77.0**	-	**F**	**1.05**	**55.1**	-
Bronson Avenue at Fifth Avenue / Madawaska Drive *Signalized*	EB	A	0.27	35.9	22.7	A	0.49	49.2	41.9
	WB	C	0.75	59.6	51.3	**F**	**1.19**	**180.5**	**#97.0**
	NB	C	0.71	10.4	142.4	B	0.61	7.5	87.1
	SB	B	0.68	5.5	50.6	B	0.67	6.1	m67.3
	Overall	**C**	**0.72**	**11.1**	-	**C**	**0.75**	**17.2**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Carling Avenue at Cambridge Street *Unsignalized*	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-
	NBR	C	0.12	16.1	3.0	C	0.13	16.1	3.0
	SBR	B	0.09	11.5	2.3	C	0.46	15.3	18.0
	Overall	**A**	**-**	**0.7**	**-**	**A**	**-**	**2.6**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

The network intersection operations for the 2025 future total horizon operate similarly to the 2025 future background conditions. During the PM peak hour, the intersection of Bronson Avenue at Carling Avenue shows the eastbound left movement's queue length extended from 74.3 metres in the background conditions to 84.1 metres in the total condition, where it is forecasted to begin to exceed mid-block length. No other new capacity issues are noted.

15.2.2 2030 Future Total Network Intersection Operations

The 2030 future total network intersection operations are summarized below in Table 22. The level of service for signalized intersections is based on HCM 2010 v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and HCM average delay for unsignalized intersections. The synchro worksheets have been provided in Appendix I.

Table 22: 2030 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Carling Avenue at Booth Street *Signalized*	EBL	E	0.93	78.3	**#134.2**	**F**	**1.18**	**165.9**	**#131.4**
	EBT	A	0.57	14.3	96.0	A	0.44	12.1	71.6
	WBT/R	A	0.59	32.7	80.0	A	0.60	44.4	m124.4
	SBL	A	0.44	39.6	60.6	E	0.99	**88.1**	**#172.2**
	SBR	A	0.31	7.5	15.0	**F**	**1.82**	**407.4**	**#328.8**
	Overall	**B**	**0.64**	**30.0**	**-**	**F**	**1.10**	**119.4**	**-**
Bronson Avenue at Powell Avenue *Signalized*	EB	**F**	**1.23**	**172.4**	**#127.6**	**F**	**1.14**	**135.9**	**#167.9**
	WB	A	0.30	37.5	29.0	A	0.52	49.1	55.9
	NB	D	0.85	39.8	m65.0	D	0.82	36.7	m126.0
	SB	A	0.54	8.4	67.2	A	0.51	11.8	79.3
	Overall	**E**	**0.93**	**40.3**	**-**	**E**	**0.91**	**41.2**	**-**
Bronson Avenue at Carling Avenue *Signalized*	EBL	E	1.00	**93.7**	**#135.3**	D	0.89	72.3	**m#88.2**
	EBL/T	E	0.97	**85.4**	**#135.1**	D	0.81	59.8	m81.7
	EBR	E	0.98	55.8	**#206.5**	**F**	**1.48**	**253.5**	**m#270.0**
	NBL	A	0.56	29.6	51.3	E	0.95	70.8	**m#103.7**
	NBT/R	**F**	**1.25**	**148.4**	**#480.7**	**F**	**1.03**	**80.4**	**m#428.1**
	SBT/R	E	0.96	46.4	**m#165.4**	B	0.70	18.9	m84.7
	Overall	**F**	**1.27**	**86.5**	**-**	**F**	**1.25**	**93.3**	**-**
Bronson Avenue at Fifth Avenue / Madawaska Drive *Signalized*	EB	A	0.54	44.3	47.1	E	0.94	**94.7**	**#101.1**
	WB	D	0.88	79.3	**#63.6**	**F**	**2.78**	**859.7**	**#128.3**
	NB	C	0.73	11.7	142.4	B	0.70	9.1	116.5
	SB	C	0.80	9.0	m193.4	B	0.67	7.0	m71.2
	Overall	**D**	**0.82**	**14.7**	**-**	**F**	**1.04**	**56.6**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Carling Avenue at Cambridge Street *Unsignalized*	EBT/R	-	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-	-
	WBR	-	-	-	-	-	-	-	-
	NBR	C	0.15	19.1	3.8	C	0.20	18.9	5.3
	SBR	B	0.10	12.2	2.3	C	0.51	17.7	21.8
	Overall	**A**	**-**	**0.7**	**-**	**A**	**-**	**2.7**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
m = metered queue
# = queue exceeds storage or mid-block length

The network intersection operations for the 2030 future total horizon operate similarly to the 2030 future background conditions. As in the 2025 future total conditions, the PM peak hour shows the eastbound left movement exceeding its midblock length at this horizon with the addition of site traffic. During the AM peak hour, this movement is forecasted to have reached its capacity at 1.00 v/c. No other new capacity issues are noted.

15.2.3 Network Intersection MMLOS

Table 23 summarizes the MMLOS analysis for the network intersections of Carling Avenue at Booth Street, Bronson Avenue at Powell Avenue, Bronson Avenue at Carling Avenue/Glebe Avenue, and Bronson Avenue at Fifth Avenue/Madawaska Drive. The existing and future conditions intersections will be considered in separate rows where they score differently. The intersection analysis is based on the policy area of "Within 300 m of a school" for both the intersections of Bronson Avenue at Carling Avenue/Glebe Avenue and Bronson Avenue at Powell Avenue, "Within 600m of a rapid transit station" for Carling Avenue at Booth Street, and "General Urban Area" for the intersection Bronson Avenue at Fifth Avenue/Madawaska Drive. The MMLOS worksheets has been provided in Appendix G.

Table 23: Network Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Carling Avenue at Booth Street	F	A	F	C	F	D	D	D	C	E
Carling Avenue at Booth Street (Fut.)	F	A	F	C	F	D	D	D	F	E
Bronson Avenue at Powell Avenue (Ex.)	D	A	C	D	E	D	N/A	N/A	D	E
Bronson Avenue at Powell Avenue (Fut.)	D	A	C	D	F	D	N/A	N/A	E	E
Bronson Avenue at Carling Avenue	F	A	F	C	F	D	D	D	F	E
Bronson Avenue at Fifth Avenue / Madawaska Drive (Ex.)	E	C	C	B	C	D	N/A	N/A	C	E
Bronson Avenue at Fifth Avenue / Madawaska Drive (Fut.)	E	C	C	B	C	D	N/A	N/A	F	E

The MMLOS targets will not be met for the pedestrian LOS at all network intersections and for the bicycle LOS at all network intersections except for Bronson Avenue at Powell Avenue. Transit LOS will not be met at the intersections of Carling Avenue at Booth Street and Bronson Avenue at Carling Avenue, and auto LOS will not be met at the intersection of Bronson avenue at Carling Avenue and at the future horizon for the intersections of Bronson Avenue at Powell Avenue and Bronson Avenue at Fifth Avenue/Madawaska Drive.

The pedestrian level of service would require a maximum of two lanes at a crossing to meet a LOS A and a maximum of three lanes to meet LOS C.

The mixed traffic approaches for cyclists and left-turn arrangements at the study area intersections govern the bicycle LOS, requiring alternative left-turn configurations at the intersections of Carling Avenue at Booth Street, and Bronson Avenue at Fifth Avenue/Madawaska Drive and/or bike lanes without shifting across right-turn lanes to meet the targets at the intersection of Carling Avenue at Booth Street and Carling Avenue/Glebe Avenue at Bronson Avenue.

The transit LOS will not be met due to delays on the southbound and eastbound approaches at the intersection of Carling Avenue and Booth Street, the northbound approach at the intersection of Bronson Avenue and Powell Avenue, and all approaches at the intersection of Bronson Avenue and Carling Avenue/Glebe Avenue.

Auto LOS would require overall intersection v/c to be 1.00 or lower.

15.2.4 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

16 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed site includes 257 high-rise apartment units and 71 student housing units
- Accesses will be provided via a full-movement access onto Bronson Avenue, an outbound only access onto Cambridge Street, and a move-in access onto Cambridge Street
- The development is proposed to be completed as two phases built-out by 2025
- The Trip Generation, Location, and Safety triggers were met for the TIA Screening
- This report accompanies and zoning by-law amendment and site plan application

Existing Conditions

- Carling Avenue and Bronson Avenue are arterial roads, Booth Street is a major collector road, and Fifth Avenue is a collector road in the study area
- Sidewalks are provided on both sides of the study area roadways, separated bike lanes are along Glebe Avenue, and cycling paths are located within Commissioners Park
- A high number of collisions were noted at the Bronson Avenue and Carling Avenue intersection, primarily occurring as sideswipe and rear end collisions due to congested conditions and queueing from turn-lanes
- Capacity issues are noted at the intersection of Carling Avenue and Booth Street, Bronson Avenue and Powell Avenue, and at the intersection of Bronson Avenue and Carling Avenue
- The continuing Highway 417 construction projects and Bronson Avenue rehabilitation work are considered contributing factors to the high volumes and noted capacity constraints

Development Generated Travel Demand

- The proposed development is forecasted produce 211 two-way people trips during the AM peak hour and 258 two-way people trips during the PM peak hour

- Of the forecasted people trips, 69 two-way trips will be vehicle trips during the AM peak hour and 82 two-way trips will be vehicle trips during the PM peak hour based on a 35% auto mode share target for the apartment units and 25% auto mode share target for the student units
- Of the forecasted trips, 35% are anticipated to travel north, 25% to the south, and 20% to each the east and west

Background Conditions

- The background developments were explicitly included in the background conditions, along with a total background growth of derived from interpolation from the existing volumes to the forecasted volumes along mainlines and major turning movements
- The study area intersections are forecasted to degrade from the existing conditions with area growth where existing capacity issues are worsened and several new capacity issues are present at the future background horizons
- A review of the network constraints identified residual capacity southbound on Bronson Avenue during the PM peak that may serve to alleviate Carling Avenue eastbound right-turn capacity constraints and Powell Avenue cut through traffic now that the Highway 417 construction activities are complete
- The City should endeavour to restrict potential cut through traffic from Queen Elizabeth Driveway on Madawaska Drive

Development Design

- Vehicle parking is underground, cycling parking is both underground and on the ground floor
- Hard surface connections are provided between all building entrances and surrounding pedestrian facilities
- The bus stop along the site frontage is proposed as being shifted north of the site access
- Garbage collection will be on Cambridge Street, and emergency services are assumed to access the three site frontages

Parking

- The site provides 174 vehicle parking spaces and 348 bicycle spaces, where by-law minimums are 170 vehicle spaces and 164 bicycle spaces

Boundary Street Design

- Carling Avenue and Bronson Avenue will not meet pedestrian and bicycle MMLOS targets, due to the arterial volumes for pedestrian LOS and lack of cycling facilities for bicycle LOS
- The City would need to reconstruct Bronson Avenue and reallocate road space along Carling Avenue to meet the boundary road targets, both of which are beyond the scope of this development

Access Intersections Design

- One full-movement access is proposed onto Bronson Avenue, and the existing access onto Cambridge Street is proposed as being converted to an outbound lane and a move-in access separated by a 1.0-metre median
- From the private approach by-law, the proposed median for the Cambridge Street accesses is narrower than the 2.0-metre minimum and the ramp to the underground parking does not provide the 6.0-metre setback from the property line, and the proposed access onto Bronson Avenue is less than 3.0 metres from the property line, which will each require an exemption

- The accesses are proposed as being stop-controlled on the minor approach
- The Cambridge Street access operates well during both peak hours, and the Bronson Avenue access is forecasted to operate with the outbound approach incurring long delays for any left-turning vehicles

TDM

- Given the current network constraints, if the mode share targets are not achieved, the greatest impact of the increased auto travel would be on the eastbound left-turn movement at the intersection of Carling Avenue and Bronson Avenue
- Supportive TDM measures to be included within the proposed development should include:
    - Designate an internal TDM program coordinator
    - Display local area maps with walking cycling routes, and transit schedules and route maps at entrances
    - Inclusion of a 6-month Presto card for first time new townhome purchase and apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
    - Unbundle parking cost from or rental costs
    - Provide a multimodal travel option information package to new residents

NTM

- Volumes along Cambridge Street at all horizons do not exceed local road NTM thresholds

Transit

- The site is forecasted to generate 46 AM and 60 PM peak hour two-way transit trips
- To meet forecasted transit use, the forecasted average increase in transit demand is 2-3 riders per bus per route travelling north-south, and 1-2 riders per bus per route travelling east-west
- No specific transit priority measures were considered as part of this development

Network Intersection Design

- Generally, the future total network intersections will operate similarly to future background conditions with additional queuing on the eastbound left-turn movement at the intersection of Bronson Avenue and Carling Avenue during the PM peak hour, and this movement reaching capacity in the AM peak hour
- The MMLOS targets will not be met for the pedestrian LOS at all network intersections, the bicycle LOS at all but the intersection of Bronson Avenue and Powell Avenue, transit LOS at all but the intersection of Bronson Avenue and Fifth Avenue/Madawaska Drive, and auto LOS at the future horizons at the intersections of Carling Avenue and Booth Street, Bronson Avenue and Carling Avenue, and Bronson Avenue and Fifth Avenue/Madawaska Drive
- Pedestrian targets would require crossings of no more than three lanes at Bronson Avenue at Fifth Avenue/Madawaska Drive and two lanes elsewhere, the bicycle targets can be achieved through the construction of dedicated cycling facilities, shifting the left-turn configurations out of mixed flow and right-turn configurations that do not shift across turn lanes, and transit LOS would require significant delay reductions throughout the study area, which are unlikely the be achieved

17 Next Steps

Following the circulation and review of the TIA, any outstanding comments will be documents within the context of the zoning by-law amendment and site plan application in the Step 4 Strategy Report. Once remaining TIA Steps

are completed and sign-off has been received from City Transportation Project Manager, a signed and stamped final report will be provided to City staff.

Appendix A

TIA Screening Form and PM Certification Form

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 30-Sep-20
Project Number: 2020-64
Project Reference: Katasa 770-774 Bronson

1.1 Description of Proposed Development	
Municipal Address	770-774 Bronson Avenue and 557 Cambridge Street South
Description of Location	Existing garage and gravel lot
Land Use Classification	Arterial Mainstreet (AM10[2373], AM1[2003] S296)
Development Size	333 apartment units
Accesses	Existing Access onto Bronson Avenue, existing access onto Cambridge Avenue
Phase of Development	Two phases
Buildout Year	2025
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	333	Units
Trip Generation Trigger	Yes	

1.3 Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	No	
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes	Bronson Traditional and Carling Arterial Mainstreet Design Priority
Location Trigger	Yes	

1.4. Safety Triggers		
Are posted speed limits on a boundary street 80 km/hr or greater?	No	
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No	
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	Yes	
Is the proposed driveway within auxiliary lanes of an intersection?	Yes	
Does the proposed driveway make use of an existing median break that serves an existing site?	No	
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	Yes	Collisions at Carling Avenue at Bronson Avenue
Does the development include a drive-thru facility?	No	
Safety Trigger	Yes	

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering √ or transportation planning □.

[1,2] **License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
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Fax: 613-560-6006

Ville d'Ottawa
Services d 'infrastructure et Viabilité des collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at ___Ottawa_____ this __20__ day of _____September_____, 2018.
(City)

Name: _____Andrew Harte_____
(Please Print)

Professional Title: _____Professional Engineer_____

_____
Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

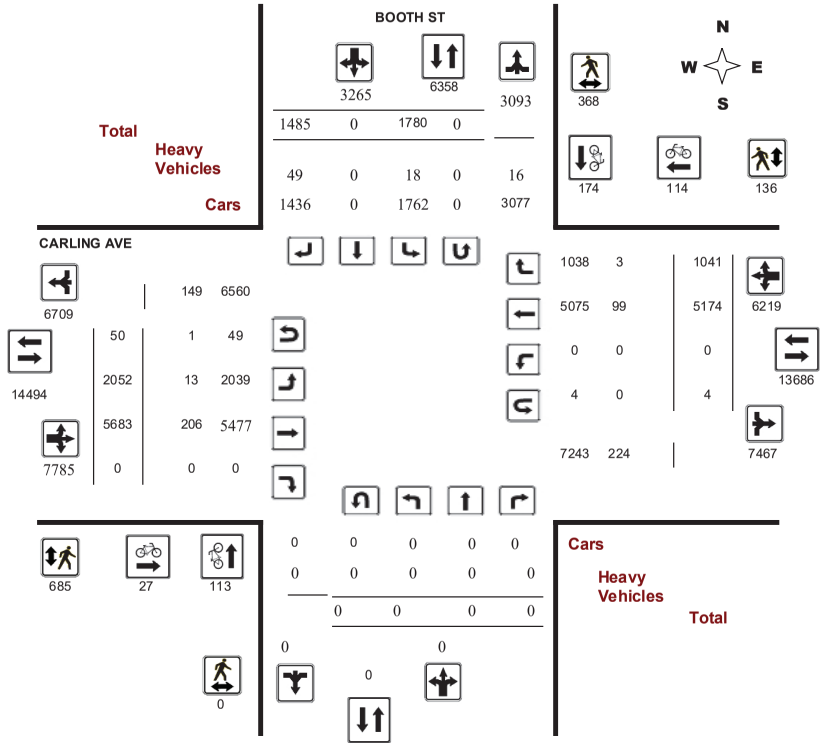
Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

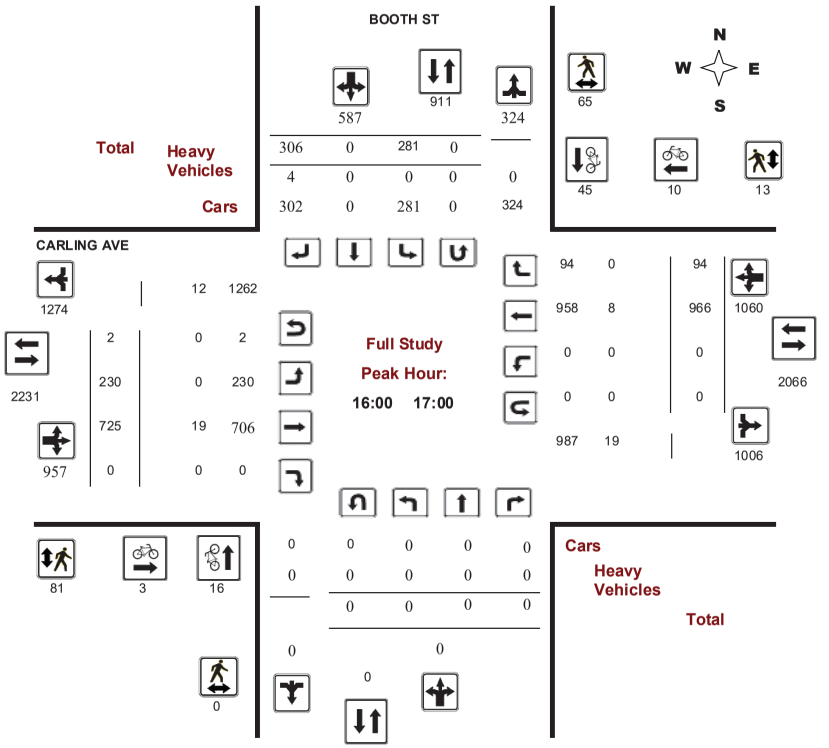
Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



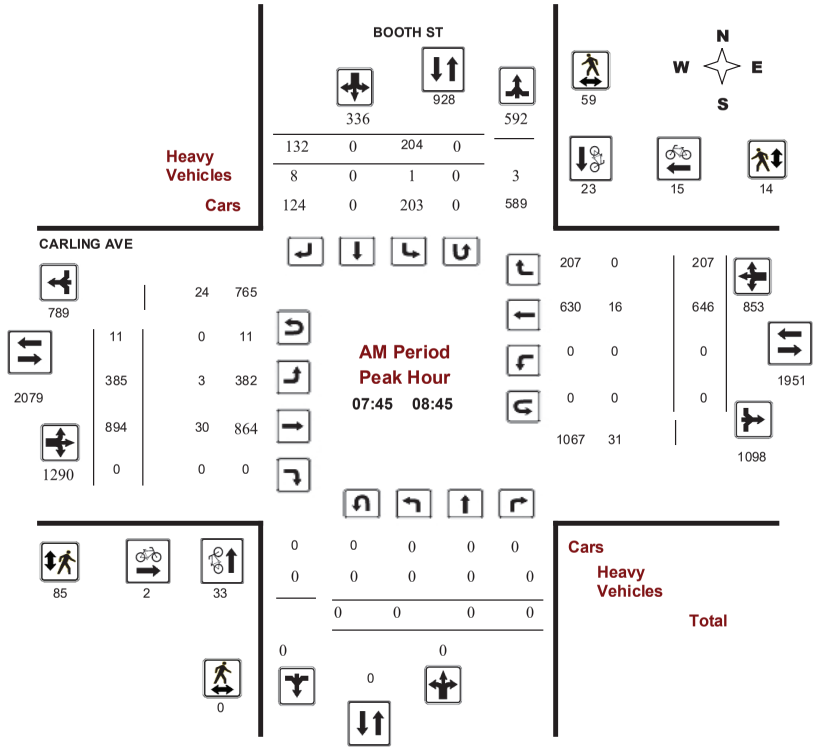
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision



Comments

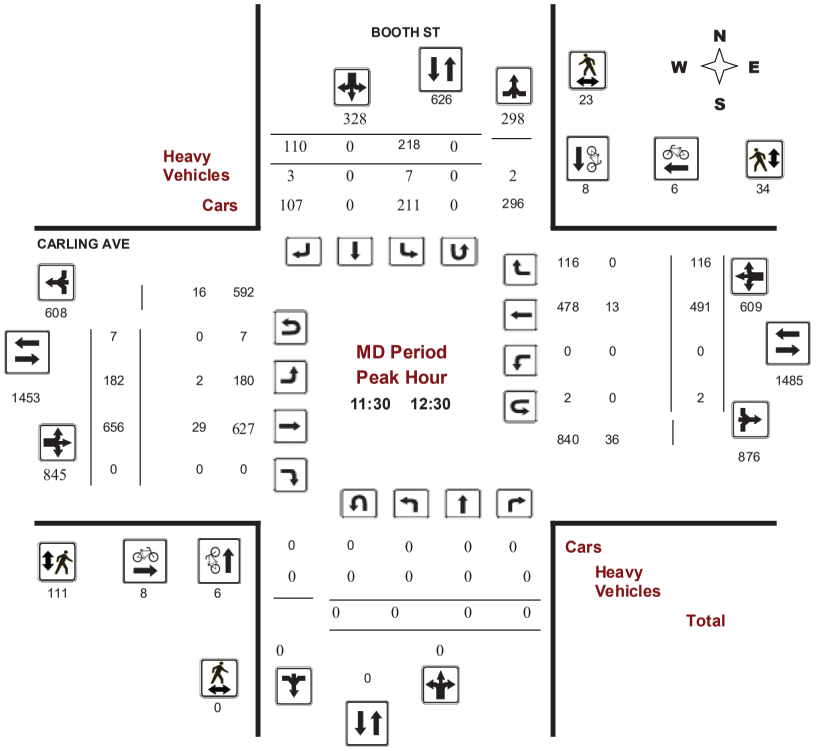
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision



Comments

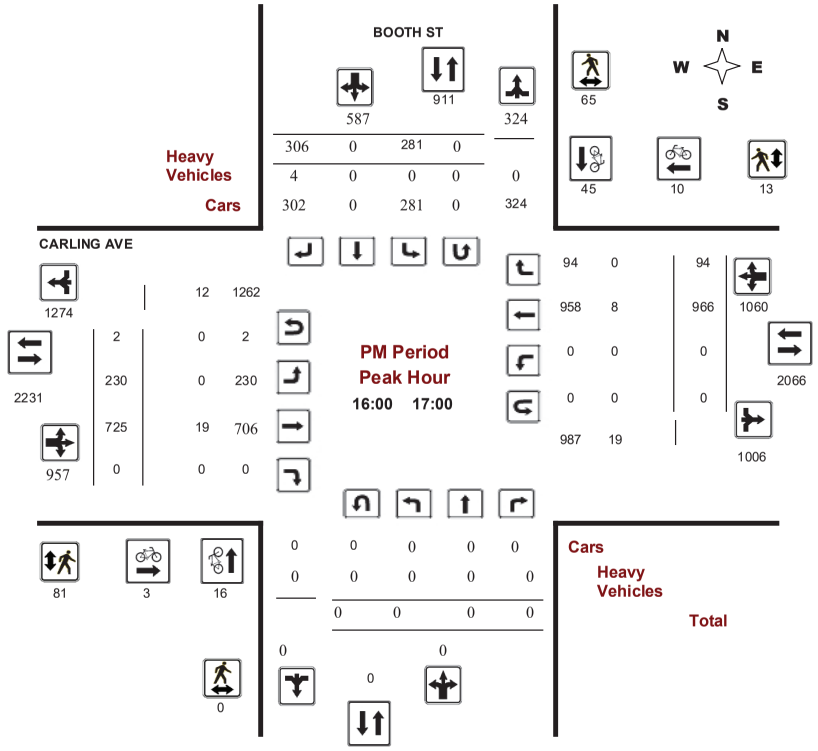
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, September 12, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 50 Westbound: 4

AADT Factor 1.00

	BOOTH ST								CARLING AVE								
	Northbound				Southbound				Eastbound				Westbound				
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	0	0	**0**	198	0	135	**333**	**333**	286	724	0	**1010**	0	576	182	**758**	**1768**	**2101**
08:00 09:00	0	0	0	**0**	197	0	130	**327**	**327**	408	877	0	**1285**	0	626	191	**817**	**2102**	**2429**
09:00 10:00	0	0	0	**0**	137	0	103	**240**	**240**	339	698	0	**1037**	0	511	159	**670**	**1707**	**1947**
11:30 12:30	0	0	0	**0**	218	0	110	**328**	**328**	182	656	0	**838**	0	491	116	**607**	**1445**	**1773**
12:30 13:30	0	0	0	**0**	179	0	128	**307**	**307**	170	649	0	**819**	0	412	94	**506**	**1325**	**1632**
15:00 16:00	0	0	0	**0**	269	0	281	**550**	**550**	216	710	0	**926**	0	733	117	**850**	**1776**	**2326**
16:00 17:00	0	0	0	**0**	281	0	306	**587**	**587**	230	725	0	**955**	0	966	94	**1060**	**2015**	**2602**
17:00 18:00	0	0	0	**0**	301	0	292	**593**	**593**	221	644	0	**865**	0	859	88	**947**	**1812**	**2405**
Sub Total	0	0	0	**0**	1780	0	1485	**3265**	**3265**	2052	5683	0	**7735**	0	5174	1041	**6215**	**13950**	**17215**
U Turns				**0**				**0**	**0**				**50**				**4**	**54**	**54**
Total	0	0	0	**0**	1780	0	1485	**3265**	**3265**	2052	5683	0	**7785**	0	5174	1041	**6219**	**14004**	**17269**
EQ 12Hr	0	0	0	**0**	2474	0	2064	**4538**	**4538**	2852	7899	0	**10821**	0	7192	1447	**8644**	**19466**	**24004**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	0	0	0	**0**	2332	0	1945	**4277**	**4538**	2688	7445	0	**10198**	0	6778	1364	**8147**	**19466**	**24004**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	0	0	0	**0**	3055	0	2548	**5603**	**5603**	3521	9753	0	**13360**	0	8879	1786	**10672**	**24032**	**29635**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		BOOTH ST									CARLING AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	0	40	0	20	60	146	48	152	0	200	0	117	38	155	146	415
07:15	07:30	0	0	0	0	47	0	37	84	208	72	155	0	227	0	139	52	191	208	502
07:30	07:45	0	0	0	0	52	0	45	97	214	75	194	0	271	0	153	42	195	214	563
07:45	08:00	0	0	0	0	59	0	33	92	233	91	223	0	316	0	167	50	217	233	625
08:00	08:15	0	0	0	0	55	0	26	81	228	94	233	0	331	0	166	53	219	228	631
08:15	08:30	0	0	0	0	42	0	30	72	230	100	238	0	340	0	155	58	213	230	625
08:30	08:45	0	0	0	0	48	0	43	91	237	100	200	0	303	0	158	46	204	237	598
08:45	09:00	0	0	0	0	52	0	31	83	231	114	206	0	325	0	147	34	181	231	589
09:00	09:15	0	0	0	0	39	0	32	71	220	112	160	0	275	0	145	37	183	220	529
09:15	09:30	0	0	0	0	24	0	27	51	200	94	185	0	284	0	129	55	184	200	519
09:30	09:45	0	0	0	0	32	0	27	59	168	72	158	0	230	0	121	37	159	168	448
09:45	10:00	0	0	0	0	42	0	17	59	150	61	195	0	261	0	116	30	146	150	466
11:30	11:45	0	0	0	0	64	0	23	87	154	44	154	0	201	0	125	23	149	154	437
11:45	12:00	0	0	0	0	44	0	24	68	162	55	183	0	239	0	122	39	161	162	468
12:00	12:15	0	0	0	0	50	0	30	80	147	46	152	0	201	0	116	21	137	147	418
12:15	12:30	0	0	0	0	60	0	33	93	163	37	167	0	204	0	128	33	162	163	459
12:30	12:45	0	0	0	0	47	0	29	76	137	35	153	0	189	0	97	26	123	137	388
12:45	13:00	0	0	0	0	54	0	36	90	155	51	179	0	232	0	105	14	119	155	441
13:00	13:15	0	0	0	0	33	0	32	65	130	39	138	0	182	0	103	26	129	130	376
13:15	13:30	0	0	0	0	45	0	31	76	149	45	179	0	224	0	107	28	135	149	435
15:00	15:15	0	0	0	0	78	0	68	146	217	52	155	0	208	0	139	19	158	217	512
15:15	15:30	0	0	0	0	62	0	63	125	221	58	195	0	253	0	172	38	210	221	588
15:30	15:45	0	0	0	0	75	0	77	152	228	44	164	0	208	0	211	32	243	228	603
15:45	16:00	0	0	0	0	54	0	73	127	217	62	196	0	258	0	211	28	239	217	624
16:00	16:15	0	0	0	0	72	0	87	159	239	57	169	0	226	0	233	23	256	239	641
16:15	16:30	0	0	0	0	75	0	56	131	208	53	190	0	243	0	241	24	265	208	639
16:30	16:45	0	0	0	0	65	0	91	156	235	56	177	0	234	0	253	23	276	235	666
16:45	17:00	0	0	0	0	69	0	72	141	229	64	189	0	254	0	239	24	263	229	658
17:00	17:15	0	0	0	0	84	0	76	160	249	60	145	0	205	0	226	29	255	249	620
17:15	17:30	0	0	0	0	74	0	75	149	218	51	189	0	240	0	230	18	248	218	637
17:30	17:45	0	0	0	0	85	0	79	164	236	53	171	0	225	0	216	19	235	236	624
17:45	18:00	0	0	0	0	58	0	62	120	199	57	139	0	196	0	187	22	209	199	525
Total:		0	0	0	0	1780	0	1485	3265	6358	2052	5683	0	7785	0	5174	1041	6219	6358	17,269

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		BOOTH ST			CARLING AVE			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	3	3	6	2	2	4	10
07:15	07:30	1	4	5	2	1	3	8
07:30	07:45	7	4	11	0	4	4	15
07:45	08:00	6	8	14	0	4	4	18
08:00	08:15	4	5	9	1	7	8	17
08:15	08:30	12	4	16	0	2	2	18
08:30	08:45	11	6	17	1	2	3	20
08:45	09:00	14	3	17	0	5	5	22
09:00	09:15	7	3	10	1	4	5	15
09:15	09:30	2	1	3	1	3	4	7
09:30	09:45	4	1	5	0	5	5	10
09:45	10:00	4	1	5	1	2	3	8
11:30	11:45	3	1	4	4	0	4	8
11:45	12:00	2	2	4	2	2	4	8
12:00	12:15	1	4	5	0	1	1	6
12:15	12:30	0	1	1	2	3	5	6
12:30	12:45	0	2	2	2	1	3	5
12:45	13:00	0	0	0	0	1	1	1
13:00	13:15	2	1	3	1	0	1	4
13:15	13:30	1	1	2	0	3	3	5
15:00	15:15	1	6	7	0	25	25	32
15:15	15:30	0	7	7	0	5	5	12
15:30	15:45	0	4	4	1	1	2	6
15:45	16:00	1	8	9	1	1	2	11
16:00	16:15	4	6	10	2	2	4	14
16:15	16:30	4	18	22	1	4	5	27
16:30	16:45	5	5	10	0	3	3	13
16:45	17:00	3	16	19	0	1	1	20
17:00	17:15	7	15	22	1	1	2	24
17:15	17:30	1	15	16	0	6	6	22
17:30	17:45	3	9	12	0	8	8	20
17:45	18:00	0	10	10	1	5	6	16
Total		113	174	**287**	27	114	141	428

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

		BOOTH ST			CARLING AVE			
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	0	4	**4**	5	4	**9**	**13**
07:15	07:30	0	6	**6**	3	1	**4**	**10**
07:30	07:45	0	6	**6**	11	4	**15**	**21**
07:45	08:00	0	10	**10**	9	4	**13**	**23**
08:00	08:15	0	15	**15**	22	6	**28**	**43**
08:15	08:30	0	19	**19**	17	1	**18**	**37**
08:30	08:45	0	15	**15**	37	3	**40**	**55**
08:45	09:00	0	10	**10**	25	1	**26**	**36**
09:00	09:15	0	9	**9**	5	0	**5**	**14**
09:15	09:30	0	7	**7**	10	0	**10**	**17**
09:30	09:45	0	7	**7**	5	12	**17**	**24**
09:45	10:00	0	2	**2**	9	4	**13**	**15**
11:30	11:45	0	3	**3**	6	1	**7**	**10**
11:45	12:00	0	6	**6**	13	6	**19**	**25**
12:00	12:15	0	3	**3**	52	13	**65**	**68**
12:15	12:30	0	11	**11**	40	14	**54**	**65**
12:30	12:45	0	10	**10**	78	6	**84**	**94**
12:45	13:00	0	9	**9**	80	6	**86**	**95**
13:00	13:15	0	6	**6**	48	5	**53**	**59**
13:15	13:30	0	8	**8**	18	1	**19**	**27**
15:00	15:15	0	48	**48**	12	3	**15**	**63**
15:15	15:30	0	17	**17**	7	2	**9**	**26**
15:30	15:45	0	11	**11**	14	2	**16**	**27**
15:45	16:00	0	7	**7**	14	5	**19**	**26**
16:00	16:15	0	19	**19**	15	1	**16**	**35**
16:15	16:30	0	14	**14**	13	1	**14**	**28**
16:30	16:45	0	10	**10**	38	7	**45**	**55**
16:45	17:00	0	22	**22**	15	4	**19**	**41**
17:00	17:15	0	14	**14**	26	5	**31**	**45**
17:15	17:30	0	8	**8**	15	7	**22**	**30**
17:30	17:45	0	17	**17**	16	2	**18**	**35**
17:45	18:00	0	15	**15**	7	5	**12**	**27**
Total	.....	0	368	**368**	685	136	**821**	**1189**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		BOOTH ST									CARLING AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	0	0	2	**3**	**3**	0	5	0	**11**	0	4	1	**10**	**21**	**12**
07:15	07:30	0	0	0	**0**	0	0	1	**1**	**1**	0	5	0	**9**	0	3	0	**8**	**17**	**9**
07:30	07:45	0	0	0	**0**	1	0	3	**4**	**4**	0	5	0	**12**	0	4	0	**10**	**22**	**13**
07:45	08:00	0	0	0	**0**	0	0	3	**5**	**5**	2	10	0	**18**	0	3	0	**13**	**31**	**18**
08:00	08:15	0	0	0	**0**	0	0	0	**1**	**1**	1	5	0	**11**	0	5	0	**10**	**21**	**11**
08:15	08:30	0	0	0	**0**	0	0	3	**3**	**3**	0	6	0	**14**	0	5	0	**11**	**25**	**14**
08:30	08:45	0	0	0	**0**	1	0	2	**3**	**3**	0	9	0	**14**	0	3	0	**13**	**27**	**15**
08:45	09:00	0	0	0	**0**	0	0	4	**6**	**6**	2	5	0	**16**	0	5	0	**10**	**26**	**16**
09:00	09:15	0	0	0	**0**	0	0	3	**3**	**3**	0	11	0	**19**	0	5	0	**16**	**35**	**19**
09:15	09:30	0	0	0	**0**	0	0	2	**3**	**3**	1	7	0	**15**	0	5	0	**12**	**27**	**15**
09:30	09:45	0	0	0	**0**	0	0	2	**3**	**3**	1	16	0	**25**	0	6	0	**22**	**47**	**25**
09:45	10:00	0	0	0	**0**	0	0	0	**4**	**4**	3	8	0	**17**	0	4	1	**13**	**30**	**17**
11:30	11:45	0	0	0	**0**	3	0	0	**3**	**3**	0	12	0	**21**	0	9	0	**24**	**45**	**24**
11:45	12:00	0	0	0	**0**	1	0	2	**5**	**5**	2	8	0	**14**	0	2	0	**11**	**25**	**15**
12:00	12:15	0	0	0	**0**	2	0	1	**3**	**3**	0	5	0	**8**	0	2	0	**9**	**17**	**10**
12:15	12:30	0	0	0	**0**	1	0	0	**1**	**1**	0	4	0	**4**	0	0	0	**5**	**9**	**5**
12:30	12:45	0	0	0	**0**	1	0	0	**1**	**1**	0	3	0	**6**	0	3	0	**7**	**13**	**7**
12:45	13:00	0	0	0	**0**	1	0	2	**3**	**3**	0	8	0	**10**	0	0	0	**9**	**19**	**11**
13:00	13:15	0	0	0	**0**	1	0	1	**3**	**3**	1	6	0	**10**	0	2	0	**9**	**19**	**11**
13:15	13:30	0	0	0	**0**	1	0	2	**4**	**4**	0	4	0	**6**	0	0	1	**6**	**12**	**8**
15:00	15:15	0	0	0	**0**	0	0	2	**2**	**2**	0	7	0	**12**	0	3	0	**10**	**22**	**12**
15:15	15:30	0	0	0	**0**	0	0	1	**1**	**1**	0	1	0	**6**	0	4	0	**5**	**11**	**6**
15:30	15:45	0	0	0	**0**	1	0	1	**2**	**2**	0	8	0	**11**	0	2	0	**11**	**22**	**12**
15:45	16:00	0	0	0	**0**	1	0	2	**3**	**3**	0	11	0	**15**	0	2	0	**14**	**29**	**16**
16:00	16:15	0	0	0	**0**	0	0	1	**1**	**1**	0	7	0	**11**	0	3	0	**10**	**21**	**11**
16:15	16:30	0	0	0	**0**	0	0	1	**1**	**1**	0	3	0	**6**	0	2	0	**5**	**11**	**6**
16:30	16:45	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**5**	0	2	0	**5**	**10**	**5**
16:45	17:00	0	0	0	**0**	0	0	2	**2**	**2**	0	6	0	**9**	0	1	0	**7**	**16**	**9**
17:00	17:15	0	0	0	**0**	2	0	1	**3**	**3**	0	5	0	**8**	0	2	0	**9**	**17**	**10**
17:15	17:30	0	0	0	**0**	0	0	2	**2**	**2**	0	7	0	**12**	0	3	0	**10**	**22**	**12**
17:30	17:45	0	0	0	**0**	0	0	2	**2**	**2**	0	1	0	**5**	0	2	0	**3**	**8**	**5**
17:45	18:00	0	0	0	**0**	1	0	1	**2**	**2**	0	5	0	**9**	0	3	0	**9**	**18**	**10**
Total:	None	0	0	0	**0**	18	0	49	**83**	**83**	13	206	0	**369**	0	99	3	**326**	**695**	**389**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ CARLING AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38761

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

BOOTH ST CARLING AVE

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	2	0	2
07:45	08:00	0	0	2	0	2
08:00	08:15	0	0	4	0	4
08:15	08:30	0	0	2	0	2
08:30	08:45	0	0	3	0	3
08:45	09:00	0	0	5	0	5
09:00	09:15	0	0	3	1	4
09:15	09:30	0	0	5	0	5
09:30	09:45	0	0	0	1	1
09:45	10:00	0	0	5	0	5
11:30	11:45	0	0	3	1	4
11:45	12:00	0	0	1	0	1
12:00	12:15	0	0	3	0	3
12:15	12:30	0	0	0	1	1
12:30	12:45	0	0	1	0	1
12:45	13:00	0	0	2	0	2
13:00	13:15	0	0	5	0	5
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	1	0	1
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	1	0	1
16:45	17:00	0	0	1	0	1
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	1	0	1
17:45	18:00	0	0	0	0	0
Total		0	0	50	4	54

Transportation Services - Traffic Services

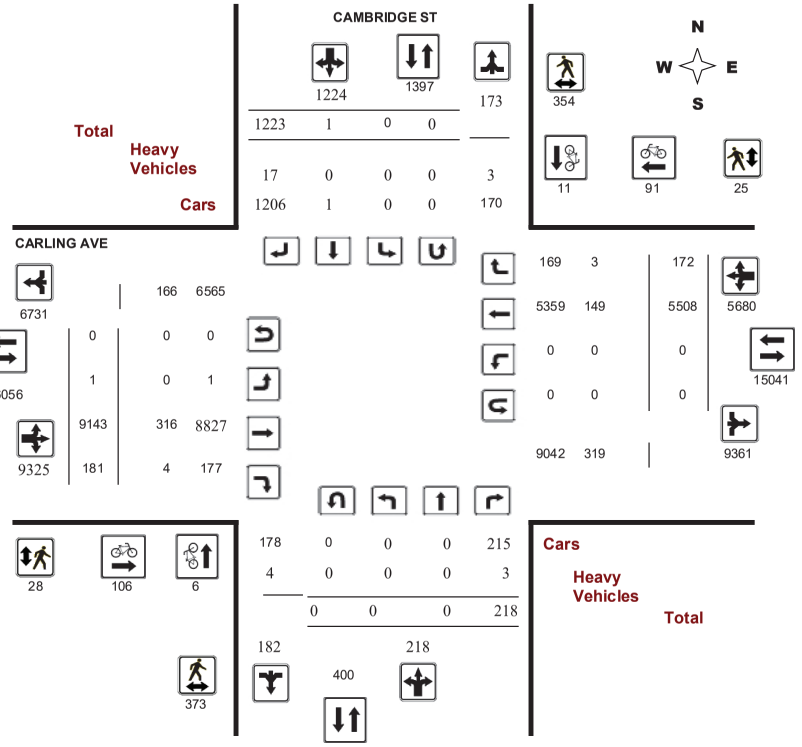
Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

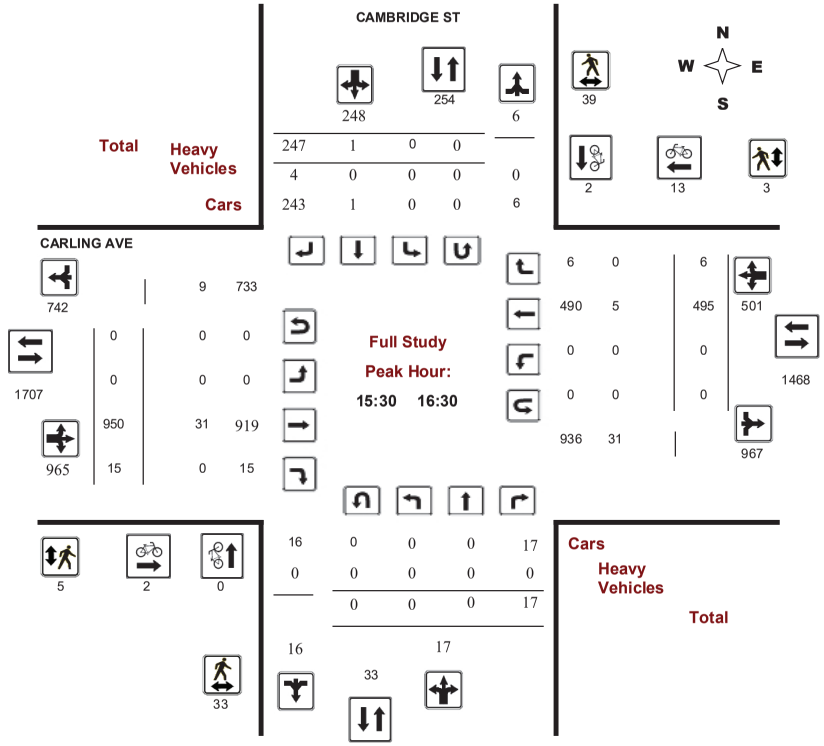
Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Work Order 37836

Turning Movement Count - Full Study Summary Report

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

Full Study

	CAMBRIDGE ST									CARLING AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	0	8	**8**	0	0	69	**69**	**77**	0	687	2	**689**	0	492	9	**501**	**1190**	**1267**
08:00 09:00	0	0	9	**9**	0	0	57	**57**	**66**	1	900	3	**904**	0	527	18	**545**	**1449**	**1515**
09:00 10:00	0	0	17	**17**	0	0	50	**50**	**67**	0	689	12	**701**	0	515	18	**533**	**1234**	**1301**
10:00 11:00	0	0	12	**12**	0	0	35	**35**	**47**	0	559	15	**574**	0	401	19	**420**	**994**	**1041**
11:00 12:00	0	0	18	**18**	0	0	42	**42**	**60**	0	656	24	**680**	0	453	10	**463**	**1143**	**1203**
12:00 13:00	0	0	20	**20**	0	0	45	**45**	**65**	0	645	17	**662**	0	423	17	**440**	**1102**	**1167**
13:00 14:00	0	0	36	**36**	0	0	47	**47**	**83**	0	679	19	**698**	0	424	23	**447**	**1145**	**1228**
14:00 15:00	0	0	20	**20**	0	0	73	**73**	**93**	0	743	24	**767**	0	424	20	**444**	**1211**	**1304**
15:00 16:00	0	0	17	**17**	0	0	172	**172**	**189**	0	921	12	**933**	0	471	7	**478**	**1411**	**1600**
16:00 17:00	0	0	15	**15**	0	1	289	**290**	**305**	0	886	17	**903**	0	473	6	**479**	**1382**	**1687**
17:00 18:00	0	0	23	**23**	0	0	249	**249**	**272**	0	866	15	**881**	0	461	7	**468**	**1349**	**1621**
18:00 19:00	0	0	23	**23**	0	0	95	**95**	**118**	0	912	21	**933**	0	444	18	**462**	**1395**	**1513**
Sub Total	0	0	218	**218**	0	1	1223	**1224**	**1442**	1	9143	181	**9325**	0	5508	172	**5680**	**15005**	**16447**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	0	0	218	**218**	0	1	1223	**1224**	**1442**	1	9143	181	**9325**	0	5508	172	**5680**	**15005**	**16447**
AVG 12Hr	0	0	196	**196**	0	1	1101	**1102**	**1298**	1	8229	163	**8392**	0	4957	155	**5112**	**13504**	**14802**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**

AVG 24Hr	0	0	257	**257**	0	1	1442	**1443**	**1700**	1	10780	213	**10994**	0	6494	203	**6697**	**17691**	**19391**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		CAMBRIDGE ST									CARLING AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	3	3	0	0	12	12	0	0	118	1	119	0	110	5	115	0	249
07:15	07:30	0	0	0	0	0	0	21	21	1	0	166	0	166	0	120	2	122	1	309
07:30	07:45	0	0	2	2	0	0	24	24	0	0	197	1	198	0	121	1	122	0	346
07:45	08:00	0	0	3	3	0	0	12	12	0	0	206	0	206	0	141	1	142	0	363
08:00	08:15	0	0	1	1	0	0	15	15	1	0	215	1	216	0	126	1	127	1	359
08:15	08:30	0	0	6	6	0	0	17	17	2	0	233	1	234	0	133	3	136	2	393
08:30	08:45	0	0	0	0	0	0	11	11	0	1	223	1	225	0	133	7	140	0	376
08:45	09:00	0	0	2	2	0	0	14	14	0	0	229	0	229	0	135	7	142	0	387
09:00	09:15	0	0	0	0	0	0	14	14	0	0	195	2	197	0	155	7	162	0	373
09:15	09:30	0	0	8	8	0	0	16	16	0	0	174	3	177	0	129	3	132	0	333
09:30	09:45	0	0	6	6	0	0	9	9	1	0	163	4	167	0	121	6	127	1	309
09:45	10:00	0	0	3	3	0	0	11	11	0	0	157	3	160	0	110	2	112	0	286
10:00	10:15	0	0	1	1	0	0	9	9	1	0	149	4	153	0	102	4	106	1	269
10:15	10:30	0	0	4	4	0	0	9	9	0	0	133	4	137	0	101	7	108	0	258
10:30	10:45	0	0	2	2	0	0	10	10	0	0	138	2	140	0	94	2	96	0	248
10:45	11:00	0	0	5	5	0	0	7	7	1	0	139	5	144	0	104	6	110	1	266
11:00	11:15	0	0	6	6	0	0	6	6	0	0	162	9	171	0	104	1	105	0	288
11:15	11:30	0	0	2	2	0	0	14	14	0	0	160	2	162	0	112	1	113	0	291
11:30	11:45	0	0	2	2	0	0	7	7	0	0	187	9	196	0	112	5	117	0	322
11:45	12:00	0	0	8	8	0	0	15	15	0	0	147	4	151	0	125	3	128	0	302
12:00	12:15	0	0	4	4	0	0	11	11	0	0	178	3	181	0	98	0	98	0	294
12:15	12:30	0	0	6	6	0	0	10	10	1	0	148	3	151	0	112	8	120	1	287
12:30	12:45	0	0	6	6	0	0	8	8	0	0	150	7	157	0	107	5	112	0	283
12:45	13:00	0	0	4	4	0	0	16	16	0	0	169	4	173	0	106	4	110	0	303
13:00	13:15	0	0	9	9	0	0	10	10	1	0	178	4	182	0	103	5	108	1	309
13:15	13:30	0	0	7	7	0	0	13	13	0	0	171	3	174	0	116	4	120	0	314
13:30	13:45	0	0	11	11	0	0	11	11	3	0	174	7	181	0	92	6	98	3	301
13:45	14:00	0	0	9	9	0	0	13	13	0	0	156	5	161	0	113	8	121	0	304
14:00	14:15	0	0	7	7	0	0	18	18	0	0	171	10	181	0	92	6	98	0	304
14:15	14:30	0	0	5	5	0	0	10	10	0	0	183	6	189	0	108	2	110	0	314
14:30	14:45	0	0	4	4	0	0	22	22	0	0	201	2	203	0	106	5	111	0	340
14:45	15:00	0	0	4	4	0	0	23	23	1	0	188	6	194	0	118	7	125	1	346
15:00	15:15	0	0	5	5	0	0	36	36	0	0	209	4	213	0	107	3	110	0	364
15:15	15:30	0	0	3	3	0	0	41	41	2	0	227	2	229	0	110	1	111	2	384
15:30	15:45	0	0	7	7	0	0	38	38	0	0	240	6	246	0	132	2	134	0	425
15:45	16:00	0	0	2	2	0	0	57	57	1	0	245	0	245	0	122	1	123	1	427
16:00	16:15	0	0	6	6	0	1	74	75	3	0	222	5	227	0	120	3	123	3	431
16:15	16:30	0	0	2	2	0	0	78	78	0	0	243	4	247	0	121	0	121	0	448
16:30	16:45	0	0	2	2	0	0	60	60	0	0	215	7	222	0	118	3	121	0	405
16:45	17:00	0	0	5	5	0	0	77	77	0	0	206	1	207	0	114	0	114	0	403
17:00	17:15	0	0	5	5	0	0	67	67	0	0	229	3	232	0	117	0	117	0	421
17:15	17:30	0	0	7	7	0	0	76	76	0	0	225	5	230	0	131	2	133	0	446

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

17:30	17:45	0	0	8	8	0	0	55	55	1	0	192	3	195	0	94	4	98	1	356
17:45	18:00	0	0	3	3	0	0	51	51	0	0	220	4	224	0	119	1	120	0	398
18:00	18:15	0	0	9	9	0	0	38	38	0	0	195	1	196	0	103	3	106	0	349
18:15	18:30	0	0	8	8	0	0	23	23	0	0	231	5	236	0	108	2	110	0	377
18:30	18:45	0	0	2	2	0	0	18	18	0	0	267	5	272	0	121	3	124	0	416
18:45	19:00	0	0	4	4	0	0	16	16	0	0	219	10	229	0	112	10	122	0	371
Total:		0	0	218	218	0	1	1223	1224	20	1	9143	181	9325	0	5508	172	5680	20	16,447

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		CAMBRIDGE ST			CARLING AVE			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	1	0	1	1
07:15	07:30	1	1	2	1	2	3	5
07:30	07:45	0	0	0	1	1	2	2
07:45	08:00	1	0	1	1	6	7	8
08:00	08:15	0	0	0	4	4	8	8
08:15	08:30	0	1	1	9	4	13	14
08:30	08:45	1	1	2	22	1	23	25
08:45	09:00	1	0	1	8	0	8	9
09:00	09:15	0	0	0	4	4	8	8
09:15	09:30	0	1	1	1	0	1	2
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	1	1	1
10:00	10:15	0	0	0	0	0	0	0
10:15	10:30	0	0	0	1	1	2	2
10:30	10:45	1	0	1	0	2	2	3
10:45	11:00	0	0	0	1	0	1	1
11:00	11:15	0	0	0	0	3	3	3
11:15	11:30	0	0	0	2	1	3	3
11:30	11:45	0	0	0	1	1	2	2
11:45	12:00	0	1	1	2	0	2	3
12:00	12:15	0	0	0	2	3	5	5
12:15	12:30	0	0	0	4	1	5	5
12:30	12:45	0	0	0	1	1	2	2
12:45	13:00	0	1	1	0	0	0	1
13:00	13:15	0	0	0	2	2	4	4
13:15	13:30	0	0	0	1	2	3	3
13:30	13:45	0	1	1	0	2	2	3
13:45	14:00	0	0	0	0	0	0	0
14:00	14:15	0	0	0	2	1	3	3
14:15	14:30	0	0	0	0	0	0	0
14:30	14:45	0	0	0	2	2	4	4
14:45	15:00	0	0	0	0	0	0	0
15:00	15:15	0	0	0	2	17	19	19
15:15	15:30	0	0	0	0	2	2	2
15:30	15:45	0	0	0	0	6	6	6
15:45	16:00	0	1	1	0	2	2	3
16:00	16:15	0	0	0	2	3	5	5
16:15	16:30	0	1	1	0	2	2	3
16:30	16:45	0	0	0	5	0	5	5
16:45	17:00	0	1	1	0	5	5	6
17:00	17:15	0	0	0	2	2	4	4
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	3	1	4	4
17:45	18:00	0	0	0	4	1	5	5
18:00	18:15	0	0	0	4	2	6	6

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

18:15	18:30	1	1	2	6	1	7	9
18:30	18:45	0	0	0	1	2	3	3
18:45	19:00	0	0	0	4	0	4	4
Total		6	11	**17**	106	91	197	214

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

	CAMBRIDGE ST			CARLING AVE			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	1	**1**	0	0	**0**	**1**
07:15 07:30	2	4	**6**	0	2	**2**	**8**
07:30 07:45	1	2	**3**	0	0	**0**	**3**
07:45 08:00	3	3	**6**	0	0	**0**	**6**
08:00 08:15	9	10	**19**	0	0	**0**	**19**
08:15 08:30	28	12	**40**	0	0	**0**	**40**
08:30 08:45	5	13	**18**	0	1	**1**	**19**
08:45 09:00	46	16	**62**	0	0	**0**	**62**
09:00 09:15	15	3	**18**	2	1	**3**	**21**
09:15 09:30	14	6	**20**	0	0	**0**	**20**
09:30 09:45	12	6	**18**	0	1	**1**	**19**
09:45 10:00	6	4	**10**	0	5	**5**	**15**
10:00 10:15	4	5	**9**	0	0	**0**	**9**
10:15 10:30	5	4	**9**	0	0	**0**	**9**
10:30 10:45	0	9	**9**	0	2	**2**	**11**
10:45 11:00	0	7	**7**	0	0	**0**	**7**
11:00 11:15	5	1	**6**	5	0	**5**	**11**
11:15 11:30	3	7	**10**	3	0	**3**	**13**
11:30 11:45	1	6	**7**	0	0	**0**	**7**
11:45 12:00	7	7	**14**	0	0	**0**	**14**
12:00 12:15	6	8	**14**	0	0	**0**	**14**
12:15 12:30	6	6	**12**	0	3	**3**	**15**
12:30 12:45	18	11	**29**	2	3	**5**	**34**
12:45 13:00	4	8	**12**	0	1	**1**	**13**
13:00 13:15	10	14	**24**	0	0	**0**	**24**
13:15 13:30	8	6	**14**	0	0	**0**	**14**
13:30 13:45	5	10	**15**	0	0	**0**	**15**
13:45 14:00	7	7	**14**	0	0	**0**	**14**
14:00 14:15	6	15	**21**	0	1	**1**	**22**
14:15 14:30	7	4	**11**	0	0	**0**	**11**
14:30 14:45	8	2	**10**	0	0	**0**	**10**
14:45 15:00	10	6	**16**	0	0	**0**	**16**
15:00 15:15	11	27	**38**	1	0	**1**	**39**
15:15 15:30	7	11	**18**	2	1	**3**	**21**
15:30 15:45	8	11	**19**	1	0	**1**	**20**
15:45 16:00	7	10	**17**	3	0	**3**	**20**
16:00 16:15	6	7	**13**	1	0	**1**	**14**
16:15 16:30	12	11	**23**	0	3	**3**	**26**
16:30 16:45	8	5	**13**	0	0	**0**	**13**
16:45 17:00	16	10	**26**	0	1	**1**	**27**
17:00 17:15	4	6	**10**	1	0	**1**	**11**
17:15 17:30	4	9	**13**	0	0	**0**	**13**
17:30 17:45	8	6	**14**	1	0	**1**	**15**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

17:45 18:00	3	3	**6**	0	0	**0**	**6**
18:00 18:15	6	5	**11**	3	0	**3**	**14**
18:15 18:30	1	3	**4**	2	0	**2**	**6**
18:30 18:45	7	4	**11**	0	0	**0**	**11**
18:45 19:00	4	3	**7**	1	0	**1**	**8**
Total	373	354	**727**	28	25	**53**	**780**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		CAMBRIDGE ST									CARLING AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	2	0	**2**	**7**	**7**
07:15	07:30	0	0	0	**0**	0	0	1	**1**	**1**	0	2	0	**2**	0	4	0	**4**	**6**	**7**
07:30	07:45	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	4	0	**4**	**8**	**8**
07:45	08:00	0	0	0	**0**	0	0	0	**0**	**0**	0	8	0	**8**	0	4	0	**4**	**12**	**12**
08:00	08:15	0	0	0	**0**	0	0	1	**1**	**1**	0	8	0	**8**	0	5	0	**5**	**13**	**14**
08:15	08:30	0	0	0	**0**	0	0	2	**2**	**2**	0	6	0	**6**	0	9	0	**9**	**15**	**17**
08:30	08:45	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	2	1	**3**	**10**	**10**
08:45	09:00	0	0	0	**0**	0	0	0	**0**	**0**	0	10	0	**10**	0	3	0	**3**	**13**	**13**
09:00	09:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	2	0	**2**	**7**	**7**
09:15	09:30	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	5	0	**5**	**12**	**12**
09:30	09:45	0	0	0	**0**	0	0	1	**1**	**1**	0	6	0	**6**	0	1	0	**1**	**7**	**8**
09:45	10:00	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	0	3	0	**3**	**12**	**12**
10:00	10:15	0	0	0	**0**	0	0	1	**1**	**1**	0	1	0	**1**	0	4	0	**4**	**5**	**6**
10:15	10:30	0	0	0	**0**	0	0	0	**0**	**0**	0	11	0	**11**	0	5	0	**5**	**16**	**16**
10:30	10:45	0	0	0	**0**	0	0	0	**0**	**0**	0	12	0	**12**	0	7	0	**7**	**19**	**19**
10:45	11:00	0	0	1	**1**	0	0	0	**0**	**1**	0	4	0	**4**	0	1	1	**2**	**6**	**7**
11:00	11:15	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	5	0	**5**	**12**	**12**
11:15	11:30	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	4	0	**4**	**8**	**8**
11:30	11:45	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	3	0	**3**	**10**	**10**
11:45	12:00	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	7	0	**7**	**12**	**12**
12:00	12:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	1	0	**1**	**6**	**6**
12:15	12:30	0	0	0	**0**	0	0	1	**1**	**1**	0	4	0	**4**	0	4	0	**4**	**8**	**9**
12:30	12:45	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	2	0	**2**	**8**	**8**
12:45	13:00	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	2	0	**2**	**7**	**7**
13:00	13:15	0	0	0	**0**	0	0	1	**1**	**1**	0	12	0	**12**	0	3	0	**3**	**15**	**16**
13:15	13:30	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	6	0	**6**	**12**	**12**
13:30	13:45	0	0	1	**1**	0	0	2	**2**	**3**	0	7	0	**7**	0	1	0	**1**	**8**	**11**
13:45	14:00	0	0	0	**0**	0	0	0	**0**	**0**	0	8	1	**9**	0	5	0	**5**	**14**	**14**
14:00	14:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	5	1	**6**	**11**	**11**
14:15	14:30	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	3	0	**3**	**10**	**10**
14:30	14:45	0	0	0	**0**	0	0	0	**0**	**0**	0	7	1	**8**	0	3	0	**3**	**11**	**11**
14:45	15:00	0	0	1	**1**	0	0	0	**0**	**1**	0	8	0	**8**	0	3	0	**3**	**11**	**12**
15:00	15:15	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	5	0	**5**	**12**	**12**
15:15	15:30	0	0	0	**0**	0	0	2	**2**	**2**	0	8	0	**8**	0	1	0	**1**	**9**	**11**
15:30	15:45	0	0	0	**0**	0	0	0	**0**	**0**	0	8	0	**8**	0	1	0	**1**	**9**	**9**
15:45	16:00	0	0	0	**0**	0	0	1	**1**	**1**	0	7	0	**7**	0	1	0	**1**	**8**	**9**
16:00	16:15	0	0	0	**0**	0	0	3	**3**	**3**	0	7	0	**7**	0	2	0	**2**	**9**	**12**
16:15	16:30	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	0	1	0	**1**	**10**	**10**
16:30	16:45	0	0	0	**0**	0	0	0	**0**	**0**	0	5	1	**6**	0	2	0	**2**	**8**	**8**
16:45	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	1	0	**1**	**6**	**6**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	1	0	**1**	**8**	**8**
17:15	17:30	0	0	0	**0**	0	0	0	**0**	**0**	0	7	1	**8**	0	2	0	**2**	**10**	**10**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

17:30	17:45	0	0	0	**0**	0	0	1	**1**	**1**	0	13	0	**13**	0	2	0	**2**	**15**	**16**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	3	0	**3**	**10**	**10**
18:00	18:15	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	1	0	**1**	**4**	**4**
18:15	18:30	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	2	0	**2**	**5**	**5**
18:30	18:45	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	5	0	**5**	**11**	**11**
18:45	19:00	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	1	0	**1**	**7**	**7**
Total:	None	0	0	3	**3**	0	0	17	**17**	**20**	0	316	4	**320**	0	149	3	**152**	**472**	**492**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		CAMBRIDGE ST		CARLING AVE		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
10:00	10:15	0	0	0	0	0
10:15	10:30	0	0	0	0	0
10:30	10:45	0	0	0	0	0
10:45	11:00	0	0	0	0	0
11:00	11:15	0	0	0	0	0
11:15	11:30	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
13:30	13:45	0	0	0	0	0
13:45	14:00	0	0	0	0	0
14:00	14:15	0	0	0	0	0
14:15	14:30	0	0	0	0	0
14:30	14:45	0	0	0	0	0
14:45	15:00	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIDGE ST @ CARLING AVE

Survey Date: Thursday, May 17, 2018 **WO No:** 37836

Start Time: 07:00 **Device:** Miovision

17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
18:00	18:15	0	0	0	0	0
18:15	18:30	0	0	0	0	0
18:30	18:45	0	0	0	0	0
18:45	19:00	0	0	0	0	0
Total		0	0	0	0	0

Transportation Services - Traffic Services

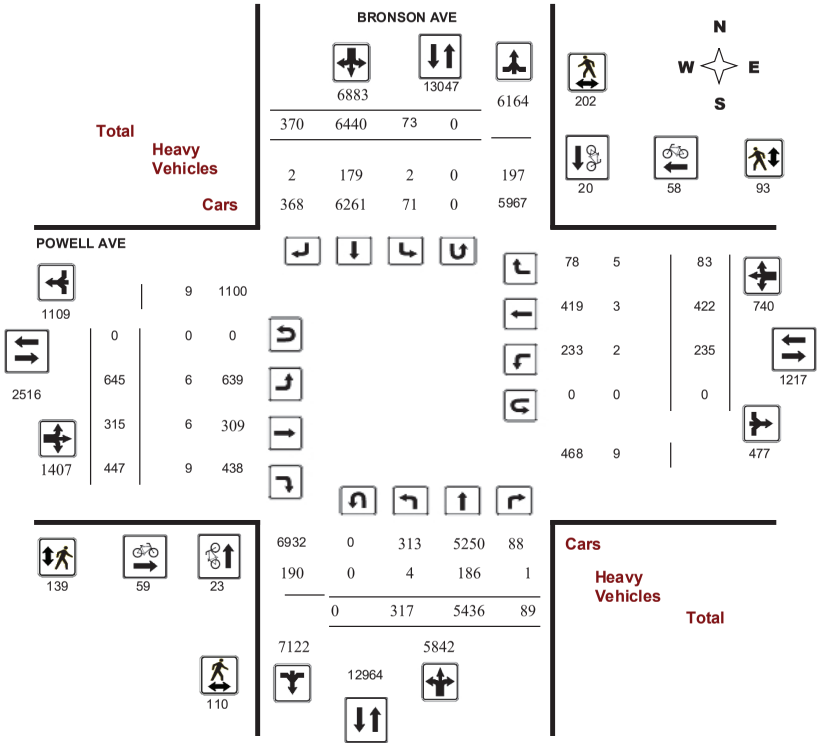
Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

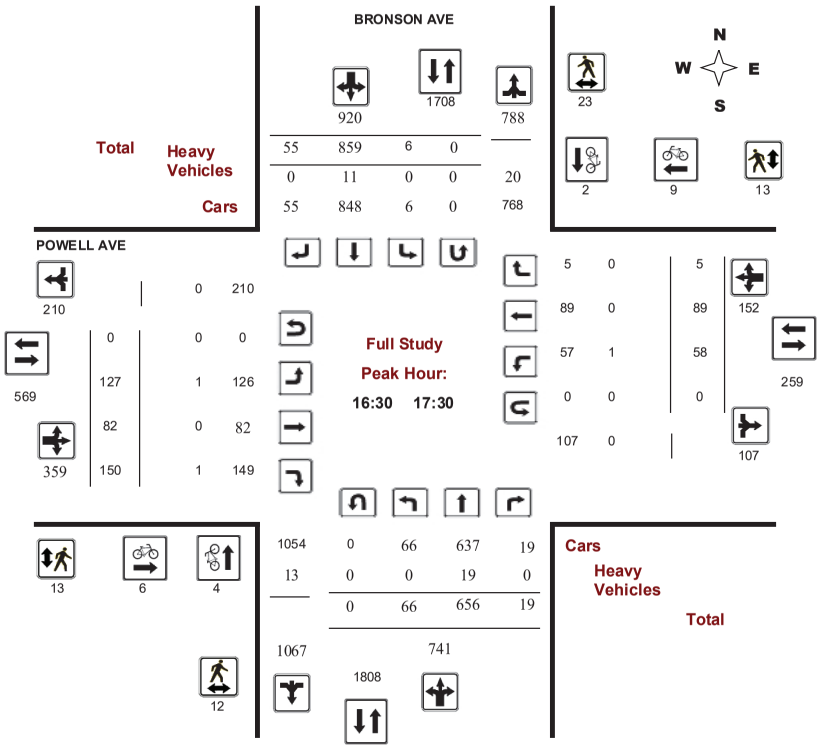
Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



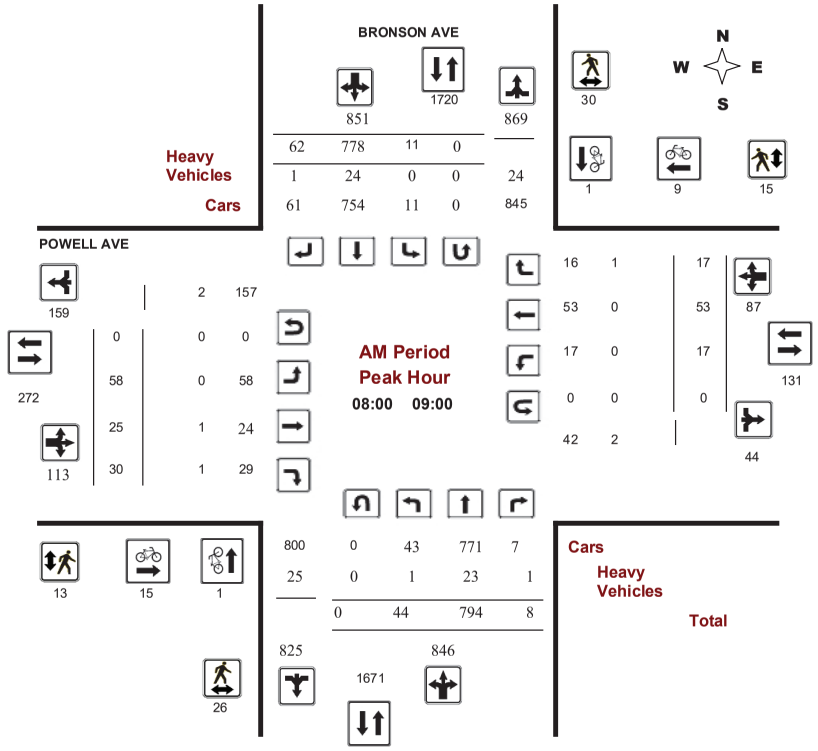
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision



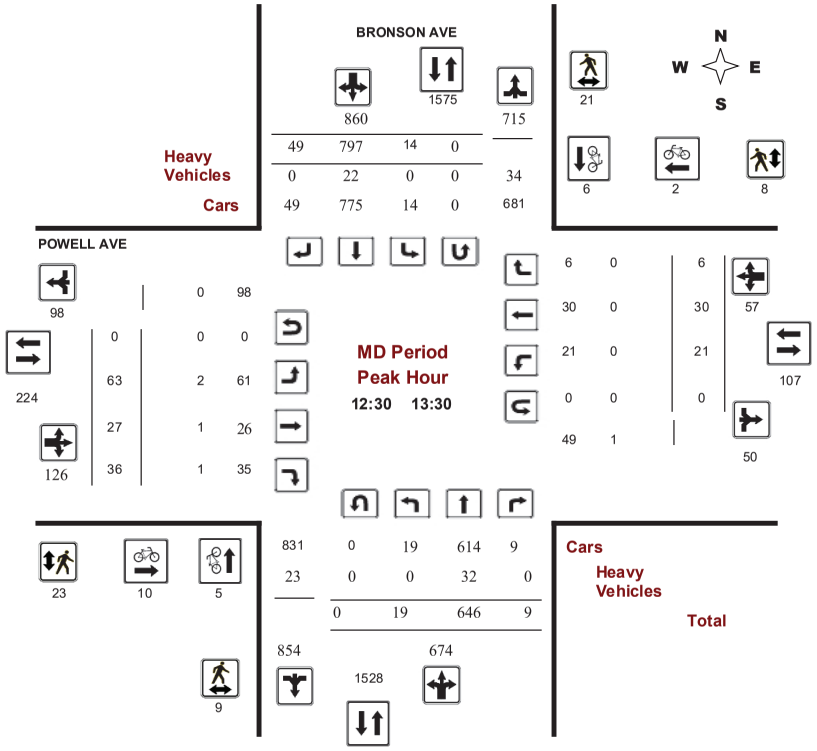
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision



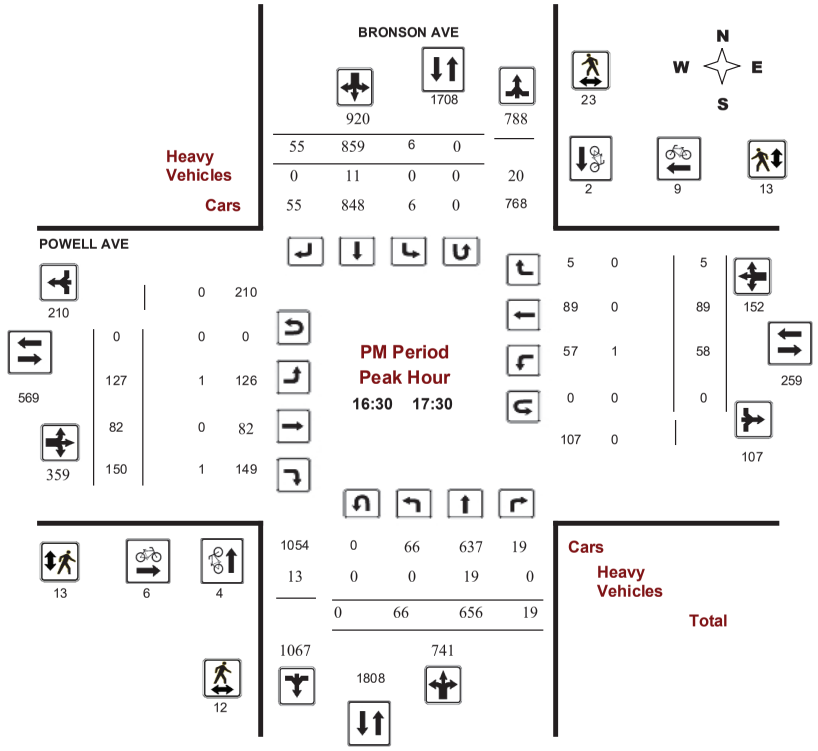
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, August 08, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

	BRONSON AVE								POWELL AVE								
	Northbound				Southbound				Eastbound				Westbound				
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	39	714	5	**758**	6	796	40	**842**	**1600**	52	13	19	**84**	11	31	5	**47**	**131**	**1731**
08:00 09:00	44	794	8	**846**	11	778	62	**851**	**1697**	58	25	30	**113**	17	53	17	**87**	**200**	**1897**
09:00 10:00	33	640	11	**684**	7	733	42	**782**	**1466**	51	23	24	**98**	20	32	13	**65**	**163**	**1629**
11:30 12:30	21	617	13	**651**	13	757	38	**808**	**1459**	73	29	28	**130**	12	43	17	**72**	**202**	**1661**
12:30 13:30	19	646	9	**674**	14	797	49	**860**	**1534**	63	27	36	**126**	21	30	6	**57**	**183**	**1717**
15:00 16:00	42	713	8	**763**	7	875	33	**915**	**1678**	106	51	66	**223**	30	45	11	**86**	**309**	**1987**
16:00 17:00	62	674	21	**757**	7	771	49	**827**	**1584**	119	81	145	**345**	78	104	7	**189**	**534**	**2118**
17:00 18:00	57	638	14	**709**	8	933	57	**998**	**1707**	123	66	99	**288**	46	84	7	**137**	**425**	**2132**
Sub Total	317	5436	89	**5842**	73	6440	370	**6883**	**12725**	645	315	447	**1407**	235	422	83	**740**	**2147**	**14872**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	317	5436	89	**5842**	73	6440	370	**6883**	**12725**	645	315	447	**1407**	235	422	83	**740**	**2147**	**14872**
EQ 12Hr	441	7556	124	**8120**	101	8952	514	**9567**	**17688**	897	438	621	**1956**	327	587	115	**1029**	**2984**	**20672**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	374	6409	105	**6888**	86	7593	436	**8115**	**15919**	760	371	527	**1659**	277	498	98	**872**	**2686**	**18605**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**0.9**					
AVG 24Hr	490	8396	137	**9023**	113	9947	571	**10631**	**19654**	996	487	690	**2173**	363	652	128	**1143**	**3316**	**22970**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		BRONSON AVE									POWELL AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	5	163	0	168	3	211	12	226	7	11	2	4	17	1	4	0	5	7	416
07:15	07:30	8	153	4	165	0	202	4	206	19	13	3	2	18	2	12	1	15	19	404
07:30	07:45	5	218	1	224	1	176	10	187	15	9	2	7	18	3	5	3	11	15	440
07:45	08:00	21	180	0	201	2	207	14	223	13	19	6	6	31	5	10	1	16	13	471
08:00	08:15	15	185	0	200	4	206	13	223	11	10	6	12	28	3	10	1	14	11	465
08:15	08:30	7	203	2	212	3	189	14	206	9	14	5	6	25	3	17	6	26	9	469
08:30	08:45	12	202	3	217	1	190	14	205	15	19	9	7	35	4	17	5	26	15	483
08:45	09:00	10	204	3	217	3	193	21	217	15	15	5	5	25	7	9	5	21	15	480
09:00	09:15	5	164	4	173	2	180	11	193	20	11	8	5	24	5	8	2	15	20	405
09:15	09:30	5	174	0	179	2	175	14	191	16	14	3	5	22	5	4	5	14	16	406
09:30	09:45	9	145	2	156	1	177	10	188	13	13	6	7	26	5	10	4	19	13	389
09:45	10:00	14	157	5	176	2	201	7	210	19	13	6	7	26	5	10	2	17	19	429
11:30	11:45	8	142	5	155	2	197	8	207	9	17	3	11	31	6	8	3	17	9	410
11:45	12:00	7	172	5	184	2	196	7	205	13	16	7	3	26	0	10	6	16	13	431
12:00	12:15	4	156	1	161	5	178	14	197	10	23	9	4	36	3	11	3	17	10	411
12:15	12:30	2	147	2	151	4	186	9	199	11	17	10	10	37	3	14	5	22	11	409
12:30	12:45	5	157	1	163	4	202	11	217	10	9	8	11	28	6	3	2	11	10	419
12:45	13:00	4	149	5	158	5	196	13	214	11	14	5	8	27	4	4	2	10	11	409
13:00	13:15	6	144	2	152	1	184	9	194	15	24	12	7	43	7	15	2	24	15	413
13:15	13:30	4	196	1	201	4	215	16	235	18	16	2	10	28	4	8	0	12	18	476
15:00	15:15	9	187	2	198	0	216	7	223	10	30	3	11	44	2	11	2	15	10	480
15:15	15:30	18	197	1	216	2	212	10	224	11	22	10	16	48	6	6	1	13	11	501
15:30	15:45	9	165	1	175	3	233	8	244	12	26	11	19	56	8	9	3	20	12	495
15:45	16:00	6	164	4	174	2	214	8	224	11	28	27	20	75	14	19	5	38	11	511
16:00	16:15	14	167	6	187	3	184	12	199	12	38	17	29	84	19	36	3	58	12	528
16:15	16:30	14	177	4	195	2	181	11	194	6	21	18	34	73	26	25	2	53	6	515
16:30	16:45	15	145	4	164	1	199	15	215	8	40	30	50	120	15	17	0	32	8	531
16:45	17:00	19	185	7	211	1	207	11	219	7	20	16	32	68	18	26	2	46	7	544
17:00	17:15	17	154	4	175	3	216	12	231	5	34	22	31	87	11	30	1	42	5	535
17:15	17:30	15	172	4	191	1	237	17	255	10	33	14	37	84	14	16	2	32	10	562
17:30	17:45	11	148	1	160	0	244	7	251	7	29	15	12	56	12	21	2	35	7	502
17:45	18:00	14	164	5	183	4	236	21	261	6	27	15	19	61	9	17	2	28	6	533
Total:		317	5436	89	5842	73	6440	370	6883	374	645	315	447	1407	235	422	83	740	374	14,872

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		BRONSON AVE			POWELL AVE			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	4	1	5	5
07:15	07:30	0	0	0	2	1	3	3
07:30	07:45	0	1	1	2	0	2	3
07:45	08:00	1	0	1	2	0	2	3
08:00	08:15	1	1	2	4	0	4	6
08:15	08:30	0	0	0	4	4	8	8
08:30	08:45	0	0	0	6	3	9	9
08:45	09:00	0	0	0	1	2	3	3
09:00	09:15	1	0	1	2	1	3	4
09:15	09:30	1	0	1	2	3	5	6
09:30	09:45	1	0	1	4	2	6	7
09:45	10:00	0	2	2	2	1	3	5
11:30	11:45	0	0	0	1	1	2	2
11:45	12:00	1	0	1	0	2	2	3
12:00	12:15	0	2	2	0	0	0	2
12:15	12:30	0	0	0	0	1	1	1
12:30	12:45	2	1	3	0	1	1	4
12:45	13:00	2	2	4	2	0	2	6
13:00	13:15	1	3	4	4	0	4	8
13:15	13:30	0	0	0	4	1	5	5
15:00	15:15	0	0	0	3	1	4	4
15:15	15:30	3	2	5	0	5	5	10
15:30	15:45	2	1	3	1	2	3	6
15:45	16:00	0	0	0	1	1	2	2
16:00	16:15	0	0	0	0	1	1	1
16:15	16:30	0	0	0	0	3	3	3
16:30	16:45	1	0	1	1	3	4	5
16:45	17:00	0	1	1	1	0	1	2
17:00	17:15	1	1	2	1	3	4	6
17:15	17:30	2	0	2	3	3	6	8
17:30	17:45	2	0	2	1	11	12	14
17:45	18:00	1	3	4	1	1	2	6
Total		23	20	43	59	58	117	160

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

		BRONSON AVE			POWELL AVE			
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	4	3	**7**	6	2	**8**	**15**
07:15	07:30	1	3	**4**	2	2	**4**	**8**
07:30	07:45	8	14	**22**	5	0	**5**	**27**
07:45	08:00	3	10	**13**	5	2	**7**	**20**
08:00	08:15	7	9	**16**	5	6	**11**	**27**
08:15	08:30	9	1	**10**	0	4	**4**	**14**
08:30	08:45	5	10	**15**	4	4	**8**	**23**
08:45	09:00	5	10	**15**	4	1	**5**	**20**
09:00	09:15	3	5	**8**	2	0	**2**	**10**
09:15	09:30	3	7	**10**	5	2	**7**	**17**
09:30	09:45	2	9	**11**	4	8	**12**	**23**
09:45	10:00	3	6	**9**	3	6	**9**	**18**
11:30	11:45	1	7	**8**	5	3	**8**	**16**
11:45	12:00	2	1	**3**	5	1	**6**	**9**
12:00	12:15	4	4	**8**	6	4	**10**	**18**
12:15	12:30	3	3	**6**	3	6	**9**	**15**
12:30	12:45	3	6	**9**	6	4	**10**	**19**
12:45	13:00	2	5	**7**	9	1	**10**	**17**
13:00	13:15	4	5	**9**	6	2	**8**	**17**
13:15	13:30	0	5	**5**	2	1	**3**	**8**
15:00	15:15	2	7	**9**	4	1	**5**	**14**
15:15	15:30	0	10	**10**	1	1	**2**	**12**
15:30	15:45	4	6	**10**	7	2	**9**	**19**
15:45	16:00	2	4	**6**	5	3	**8**	**14**
16:00	16:15	3	3	**6**	2	3	**5**	**11**
16:15	16:30	4	1	**5**	4	0	**4**	**9**
16:30	16:45	3	8	**11**	3	7	**10**	**21**
16:45	17:00	2	3	**5**	2	1	**3**	**8**
17:00	17:15	3	8	**11**	5	1	**6**	**17**
17:15	17:30	4	4	**8**	3	4	**7**	**15**
17:30	17:45	6	16	**22**	8	8	**16**	**38**
17:45	18:00	5	9	**14**	8	3	**11**	**25**
Total	.....	110	202	**312**	139	93	**232**	**544**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		BRONSON AVE									POWELL AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	3	0	**3**	0	4	0	**4**	**7**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
07:15	07:30	0	6	0	**6**	0	13	0	**13**	**19**	1	0	0	**1**	0	0	0	**0**	**1**	**20**
07:30	07:45	0	9	0	**9**	0	6	0	**6**	**15**	0	0	1	**1**	0	0	1	**1**	**2**	**17**
07:45	08:00	0	6	0	**6**	0	7	0	**7**	**13**	1	0	0	**1**	0	0	0	**0**	**1**	**14**
08:00	08:15	0	7	0	**7**	0	4	0	**4**	**11**	0	0	1	**1**	0	0	0	**0**	**1**	**12**
08:15	08:30	0	4	0	**4**	0	4	1	**5**	**9**	0	0	0	**0**	0	0	0	**0**	**0**	**9**
08:30	08:45	0	7	1	**8**	0	7	0	**7**	**15**	0	0	0	**0**	0	0	1	**1**	**1**	**16**
08:45	09:00	1	5	0	**6**	0	9	0	**9**	**15**	0	1	0	**1**	0	0	0	**0**	**1**	**16**
09:00	09:15	0	11	0	**11**	0	9	0	**9**	**20**	0	0	0	**0**	0	0	0	**0**	**0**	**20**
09:15	09:30	0	9	0	**9**	0	7	0	**7**	**16**	0	1	1	**2**	0	0	0	**0**	**2**	**18**
09:30	09:45	0	4	0	**4**	1	8	0	**9**	**13**	0	0	1	**1**	0	0	2	**2**	**3**	**16**
09:45	10:00	1	10	0	**11**	1	7	0	**8**	**19**	0	0	0	**0**	0	0	0	**0**	**0**	**19**
11:30	11:45	0	3	0	**3**	0	6	0	**6**	**9**	0	0	0	**0**	0	0	0	**0**	**0**	**9**
11:45	12:00	0	7	0	**7**	0	6	0	**6**	**13**	0	0	0	**0**	0	1	0	**1**	**1**	**14**
12:00	12:15	0	3	0	**3**	0	6	1	**7**	**10**	0	1	0	**1**	0	1	0	**1**	**2**	**12**
12:15	12:30	0	3	0	**3**	0	8	0	**8**	**11**	1	2	0	**3**	0	1	1	**2**	**5**	**16**
12:30	12:45	0	7	0	**7**	0	3	0	**3**	**10**	0	1	0	**1**	0	0	0	**0**	**1**	**11**
12:45	13:00	0	6	0	**6**	0	5	0	**5**	**11**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
13:00	13:15	0	10	0	**10**	0	5	0	**5**	**15**	1	0	1	**2**	0	0	0	**0**	**2**	**17**
13:15	13:30	0	9	0	**9**	0	9	0	**9**	**18**	1	0	0	**1**	0	0	0	**0**	**1**	**19**
15:00	15:15	0	5	0	**5**	0	5	0	**5**	**10**	0	0	0	**0**	0	0	0	**0**	**0**	**10**
15:15	15:30	0	7	0	**7**	0	4	0	**4**	**11**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
15:30	15:45	0	6	0	**6**	0	6	0	**6**	**12**	0	0	2	**2**	0	0	0	**0**	**2**	**14**
15:45	16:00	0	5	0	**5**	0	6	0	**6**	**11**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
16:00	16:15	2	4	0	**6**	0	6	0	**6**	**12**	0	0	0	**0**	0	0	0	**0**	**0**	**12**
16:15	16:30	0	4	0	**4**	0	2	0	**2**	**6**	0	0	1	**1**	1	0	0	**1**	**2**	**8**
16:30	16:45	0	6	0	**6**	0	2	0	**2**	**8**	1	0	0	**1**	0	0	0	**0**	**1**	**9**
16:45	17:00	0	6	0	**6**	0	1	0	**1**	**7**	0	0	1	**1**	0	0	0	**0**	**1**	**8**
17:00	17:15	0	4	0	**4**	0	1	0	**1**	**5**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
17:15	17:30	0	3	0	**3**	0	7	0	**7**	**10**	0	0	0	**0**	1	0	0	**1**	**1**	**11**
17:30	17:45	0	4	0	**4**	0	3	0	**3**	**7**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
17:45	18:00	0	3	0	**3**	0	3	0	**3**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
Total:	None	4	186	1	**191**	2	179	2	**183**	**374**	6	6	9	**21**	2	3	5	**10**	**31**	**405**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ POWELL AVE

Survey Date: Thursday, August 08, 2019 **WO No:** 38709

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		BRONSON AVE	BRONSON AVE	POWELL AVE	POWELL AVE	
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Transportation Services - Traffic Services

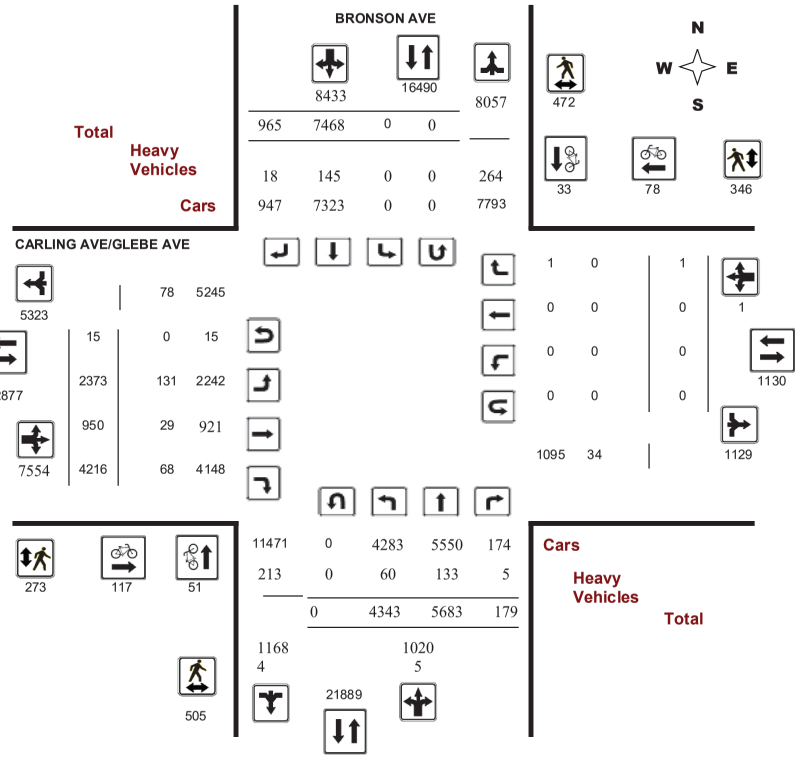
Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

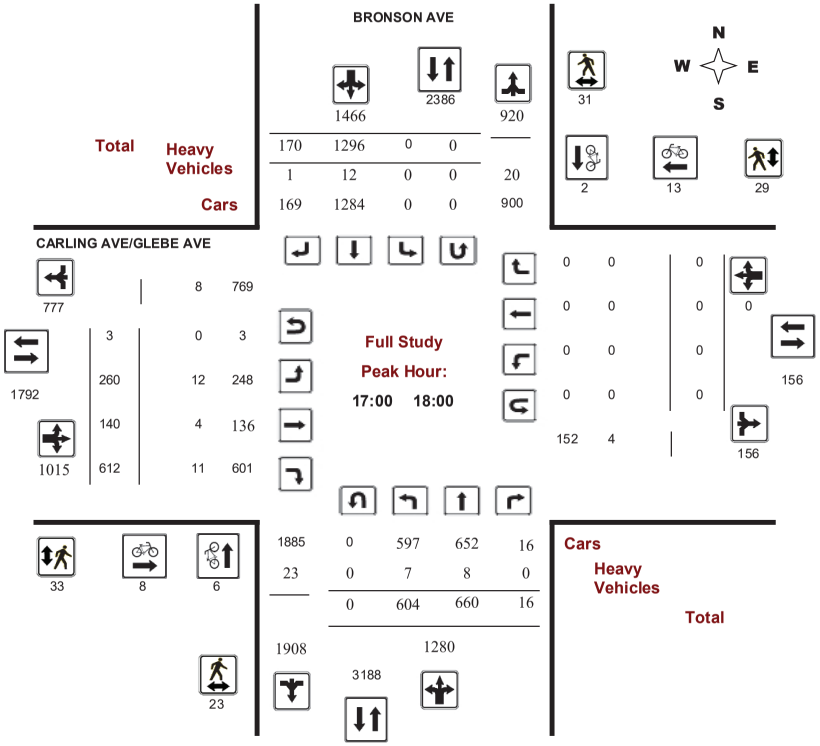
Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



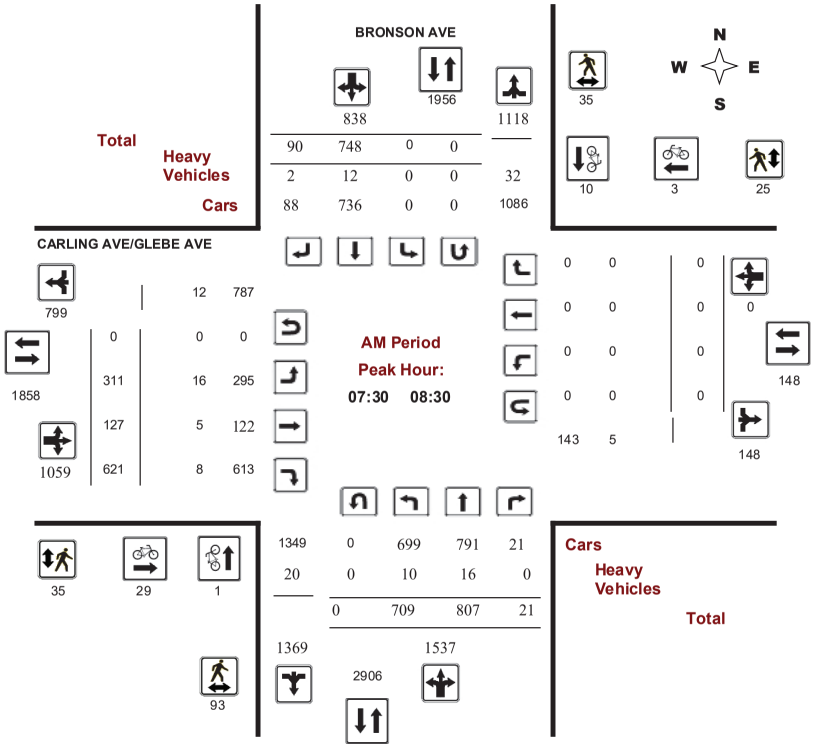
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision



Comments

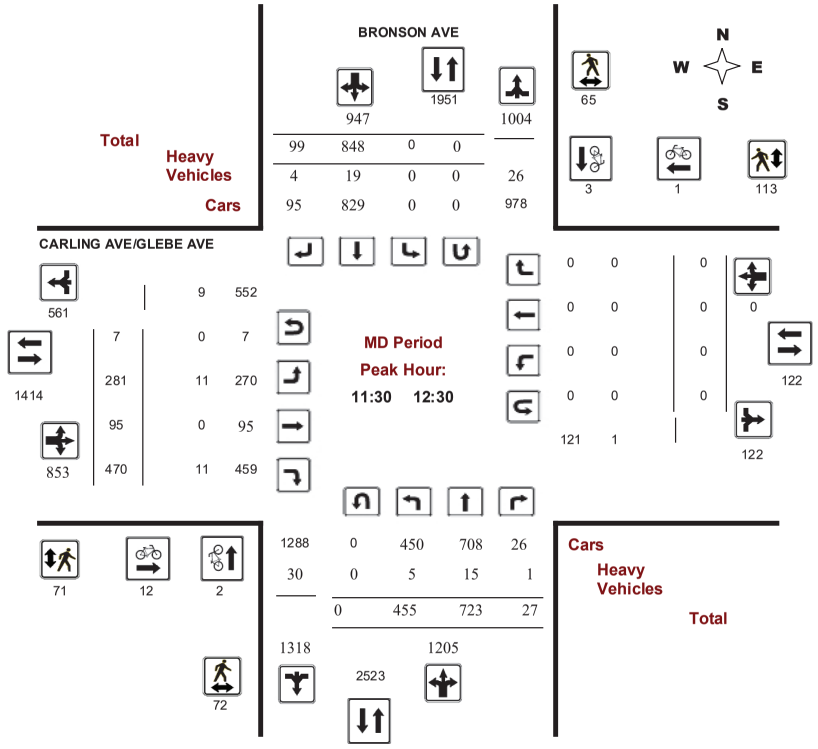
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision



Comments

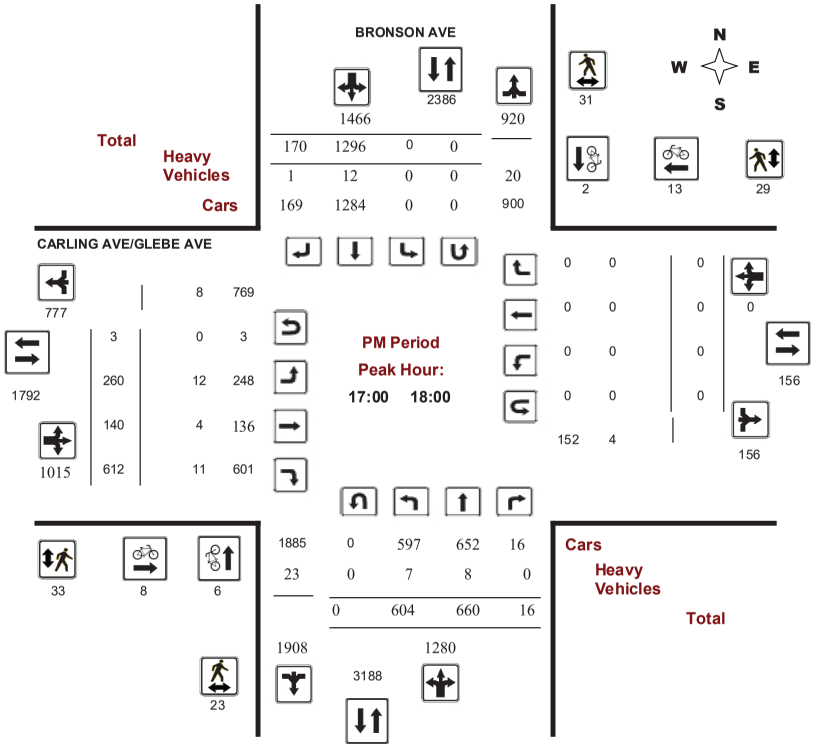
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, September 12, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 15 Westbound: 0

AADT Factor

1.00

	BRONSON AVE									CARLING AVE/GLEBE AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	642	809	14	**1465**	0	668	98	**766**	**2231**	269	70	559	**898**	0	0	0	**0**	**898**	**3129**
08:00 09:00	671	765	34	**1470**	0	791	81	**872**	**2342**	336	151	568	**1055**	0	0	0	**0**	**1055**	**3397**
09:00 10:00	532	648	29	**1209**	0	789	89	**878**	**2087**	349	119	453	**921**	0	0	0	**0**	**921**	**3008**
11:30 12:30	455	723	27	**1205**	0	848	99	**947**	**2152**	281	95	470	**846**	0	0	0	**0**	**846**	**2998**
12:30 13:30	384	697	19	**1100**	0	902	86	**988**	**2088**	278	103	475	**856**	0	0	0	**0**	**856**	**2944**
15:00 16:00	501	690	23	**1214**	0	1012	143	**1155**	**2369**	302	128	519	**949**	0	0	0	**0**	**949**	**3318**
16:00 17:00	554	691	17	**1262**	0	1162	199	**1361**	**2623**	298	144	560	**1002**	0	0	1	**1**	**1003**	**3626**
17:00 18:00	604	660	16	**1280**	0	1296	170	**1466**	**2746**	260	140	612	**1012**	0	0	0	**0**	**1012**	**3758**
Sub Total	4343	5683	179	**10205**	0	7468	965	**8433**	**18638**	2373	950	4216	**7539**	0	0	1	**1**	**7540**	**26178**
U Turns				**0**				**0**	**0**				**15**				**0**	**15**	**15**
Total	4343	5683	179	**10205**	0	7468	965	**8433**	**18638**	2373	950	4216	**7554**	0	0	1	**1**	**7555**	**26193**
EQ 12Hr	6037	7899	249	**14185**	0	10381	1341	**11722**	**25907**	3298	1320	5860	**10500**	0	0	1	**1**	**10501**	**36408**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	5689	7445	234	**13369**	0	9783	1264	**11047**	**25907**	3109	1244	5523	**9896**	0	0	1	**1**	**10501**	**36408**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	7453	9753	307	**17513**	0	12816	1656	**14472**	**31985**	4072	1630	7235	**12963**	0	0	2	**2**	**12965**	**44950**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		BRONSON AVE									CARLING AVE/GLEBE AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	128	194	5	327	0	175	25	200	1064	51	8	117	176	0	0	0	0	1064	703
07:15	07:30	157	202	6	365	0	156	22	178	1100	70	21	129	220	0	0	0	0	1100	763
07:30	07:45	167	225	2	394	0	181	29	210	1228	72	20	146	238	0	0	0	0	1228	842
07:45	08:00	190	188	1	379	0	156	22	178	1144	76	21	167	264	0	0	0	0	1144	821
08:00	08:15	176	200	4	380	0	194	17	211	1229	87	44	157	288	0	0	0	0	1229	879
08:15	08:30	176	194	14	384	0	217	22	239	1261	76	42	151	269	0	0	0	0	1261	892
08:30	08:45	166	184	12	362	0	205	22	227	1185	83	27	124	234	0	0	0	0	1185	823
08:45	09:00	153	187	4	344	0	175	20	195	1127	90	38	136	265	0	0	0	0	1127	804
09:00	09:15	160	154	5	319	0	170	19	189	1058	88	31	138	257	0	0	0	0	1058	765
09:15	09:30	151	178	10	339	0	188	18	206	1104	91	20	102	213	0	0	0	0	1104	758
09:30	09:45	125	178	9	312	0	213	26	239	1127	91	24	94	210	0	0	0	0	1127	761
09:45	10:00	96	138	5	239	0	218	26	244	1037	79	44	119	243	0	0	0	0	1037	726
11:30	11:45	117	186	5	308	0	224	23	247	1156	74	21	117	213	0	0	0	0	1156	768
11:45	12:00	109	213	9	331	0	185	32	217	1145	78	30	121	233	0	0	0	0	1145	781
12:00	12:15	99	150	5	254	0	198	25	223	995	55	19	115	191	0	0	0	0	995	668
12:15	12:30	130	174	8	312	0	241	19	260	1178	74	25	117	216	0	0	0	0	1178	788
12:30	12:45	95	128	3	226	0	245	24	269	1064	66	32	130	228	0	0	0	0	1064	723
12:45	13:00	95	173	6	274	0	229	18	247	1146	83	24	140	247	0	0	0	0	1146	768
13:00	13:15	112	200	6	318	0	200	20	220	1091	71	21	82	174	0	0	0	0	1091	712
13:15	13:30	82	196	4	282	0	228	24	252	1139	58	26	123	207	0	0	0	0	1139	741
15:00	15:15	108	174	11	293	0	223	23	246	1113	70	24	107	201	0	0	0	0	1113	740
15:15	15:30	116	179	0	295	0	247	42	289	1241	79	38	152	269	0	0	0	0	1241	853
15:30	15:45	130	193	9	332	0	258	44	302	1312	78	32	149	260	0	0	0	0	1312	894
15:45	16:00	147	144	3	294	0	284	34	318	1226	75	34	111	220	0	0	0	0	1226	832
16:00	16:15	135	164	3	302	0	269	49	318	1256	69	27	134	230	0	0	0	0	1256	850
16:15	16:30	143	163	4	310	0	315	50	365	1363	78	29	131	238	0	0	1	1	1363	914
16:30	16:45	142	190	8	340	0	293	54	347	1400	72	43	158	274	0	0	0	0	1400	961
16:45	17:00	134	174	2	310	0	285	46	331	1316	79	45	137	261	0	0	0	0	1316	902
17:00	17:15	174	155	6	335	0	330	44	374	1417	63	27	160	251	0	0	0	0	1417	960
17:15	17:30	139	142	5	286	0	331	51	382	1358	65	35	152	252	0	0	0	0	1358	920
17:30	17:45	154	177	2	333	0	302	48	350	1390	65	44	163	273	0	0	0	0	1390	956
17:45	18:00	137	186	3	326	0	333	27	360	1409	67	34	137	239	0	0	0	0	1409	925
Total:		4343	5683	179	1020	0	7468	965	8433	38379	2373	950	4216	7554	0	0	1	1	38379	26,193

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		BRONSON AVE			CARLING AVE/GLEBE AVE			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	2	1	3	3	0	3	6
07:15	07:30	0	0	0	1	1	2	2
07:30	07:45	0	1	1	3	0	3	4
07:45	08:00	0	2	2	3	1	4	6
08:00	08:15	1	2	3	5	2	7	10
08:15	08:30	0	5	5	18	0	18	23
08:30	08:45	0	3	3	20	2	22	25
08:45	09:00	1	0	1	12	2	14	15
09:00	09:15	2	0	2	5	2	7	9
09:15	09:30	1	1	2	4	0	4	6
09:30	09:45	0	1	1	1	1	2	3
09:45	10:00	2	2	4	1	1	2	6
11:30	11:45	0	1	1	6	0	6	7
11:45	12:00	2	1	3	1	1	2	5
12:00	12:15	0	1	1	3	0	3	4
12:15	12:30	0	0	0	2	0	2	2
12:30	12:45	2	2	4	3	1	4	8
12:45	13:00	1	1	2	3	0	3	5
13:00	13:15	3	1	4	1	2	3	7
13:15	13:30	3	0	3	0	0	0	3
15:00	15:15	0	0	0	0	28	28	28
15:15	15:30	1	2	3	2	5	7	10
15:30	15:45	3	0	3	0	1	1	4
15:45	16:00	4	1	5	0	3	3	8
16:00	16:15	7	2	9	4	1	5	14
16:15	16:30	5	1	6	5	2	7	13
16:30	16:45	3	0	3	1	7	8	11
16:45	17:00	2	0	2	2	2	4	6
17:00	17:15	1	0	1	1	0	1	2
17:15	17:30	1	1	2	2	3	5	7
17:30	17:45	2	0	2	5	5	10	12
17:45	18:00	2	1	3	0	5	5	8
Total		51	33	**84**	117	78	195	279

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		BRONSON AVE			CARLING AVE/GLEBE AVE			
		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	8	2	**10**	4	4	**8**	**18**
07:15	07:30	10	2	**12**	4	1	**5**	**17**
07:30	07:45	7	7	**14**	5	2	**7**	**21**
07:45	08:00	9	4	**13**	11	2	**13**	**26**
08:00	08:15	30	8	**38**	7	12	**19**	**57**
08:15	08:30	47	16	**63**	12	9	**21**	**84**
08:30	08:45	84	16	**100**	30	20	**50**	**150**
08:45	09:00	44	18	**62**	10	6	**16**	**78**
09:00	09:15	6	9	**15**	2	4	**6**	**21**
09:15	09:30	5	5	**10**	2	7	**9**	**19**
09:30	09:45	13	2	**15**	9	5	**14**	**29**
09:45	10:00	3	4	**7**	5	3	**8**	**15**
11:30	11:45	9	21	**30**	7	35	**42**	**72**
11:45	12:00	10	9	**19**	12	19	**31**	**50**
12:00	12:15	26	26	**52**	28	46	**74**	**126**
12:15	12:30	27	9	**36**	24	13	**37**	**73**
12:30	12:45	6	10	**16**	10	4	**14**	**30**
12:45	13:00	4	8	**12**	3	9	**12**	**24**
13:00	13:15	3	10	**13**	3	4	**7**	**20**
13:15	13:30	8	7	**15**	5	2	**7**	**22**
15:00	15:15	28	169	**197**	4	62	**66**	**263**
15:15	15:30	38	24	**62**	5	15	**20**	**82**
15:30	15:45	8	10	**18**	5	4	**9**	**27**
15:45	16:00	2	12	**14**	8	3	**11**	**25**
16:00	16:15	6	13	**19**	3	6	**9**	**28**
16:15	16:30	30	6	**36**	4	10	**14**	**50**
16:30	16:45	4	11	**15**	7	8	**15**	**30**
16:45	17:00	7	3	**10**	11	2	**13**	**23**
17:00	17:15	9	7	**16**	5	13	**18**	**34**
17:15	17:30	4	8	**12**	11	4	**15**	**27**
17:30	17:45	9	7	**16**	10	10	**20**	**36**
17:45	18:00	1	9	**10**	7	2	**9**	**19**
Total	.....	505	472	**977**	273	346	**619**	**1596**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		BRONSON AVE									CARLING AVE/GLEBE AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	2	1	0	**12**	0	6	2	**11**	**23**	2	0	3	**9**	0	0	0	**0**	**9**	**16**
07:15	07:30	2	3	0	**8**	0	3	0	**10**	**18**	4	1	0	**7**	0	0	0	**1**	**8**	**13**
07:30	07:45	3	5	0	**11**	0	2	0	**10**	**21**	3	0	1	**7**	0	0	0	**0**	**7**	**14**
07:45	08:00	2	3	0	**12**	0	4	1	**12**	**24**	4	2	3	**12**	0	0	0	**2**	**14**	**19**
08:00	08:15	2	4	0	**10**	0	3	1	**15**	**25**	7	0	1	**11**	0	0	0	**0**	**11**	**18**
08:15	08:30	3	4	0	**13**	0	3	0	**9**	**22**	2	3	3	**11**	0	0	0	**3**	**14**	**18**
08:30	08:45	2	4	0	**15**	0	7	0	**15**	**30**	4	1	2	**9**	0	0	0	**1**	**10**	**20**
08:45	09:00	5	2	0	**15**	0	7	0	**10**	**25**	1	2	1	**9**	0	0	0	**2**	**11**	**18**
09:00	09:15	6	6	1	**22**	0	5	1	**20**	**42**	8	1	4	**20**	0	0	0	**2**	**22**	**32**
09:15	09:30	2	11	1	**22**	0	5	1	**24**	**46**	7	1	3	**14**	0	0	0	**2**	**16**	**31**
09:30	09:45	3	6	0	**16**	0	6	0	**22**	**38**	10	2	1	**16**	0	0	0	**2**	**18**	**28**
09:45	10:00	3	5	0	**15**	0	5	1	**17**	**32**	6	3	2	**15**	0	0	0	**3**	**18**	**25**
11:30	11:45	3	3	0	**16**	0	5	3	**16**	**32**	5	0	5	**16**	0	0	0	**0**	**16**	**24**
11:45	12:00	0	4	1	**12**	0	6	1	**14**	**26**	3	0	1	**5**	0	0	0	**1**	**6**	**16**
12:00	12:15	2	2	0	**12**	0	4	0	**8**	**20**	2	0	4	**8**	0	0	0	**0**	**8**	**14**
12:15	12:30	0	6	0	**11**	0	4	0	**11**	**22**	1	0	1	**2**	0	0	0	**0**	**2**	**12**
12:30	12:45	0	5	0	**13**	0	7	1	**17**	**30**	4	0	1	**6**	0	0	0	**0**	**6**	**18**
12:45	13:00	0	2	0	**10**	0	4	0	**11**	**21**	5	1	4	**10**	0	0	0	**1**	**11**	**16**
13:00	13:15	3	4	2	**17**	0	4	0	**15**	**32**	7	0	4	**14**	0	0	0	**2**	**16**	**24**
13:15	13:30	0	8	0	**13**	0	4	0	**15**	**28**	3	0	1	**4**	0	0	0	**0**	**4**	**16**
15:00	15:15	1	7	0	**16**	0	5	1	**17**	**33**	4	1	3	**10**	0	0	0	**1**	**11**	**22**
15:15	15:30	2	6	0	**15**	0	6	1	**14**	**29**	1	1	1	**6**	0	0	0	**1**	**7**	**18**
15:30	15:45	1	5	0	**10**	0	3	1	**14**	**24**	5	1	1	**9**	0	0	0	**1**	**10**	**17**
15:45	16:00	1	5	0	**12**	0	4	0	**14**	**26**	5	2	2	**10**	0	0	0	**2**	**12**	**19**
16:00	16:15	2	5	0	**17**	0	9	0	**21**	**38**	7	0	1	**10**	0	0	0	**0**	**10**	**24**
16:15	16:30	0	3	0	**7**	0	3	1	**12**	**19**	5	1	1	**8**	0	0	0	**1**	**9**	**14**
16:30	16:45	2	5	0	**13**	0	4	1	**14**	**27**	4	1	2	**10**	0	0	0	**1**	**11**	**19**
16:45	17:00	1	1	0	**8**	0	5	0	**6**	**14**	0	1	1	**3**	0	0	0	**1**	**4**	**9**
17:00	17:15	2	3	0	**15**	0	4	0	**14**	**29**	7	1	6	**16**	0	0	0	**1**	**17**	**23**
17:15	17:30	1	1	0	**3**	0	0	0	**2**	**5**	1	1	1	**4**	0	0	0	**1**	**5**	**5**
17:30	17:45	2	1	0	**8**	0	4	1	**9**	**17**	3	0	1	**7**	0	0	0	**0**	**7**	**12**
17:45	18:00	2	3	0	**12**	0	4	0	**8**	**20**	1	2	3	**8**	0	0	0	**2**	**10**	**15**
Total:	None	60	133	5	**411**	0	145	18	**427**	**838**	131	29	68	**306**	0	0	0	**34**	**340**	**589**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CARLING AVE/GLEBE AVE

Survey Date: Thursday, September 12, 2019 **WO No:** 38767

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		BRONSON AVE		CARLING AVE/GLEBE AVE		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	1	0	1
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	1	0	1
09:45	10:00	0	0	1	0	1
11:30	11:45	0	0	1	0	1
11:45	12:00	0	0	4	0	4
12:00	12:15	0	0	2	0	2
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	1	0	1
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	1	0	1
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	1	0	1
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	1	0	1
17:45	18:00	0	0	1	0	1
Total		0	0	15	0	15

Transportation Services - Traffic Services

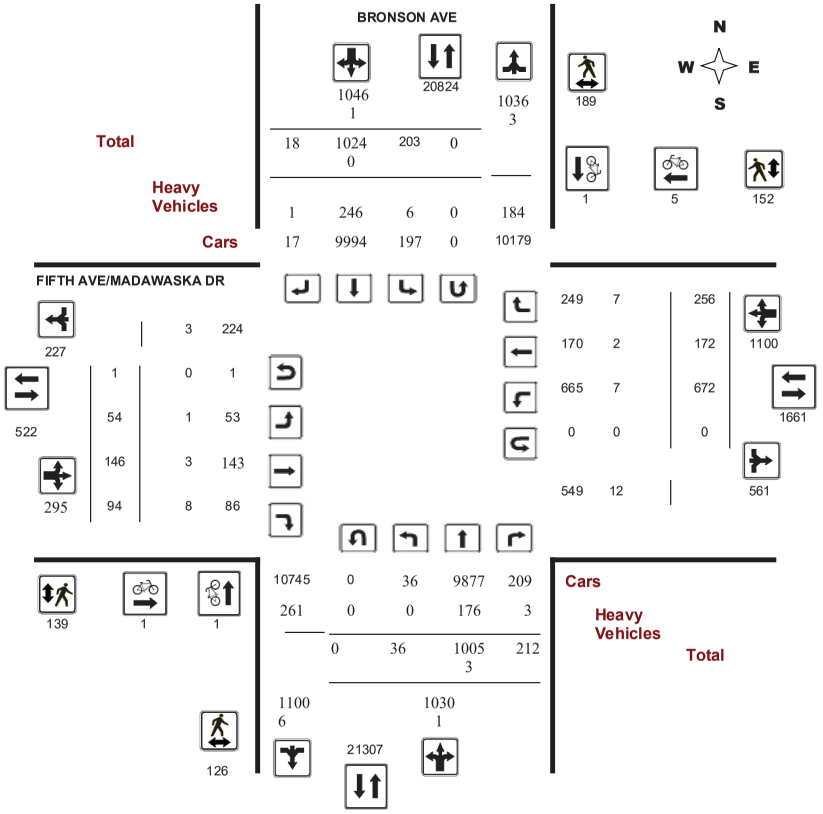
Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

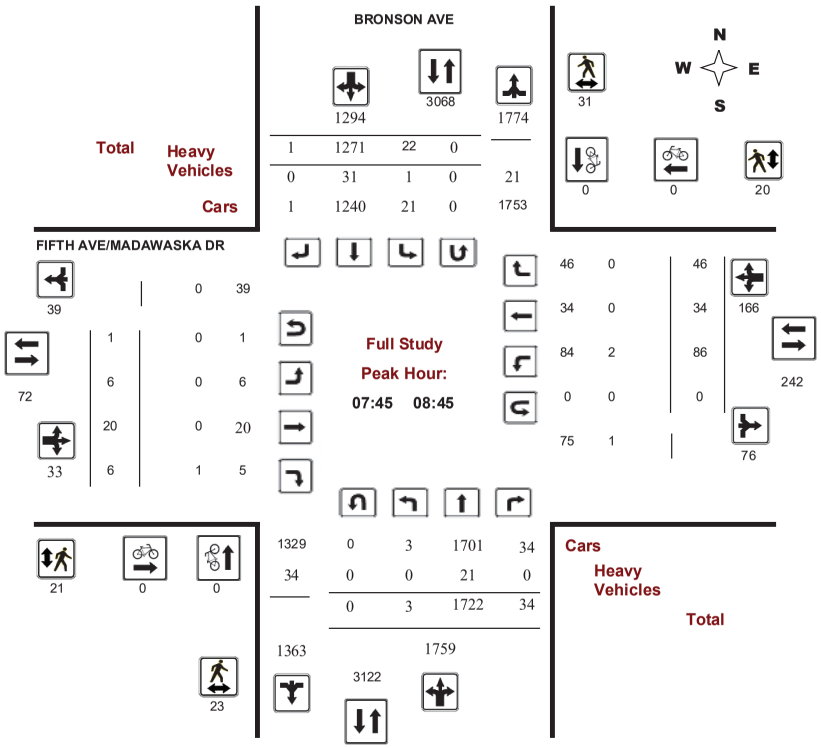
Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



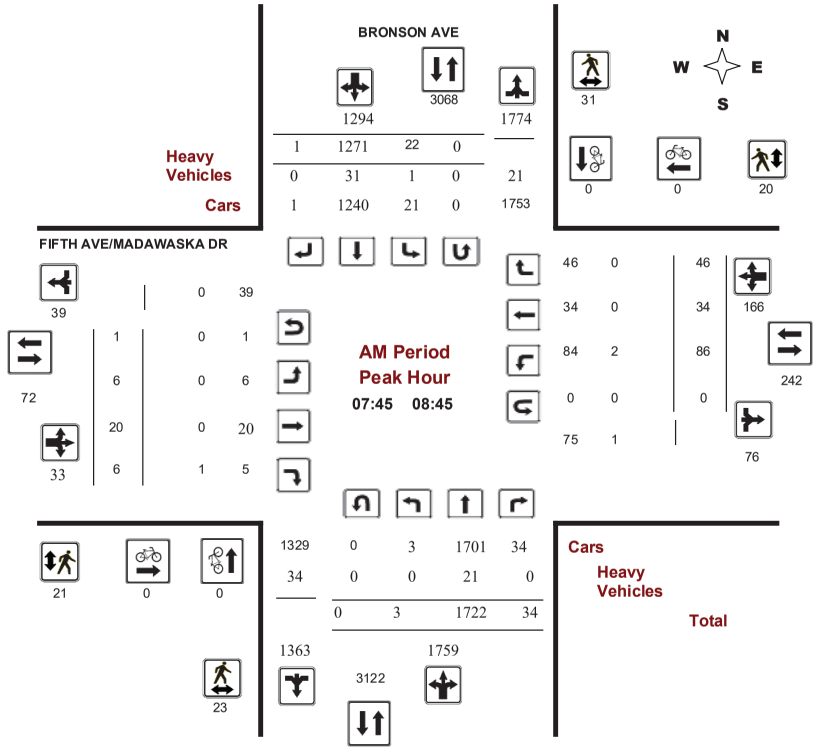
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision



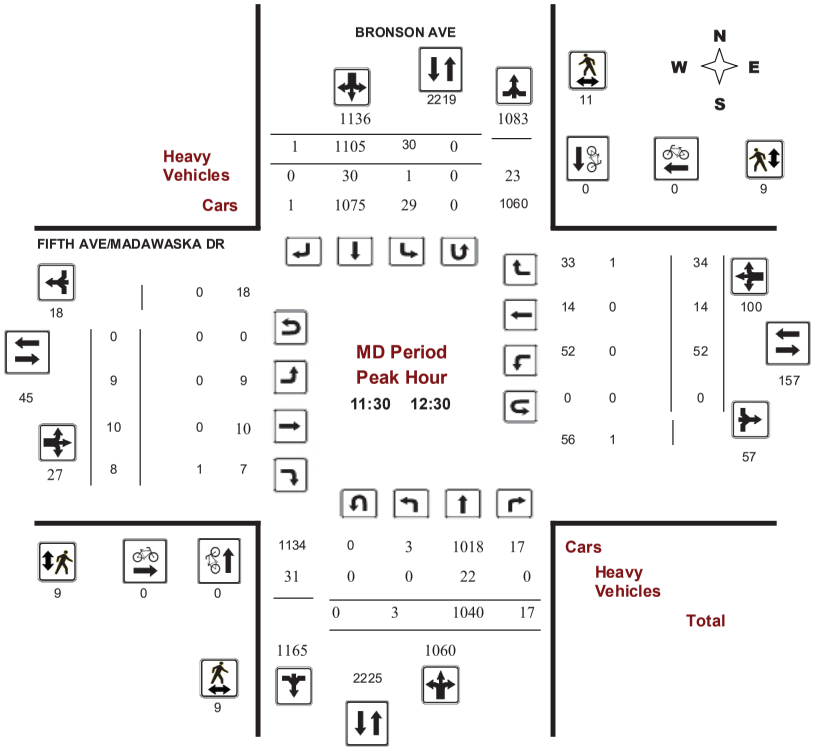
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision



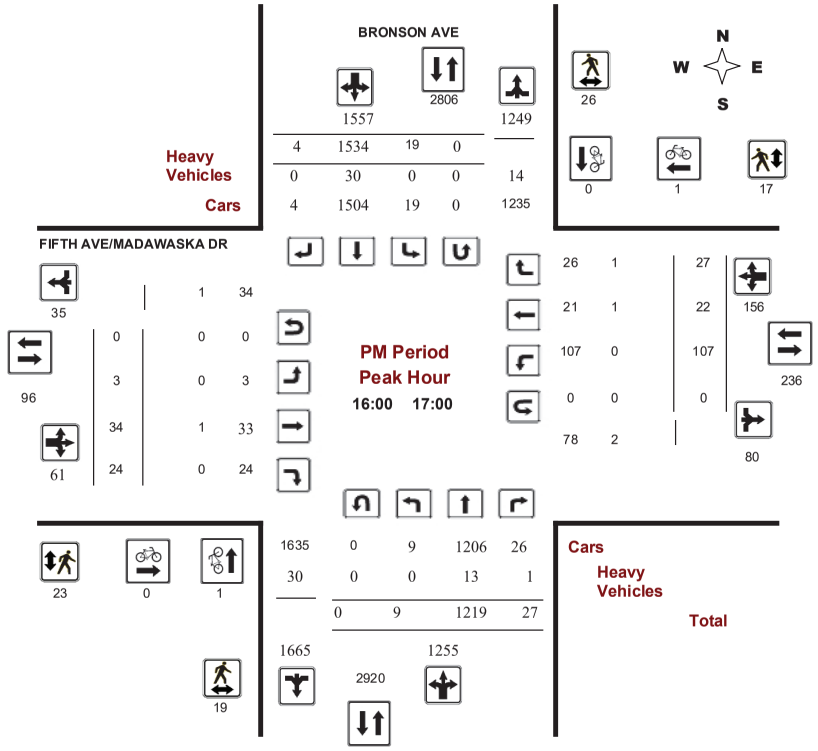
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, January 10, 201

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 1 Westbound: 0

AADT Factor 1.00

	BRONSON AVE									FIFTH AVE/MADAWASKA DR									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	1	1621	12	**1634**	25	1174	4	**1203**	**2837**	6	5	5	**16**	58	13	30	**101**	**117**	**2954**
08:00 09:00	3	1690	40	**1733**	20	1264	0	**1284**	**3017**	7	22	6	**35**	90	36	47	**173**	**208**	**3225**
09:00 10:00	2	1221	25	**1248**	36	1093	2	**1131**	**2379**	6	9	9	**24**	65	24	29	**118**	**142**	**2521**
11:30 12:30	3	1040	17	**1060**	30	1105	1	**1136**	**2196**	9	10	8	**27**	52	14	34	**100**	**127**	**2323**
12:30 13:30	5	929	15	**949**	30	1190	2	**1222**	**2171**	7	10	8	**25**	61	23	37	**121**	**146**	**2317**
15:00 16:00	5	1230	34	**1269**	22	1395	0	**1417**	**2686**	7	25	7	**39**	116	23	30	**169**	**208**	**2894**
16:00 17:00	9	1219	27	**1255**	19	1534	4	**1557**	**2812**	3	34	24	**61**	107	22	27	**156**	**217**	**3029**
17:00 18:00	8	1103	42	**1153**	21	1485	5	**1511**	**2664**	9	31	27	**67**	123	17	22	**162**	**229**	**2893**
Sub Total	36	10053	212	**10301**	203	10240	18	**10461**	**20762**	54	146	94	**294**	672	172	256	**1100**	**1394**	**22156**
U Turns				**0**				**0**	**0**				**1**				**0**	**1**	**1**
Total	36	10053	212	**10301**	203	10240	18	**10461**	**20762**	54	146	94	**295**	672	172	256	**1100**	**1395**	**22157**
EQ 12Hr	50	13974	295	**14318**	282	14234	25	**14541**	**28859**	75	203	131	**410**	934	239	356	**1529**	**1939**	**30798**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	47	13169	278	**13494**	266	13414	24	**13704**	**28859**	71	191	123	**386**	880	225	335	**1441**	**1939**	**30798**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	62	17252	364	**17678**	348	17573	31	**17952**	**35630**	93	251	161	**506**	1153	295	439	**1888**	**2394**	**38024**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		BRONSON AVE									FIFTH AVE/MADAWASKA DR									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	351	1	352	7	302	0	309	1325	0	0	2	2	2	0	7	9	1325	672
07:15	07:30	1	389	3	393	6	275	1	282	1368	2	0	0	2	15	7	12	34	1368	711
07:30	07:45	0	453	3	456	3	284	2	289	1514	2	1	1	4	23	4	6	33	1514	782
07:45	08:00	0	428	5	433	9	313	1	323	1524	2	4	2	9	18	2	5	25	1524	790
08:00	08:15	2	432	9	443	2	332	0	334	1584	3	4	2	9	20	9	18	47	1584	833
08:15	08:30	1	423	8	432	4	306	0	310	1508	0	6	1	7	23	10	13	46	1508	795
08:30	08:45	0	439	12	451	7	320	0	327	1574	1	6	1	8	25	13	10	48	1574	834
08:45	09:00	0	396	11	407	7	306	0	313	1455	3	6	2	11	22	4	6	32	1455	763
09:00	09:15	1	392	11	404	9	276	0	285	1389	1	3	2	6	24	7	5	36	1389	731
09:15	09:30	1	307	6	314	12	262	1	275	1189	5	1	2	8	17	4	7	28	1189	625
09:30	09:45	0	263	4	267	6	300	0	306	1161	0	1	3	4	14	6	8	28	1161	605
09:45	10:00	0	259	4	263	9	255	1	265	1063	0	4	2	6	10	7	9	26	1063	560
11:30	11:45	1	290	2	293	3	270	1	274	1154	2	3	3	8	15	6	7	28	1154	603
11:45	12:00	2	286	4	292	7	250	0	257	1110	1	1	3	5	14	4	7	25	1110	579
12:00	12:15	0	233	5	238	11	266	0	277	1038	3	1	1	5	10	3	10	23	1038	543
12:15	12:30	0	231	6	237	9	319	0	328	1142	3	5	1	9	13	1	10	24	1142	598
12:30	12:45	0	228	5	233	6	295	0	301	1092	1	1	2	4	25	4	7	36	1092	574
12:45	13:00	3	217	1	221	8	311	0	319	1086	3	3	2	8	8	8	5	21	1086	569
13:00	13:15	1	227	4	232	9	286	2	297	1076	2	3	2	7	20	4	10	34	1076	570
13:15	13:30	1	257	5	263	7	298	0	305	1149	1	3	2	6	8	7	15	30	1149	604
15:00	15:15	2	300	9	311	6	311	0	317	1271	1	6	2	9	23	2	6	31	1271	668
15:15	15:30	1	315	9	325	4	350	0	354	1390	2	10	3	15	30	4	11	45	1390	739
15:30	15:45	1	314	8	323	7	366	0	373	1415	3	6	2	11	24	9	10	43	1415	750
15:45	16:00	1	301	8	310	5	368	0	373	1395	1	3	0	4	39	8	3	50	1395	737
16:00	16:15	1	275	7	283	5	399	2	406	1407	1	7	1	9	33	7	9	49	1407	747
16:15	16:30	2	342	7	351	5	370	0	375	1473	0	7	4	11	28	7	3	38	1473	775
16:30	16:45	1	298	9	308	4	391	0	395	1431	2	7	7	16	24	2	6	32	1431	751
16:45	17:00	5	304	4	313	5	374	2	381	1415	0	13	12	25	22	6	9	37	1415	756
17:00	17:15	3	250	12	265	2	367	1	370	1297	3	10	9	22	26	7	7	40	1297	697
17:15	17:30	3	302	12	317	7	383	2	392	1435	2	5	4	11	31	5	4	40	1435	760
17:30	17:45	0	286	10	296	8	376	1	385	1389	0	7	10	17	31	4	5	40	1389	738
17:45	18:00	2	265	8	275	4	359	1	364	1312	4	9	4	17	35	1	6	42	1312	698
Total:		36	1005	212	1030	203	10240	18	10461	42131	54	146	94	295	672	172	256	1100	42131	22,157

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		BRONSON AVE			FIFTH AVE/MADAWASKA DR			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	1	1	0	0	0	1
07:30	07:45	0	0	0	0	1	1	1
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	1	0	1	1
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	1	1	1
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	1	1	1
15:45	16:00	0	0	0	0	1	1	1
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	1	0	1	0	0	0	1
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	1	1	1
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		1	1	2	1	5	6	8

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

	BRONSON AVE			FIFTH AVE/MADAWASKA DR			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	6	**7**	2	0	**2**	**9**
07:15 07:30	1	5	**6**	2	0	**2**	**8**
07:30 07:45	2	4	**6**	3	5	**8**	**14**
07:45 08:00	3	4	**7**	2	2	**4**	**11**
08:00 08:15	6	11	**17**	7	6	**13**	**30**
08:15 08:30	5	8	**13**	6	5	**11**	**24**
08:30 08:45	9	8	**17**	6	7	**13**	**30**
08:45 09:00	9	13	**22**	5	5	**10**	**32**
09:00 09:15	2	12	**14**	7	6	**13**	**27**
09:15 09:30	1	6	**7**	1	2	**3**	**10**
09:30 09:45	1	8	**9**	2	3	**5**	**14**
09:45 10:00	0	5	**5**	4	4	**8**	**13**
11:30 11:45	3	1	**4**	5	4	**9**	**13**
11:45 12:00	3	2	**5**	1	0	**1**	**6**
12:00 12:15	1	3	**4**	2	0	**2**	**6**
12:15 12:30	2	5	**7**	1	5	**6**	**13**
12:30 12:45	2	7	**9**	4	5	**9**	**18**
12:45 13:00	0	2	**2**	4	4	**8**	**10**
13:00 13:15	2	5	**7**	4	5	**9**	**16**
13:15 13:30	4	4	**8**	5	3	**8**	**16**
15:00 15:15	1	1	**2**	5	15	**20**	**22**
15:15 15:30	2	2	**4**	1	10	**11**	**15**
15:30 15:45	4	3	**7**	2	5	**7**	**14**
15:45 16:00	4	6	**10**	1	6	**7**	**17**
16:00 16:15	4	5	**9**	5	6	**11**	**20**
16:15 16:30	7	7	**14**	7	3	**10**	**24**
16:30 16:45	2	4	**6**	5	4	**9**	**15**
16:45 17:00	6	10	**16**	6	4	**10**	**26**
17:00 17:15	11	8	**19**	5	12	**17**	**36**
17:15 17:30	11	8	**19**	8	5	**13**	**32**
17:30 17:45	6	8	**14**	15	6	**21**	**35**
17:45 18:00	11	8	**19**	6	5	**11**	**30**
Total	126	189	**315**	139	152	**291**	**606**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		BRONSON AVE									FIFTH AVE/MADAWASKA DR									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	5	0	**19**	0	13	0	**18**	**37**	0	0	1	**1**	0	0	0	**0**	**1**	**19**
07:15	07:30	0	10	0	**22**	1	12	0	**23**	**45**	0	0	0	**0**	0	0	0	**1**	**1**	**23**
07:30	07:45	0	5	0	**13**	0	7	1	**14**	**27**	1	0	1	**3**	0	0	0	**0**	**3**	**15**
07:45	08:00	0	10	0	**15**	0	4	0	**14**	**29**	0	0	0	**0**	1	0	0	**1**	**1**	**15**
08:00	08:15	0	3	0	**10**	0	6	0	**9**	**19**	0	0	1	**1**	0	0	0	**0**	**1**	**10**
08:15	08:30	0	5	0	**18**	0	13	0	**18**	**36**	0	0	0	**0**	0	0	0	**0**	**0**	**18**
08:30	08:45	0	3	0	**12**	1	8	0	**12**	**24**	0	0	0	**0**	1	0	0	**2**	**2**	**13**
08:45	09:00	0	5	0	**13**	0	8	0	**14**	**27**	0	1	0	**1**	0	0	1	**2**	**3**	**15**
09:00	09:15	0	19	0	**27**	1	8	0	**28**	**55**	0	0	0	**0**	0	0	0	**1**	**1**	**28**
09:15	09:30	0	9	0	**22**	0	11	0	**21**	**43**	0	0	2	**2**	0	0	1	**1**	**3**	**23**
09:30	09:45	0	6	0	**15**	0	8	0	**14**	**29**	0	0	1	**1**	0	0	0	**0**	**1**	**15**
09:45	10:00	0	5	0	**13**	1	8	0	**14**	**27**	0	0	0	**0**	0	0	0	**1**	**1**	**14**
11:30	11:45	0	8	0	**14**	0	5	0	**14**	**28**	0	0	1	**1**	0	0	1	**1**	**2**	**15**
11:45	12:00	0	4	0	**12**	0	8	0	**12**	**24**	0	0	0	**0**	0	0	0	**0**	**0**	**12**
12:00	12:15	0	7	0	**15**	1	8	0	**16**	**31**	0	0	0	**0**	0	0	0	**1**	**1**	**16**
12:15	12:30	0	3	0	**12**	0	9	0	**12**	**24**	0	0	0	**0**	0	0	0	**0**	**0**	**12**
12:30	12:45	0	5	0	**9**	0	3	0	**9**	**18**	0	0	0	**0**	1	0	1	**2**	**2**	**10**
12:45	13:00	0	1	0	**11**	1	10	0	**13**	**24**	0	0	0	**0**	0	0	1	**2**	**2**	**13**
13:00	13:15	0	6	1	**12**	0	5	0	**11**	**23**	0	0	0	**0**	0	0	0	**1**	**1**	**12**
13:15	13:30	0	8	0	**17**	0	9	0	**17**	**34**	0	0	0	**0**	0	0	0	**0**	**0**	**17**
15:00	15:15	0	8	0	**15**	0	7	0	**16**	**31**	0	0	0	**0**	0	0	1	**1**	**1**	**16**
15:15	15:30	0	5	1	**11**	0	4	0	**9**	**20**	0	0	0	**0**	1	0	0	**2**	**2**	**11**
15:30	15:45	0	5	0	**16**	0	10	0	**15**	**31**	0	1	1	**2**	0	0	0	**1**	**3**	**17**
15:45	16:00	0	2	0	**8**	0	4	0	**6**	**14**	0	0	0	**1**	2	1	0	**3**	**4**	**9**
16:00	16:15	0	3	0	**12**	0	9	0	**12**	**24**	0	1	0	**1**	0	0	0	**1**	**2**	**13**
16:15	16:30	0	5	0	**13**	0	8	0	**13**	**26**	0	0	0	**1**	0	1	0	**1**	**2**	**14**
16:30	16:45	0	2	1	**7**	0	4	0	**6**	**13**	0	0	0	**0**	0	0	0	**1**	**1**	**7**
16:45	17:00	0	3	0	**12**	0	9	0	**13**	**25**	0	0	0	**0**	0	0	1	**1**	**1**	**13**
17:00	17:15	0	7	0	**11**	0	4	0	**11**	**22**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
17:15	17:30	0	3	0	**9**	0	6	0	**9**	**18**	0	0	0	**0**	0	0	0	**0**	**0**	**9**
17:30	17:45	0	4	0	**18**	0	13	0	**17**	**35**	0	0	0	**0**	1	0	0	**1**	**1**	**18**
17:45	18:00	0	2	0	**7**	0	5	0	**7**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
Total:	None	0	176	3	**440**	6	246	1	**437**	**877**	1	3	8	**15**	7	2	7	**28**	**43**	**460**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ FIFTH AVE/MADAWASKA DR

Survey Date: Wednesday, January 10, 2018 **WO No:** 37405

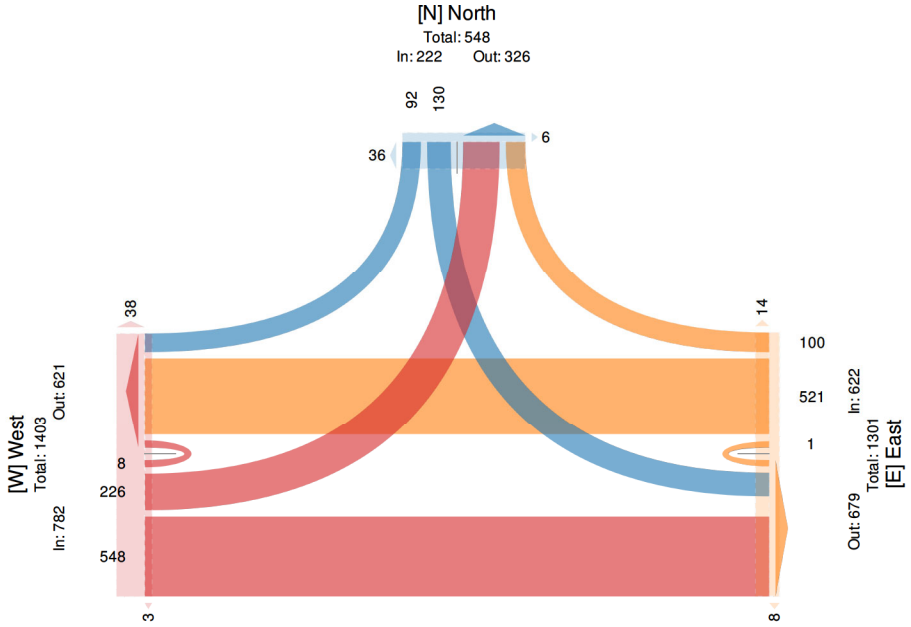
Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

Time Period		BRONSON AVE Northbound U-Turn Total	BRONSON AVE Southbound U-Turn Total	FIFTH AVE/MADAWASKA DR Eastbound U-Turn Total	FIFTH AVE/MADAWASKA DR Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	1	0	1
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	1	0	1

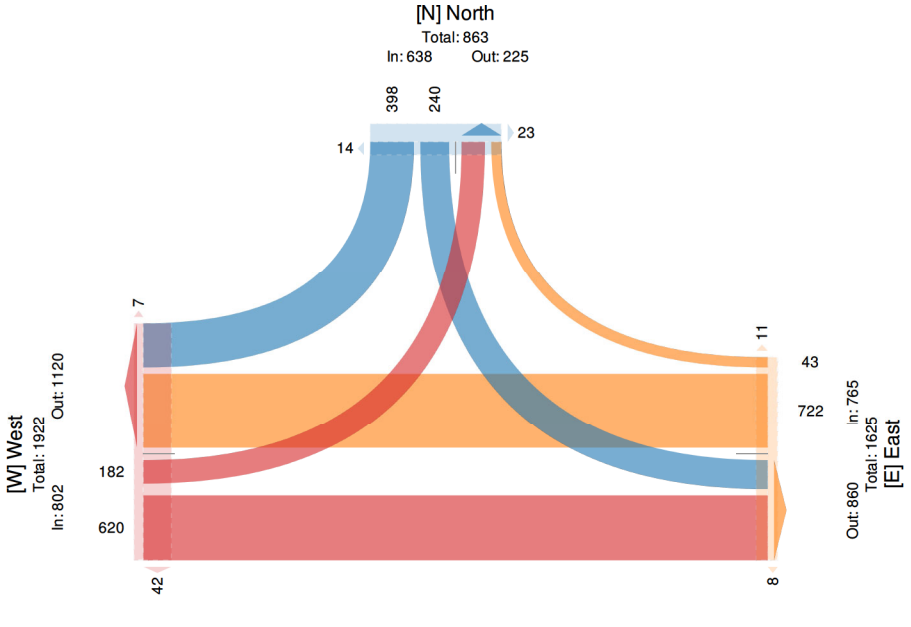
5245346 - Booth and Carling - July - 26th - TMC
Tue Jul 26, 2016
AM Peak (8AM - 9AM)
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road)
All Movements
ID: 334266, Location: 45.399071, -75.704256, Site Code: 36084103

Provided by: City of Ottawa
100 Constellation Dr, Nepean, ON, K2G 5J9, CA



5245346 - Booth and Carling - July - 26th - TMC
Tue Jul 26, 2016
PM Peak (4:15PM - 5:15PM) - Overall Peak Hour
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road)
All Movements
ID: 334266, Location: 45.399071, -75.704256, Site Code: 36084103

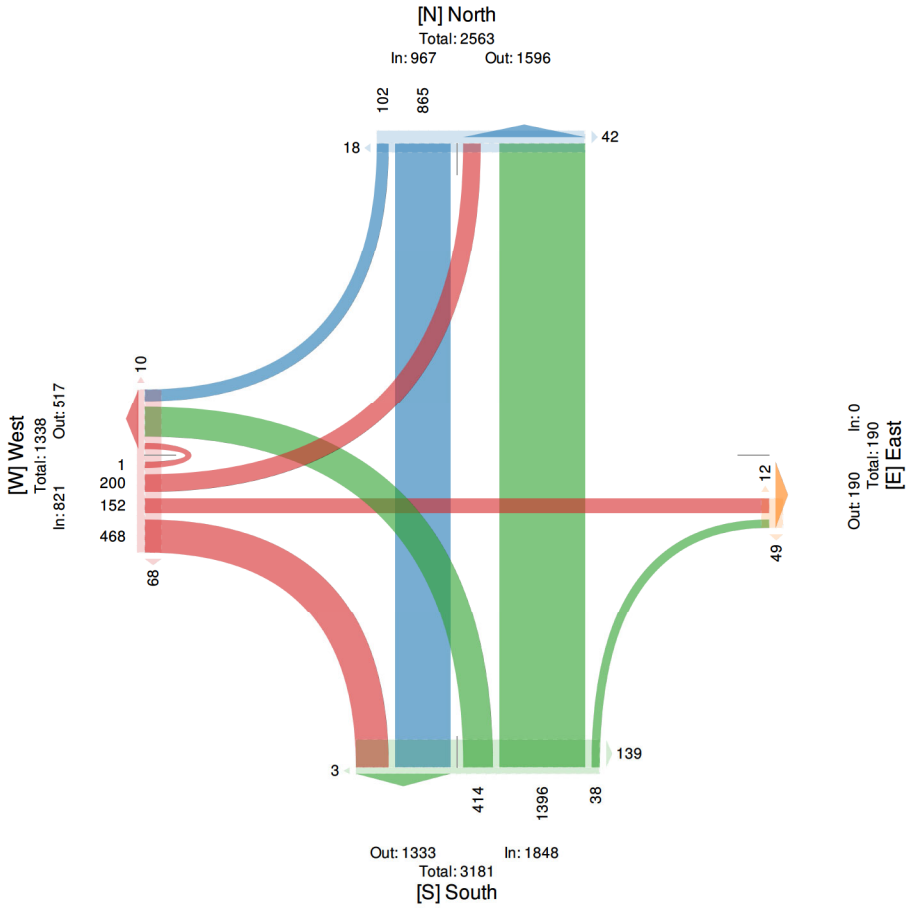
Provided by: City of Ottawa
100 Constellation Dr, Nepean, ON, K2G 5J9, CA



5347405 - BRONSON AVE/ CARLING AVE/ GLEBE AVE - Jan 10th - TMC

Wed Jan 10, 2018
AM Peak (7:45AM - 8:45AM) - Overall Peak Hour
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road)
All Movements
ID: 485262, Location: 45.401058, -75.699682

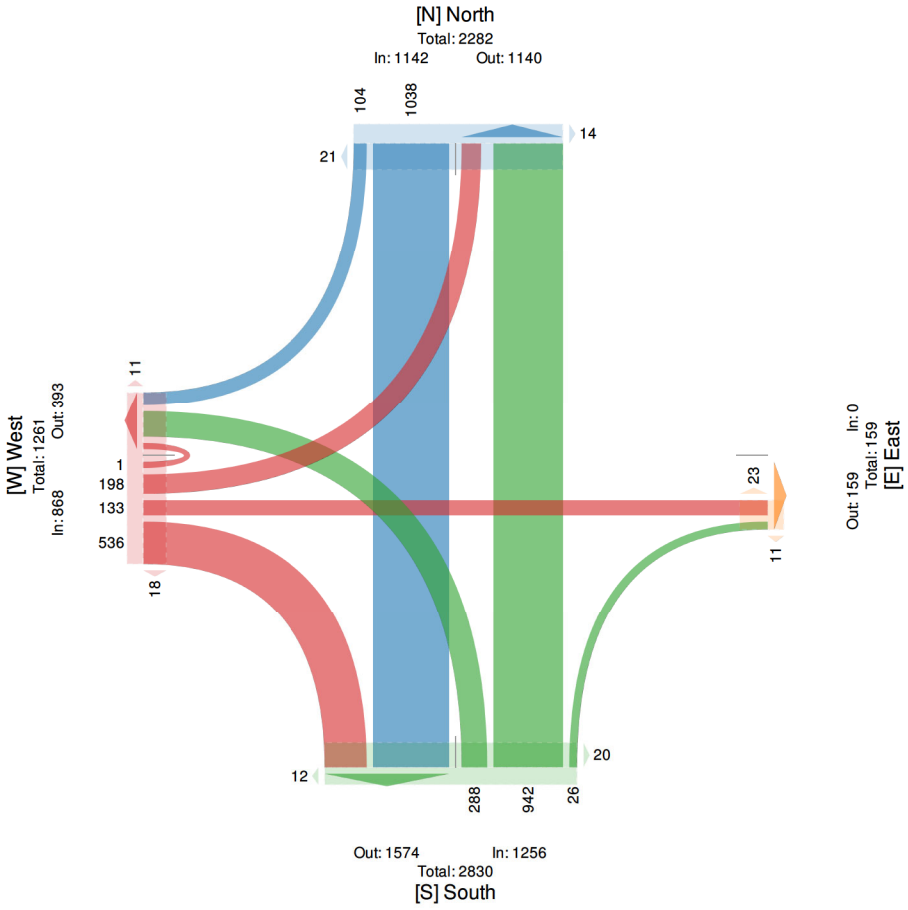
Provided by: City of Ottawa
100 Constellation Dr,
Nepean, ON, K2G 5J9, CA



5347405 - BRONSON AVE/ CARLING AVE/ GLEBE AVE - Jan 10th - TMC

Wed Jan 10, 2018
PM Peak (3:45PM - 4:45PM)
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road)
All Movements
ID: 485262, Location: 45.401058, -75.699682

Provided by: City of Ottawa
100 Constellation Dr,
Nepean, ON, K2G 5J9, CA



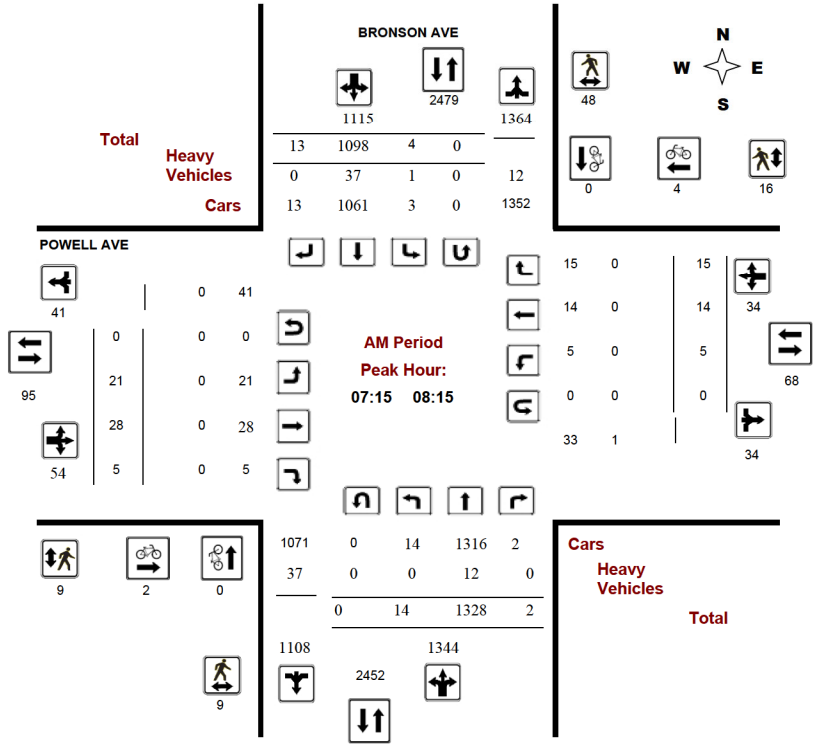
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BRONSON AVE @ POWELL AVE

Survey Date: Friday, August 28, 2015
Start Time: 07:00

WO No: 35323
Device: Jamar Technologies, Inc



Comments

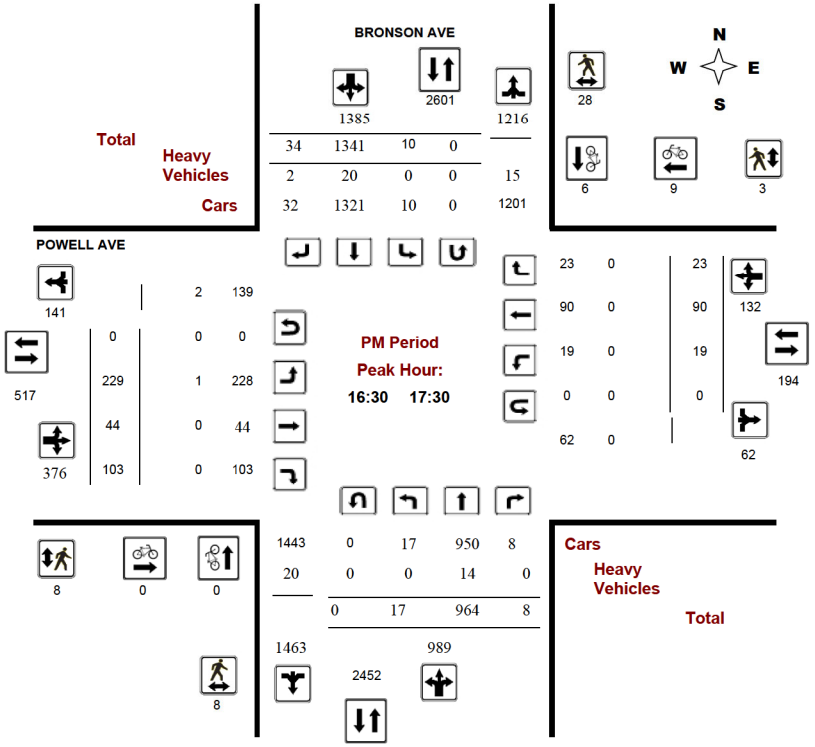
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BRONSON AVE @ POWELL AVE

Survey Date: Friday, August 28, 2015
Start Time: 07:00

WO No: 35323
Device: Jamar Technologies, Inc



Comments

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	226	750	571	100	130	92
Future Volume (vph)	226	750	571	100	130	92
Satd. Flow (prot)	1658	3283	4536	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1571	3283	4536	0	1633	1258
Satd. Flow (RTOR)			31			102
Lane Group Flow (vph)	251	833	745	0	144	102
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	34.0	81.0	47.0		39.0	39.0
Total Split (%)	28.3%	67.5%	39.2%		32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	22.7	75.3	46.7		33.0	33.0
Actuated g/C Ratio	0.19	0.63	0.39		0.28	0.28
v/c Ratio	0.80	0.40	0.42		0.32	0.24
Control Delay	65.2	11.9	27.2		37.1	7.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	65.2	11.9	27.2		37.1	7.9
LOS	E	B	C		D	A
Approach Delay		24.2	27.2		25.0	
Approach LOS		C	C		C	
Queue Length 50th (m)	56.6	48.0	44.6		27.0	0.0
Queue Length 95th (m)	82.0	60.4	60.1		45.1	13.1
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	388	2060	1784		449	419
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.65	0.40	0.42		0.32	0.24

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 25.4	Intersection LOS: C
Intersection Capacity Utilization 74.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Carling Avenue & Booth Street

Intersection												
Int Delay, s/veh	0.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	877	3	0	533	12	0	0	10	0	0	55
Future Vol, veh/h	0	877	3	0	533	12	0	0	10	0	0	55
Conflicting Peds, #/hr	0	0	45	0	0	38	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	974	3	0	592	13	0	0	11	0	0	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	535	-	-	334
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	419	0	0	653
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	401	-	-	630
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	14.2	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	401	-	-	-	-	630
HCM Lane V/C Ratio	0.028	-	-	-	-	0.097
HCM Control Delay (s)	14.2	-	-	-	-	11.3
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	25	30	17	53	17	44	1644	8	11	920	62
Future Volume (vph)	58	25	30	17	53	17	44	1644	8	11	920	62
Satd. Flow (prot)	0	1593	0	0	1642	0	0	3275	0	0	3241	0
Flt Permitted		0.768			0.922			0.874			0.917	
Satd. Flow (perm)	0	1222	0	0	1517	0	0	2865	0	0	2975	0
Satd. Flow (RTOR)		14			10			1			16	
Lane Group Flow (vph)	0	125	0	0	97	0	0	1885	0	0	1103	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	26.0	26.0		26.0	26.0		84.0	84.0		84.0	84.0	
Total Split (%)	23.6%	23.6%		23.6%	23.6%		76.4%	76.4%		76.4%	76.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		15.1			15.1			83.9			83.9	
Actuated g/C Ratio		0.14			0.14			0.76			0.76	
v/c Ratio		0.70			0.45			0.86			0.49	
Control Delay		59.5			44.5			6.6			6.1	
Queue Delay		0.0			0.0			29.4			0.0	
Total Delay		59.5			44.5			36.1			6.2	
LOS		E			D			D			A	
Approach Delay		59.5			44.5			36.1			6.2	
Approach LOS		E			D			D			A	
Queue Length 50th (m)		23.0			17.3			53.6			38.4	
Queue Length 95th (m)		40.9			31.9			m42.3			61.7	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		236			288			2184			2271	
Starvation Cap Reductn		0			0			403			0	
Spillback Cap Reductn		0			0			0			119	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.53			0.34			1.06			0.51	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 104.8%	ICU Level of Service G
Analysis Period (min) 15	

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

Splits and Phases: 3: Bronson Avenue & Powell Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	314	152	421	0	0	0	443	1396	38	0	865	102
Future Volume (vph)	314	152	421	0	0	0	443	1396	38	0	865	102
Satd. Flow (prot)	1530	1591	1483	0	0	0	3216	1730	0	0	3246	0
Flt Permitted	0.950	0.982					0.950					
Satd. Flow (perm)	1459	1565	1273	0	0	0	3179	1730	0	0	3246	0
Satd. Flow (RTOR)			30					3			13	
Lane Group Flow (vph)	255	263	468	0	0	0	492	1593	0	0	1074	0
Turn Type	Perm	NA	custom				Prot	NA			NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4 5									
Detector Phase	4	4	4 5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0					5.0	10.0			10.0	
Minimum Split (s)	31.0	31.0					11.0	24.0			33.0	
Total Split (s)	31.0	31.0					34.0	79.0			45.0	
Total Split (%)	28.2%	28.2%					30.9%	71.8%			40.9%	
Yellow Time (s)	3.3	3.3					3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7					2.7	2.7			2.7	
Lost Time Adjust (s)	0.0	0.0					0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0					6.0	6.0			6.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode	None	None					Min	C-Max			C-Max	
Act Effct Green (s)	25.0	25.0	53.6				22.6	73.0			44.4	
Actuated g/C Ratio	0.23	0.23	0.49				0.21	0.66			0.40	
v/c Ratio	0.77	0.74	0.74				0.75	1.39			0.81	
Control Delay	56.7	53.5	28.4				37.8	205.3			31.3	
Queue Delay	0.0	0.0	0.0				0.0	0.2			0.1	
Total Delay	56.7	53.5	28.4				37.8	205.4			31.4	
LOS	E	D	C				D	F			C	
Approach Delay		42.4						165.9			31.4	
Approach LOS		D						F			C	
Queue Length 50th (m)	54.3	55.4	72.7				50.5	~471.6			107.0	
Queue Length 95th (m)	#93.8	#92.5	103.4				m57.3	#553.7			#156.3	
Internal Link Dist (m)		82.5			112.6			392.2			142.6	
Turn Bay Length (m)							40.0					
Base Capacity (vph)	331	355	696				818	1149			1318	
Starvation Cap Reductn	0	0	0				0	0			14	
Spillback Cap Reductn	0	0	0				0	42			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.77	0.74	0.67				0.60	1.44			0.82	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 53 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.39

Intersection Signal Delay: 101.7	Intersection LOS: F
Intersection Capacity Utilization 110.6%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	20	6	86	34	46	0	1722	34	22	1271	1
Future Volume (vph)	7	20	6	86	34	46	0	1722	34	22	1271	1
Satd. Flow (prot)	0	1619	0	0	1608	0	0	3302	0	0	3311	0
Flt Permitted		0.939			0.817						0.868	
Satd. Flow (perm)	0	1526	0	0	1319	0	0	3302	0	0	2876	0
Satd. Flow (RTOR)		7			16			4				
Lane Group Flow (vph)	0	37	0	0	185	0	0	1951	0	0	1437	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0			10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3			30.3		30.3	30.3	
Total Split (s)	28.0	28.0		28.0	28.0			82.0		82.0	82.0	
Total Split (%)	25.5%	25.5%		25.5%	25.5%			74.5%		74.5%	74.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3			3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)		18.4			18.4			81.0			81.0	
Actuated g/C Ratio		0.17			0.17			0.74			0.74	
v/c Ratio		0.14			0.79			0.80			0.68	
Control Delay		32.6			63.1			13.6			5.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		32.6			63.1			13.6			5.5	
LOS		C			E			B			A	
Approach Delay		32.6			63.1			13.6			5.5	
Approach LOS		C			E			B			A	
Queue Length 50th (m)		5.5			34.9			127.2			28.4	
Queue Length 95th (m)		14.1			57.8			182.0			41.6	
Internal Link Dist (m)		190.1			132.1			94.8			392.2	
Turn Bay Length (m)												
Base Capacity (vph)		320			284			2431			2117	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.12			0.65			0.80			0.68	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 13.1	Intersection LOS: B
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	182	663	797	43	240	398
Future Volume (vph)	182	663	797	43	240	398
Satd. Flow (prot)	1658	3283	4678	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1578	3283	4678	0	1632	1230
Satd. Flow (RTOR)			9			114
Lane Group Flow (vph)	202	737	934	0	267	442
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	23.0	90.0	67.0		40.0	40.0
Total Split (%)	17.7%	69.2%	51.5%		30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	17.1	84.3	61.3		34.0	34.0
Actuated g/C Ratio	0.13	0.65	0.47		0.26	0.26
v/c Ratio	0.93	0.35	0.42		0.63	1.09
Control Delay	100.7	10.9	43.8		50.0	105.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	100.7	10.9	43.8		50.0	105.2
LOS	F	B	D		D	F
Approach Delay		30.2	43.8		84.4	
Approach LOS		C	D		F	
Queue Length 50th (m)	51.9	42.0	78.1		60.6	~104.4
Queue Length 95th (m)	#97.9	52.7	91.9		90.0	#169.3
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	218	2128	2211		426	405
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.93	0.35	0.42		0.63	1.09

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 110 (85%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 50.0	Intersection LOS: D
Intersection Capacity Utilization 76.7%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 1: Carling Avenue & Booth Street

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	886	17	0	473	6	0	0	15	0	0	289
Future Vol, veh/h	0	886	17	0	473	6	0	0	15	0	0	289
Conflicting Peds, #/hr	0	0	42	0	0	33	0	0	4	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	984	19	0	526	7	0	0	17	0	0	321

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	548	-	-	297
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	411	0	0	690
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	393	-	-	668
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	14.6	15.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	393	-	-	-	-	668
HCM Lane V/C Ratio	0.042	-	-	-	-	0.481
HCM Control Delay (s)	14.6	-	-	-	-	15.3
HCM Lane LOS	B	-	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	-	2.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	82	150	58	89	5	66	1046	19	6	934	55
Future Volume (vph)	127	82	150	58	89	5	66	1046	19	6	934	55
Satd. Flow (prot)	0	1572	0	0	1696	0	0	3257	0	0	3249	0
Flt Permitted		0.779			0.654			0.744			0.945	
Satd. Flow (perm)	0	1231	0	0	1131	0	0	2430	0	0	3070	0
Satd. Flow (RTOR)		27			1			3			10	
Lane Group Flow (vph)	0	399	0	0	169	0	0	1256	0	0	1106	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	38.0	38.0		38.0	38.0		92.0	92.0		92.0	92.0	
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		32.3			32.3			86.7			86.7	
Actuated g/C Ratio		0.25			0.25			0.67			0.67	
v/c Ratio		1.22			0.60			0.77			0.54	
Control Delay		163.9			53.2			17.7			12.3	
Queue Delay		0.0			0.0			3.8			0.1	
Total Delay		163.9			53.2			21.5			12.4	
LOS		F			D			C			B	
Approach Delay		163.9			53.2			21.5			12.4	
Approach LOS		F			D			C			B	
Queue Length 50th (m)		~120.6			38.2			124.8			71.0	
Queue Length 95th (m)		#183.3			63.2			144.6			87.3	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		326			281			1621			2050	
Starvation Cap Reductn		0			0			277			0	
Spillback Cap Reductn		0			0			0			134	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.22			0.60			0.93			0.58	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.22
Intersection Signal Delay: 39.3 Intersection LOS: D
Intersection Capacity Utilization 104.0% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Bronson Avenue & Powell Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	133	561	0	0	0	375	942	26	0	1038	104
Future Volume (vph)	207	133	561	0	0	0	375	942	26	0	1038	104
Satd. Flow (prot)	1530	1605	1483	0	0	0	3216	1729	0	0	3253	0
Flt Permitted	0.950	0.989					0.950					
Satd. Flow (perm)	1456	1587	1407	0	0	0	3178	1729	0	0	3253	0
Satd. Flow (RTOR)			46					3			12	
Lane Group Flow (vph)	186	192	623	0	0	0	417	1076	0	0	1269	0
Turn Type	Perm	NA	custom				Prot	NA			NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4 5									
Detector Phase	4	4	4 5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0					5.0	10.0			10.0	
Minimum Split (s)	31.0	31.0					11.0	24.0			33.0	
Total Split (s)	31.0	31.0					26.0	99.0			73.0	
Total Split (%)	23.8%	23.8%					20.0%	76.2%			56.2%	
Yellow Time (s)	3.3	3.3					3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7					2.7	2.7			2.7	
Lost Time Adjust (s)	0.0	0.0					0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0					6.0	6.0			6.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Recall Mode	None	None					Min	C-Max			C-Max	
Act Effct Green (s)	25.0	25.0	51.0				20.0	93.0			67.0	
Actuated g/C Ratio	0.19	0.19	0.39				0.15	0.72			0.52	
v/c Ratio	0.66	0.63	1.08				0.84	0.87			0.75	
Control Delay	51.6	48.9	92.0				62.9	27.7			20.3	
Queue Delay	0.0	0.0	0.0				0.0	1.1			0.3	
Total Delay	51.6	48.9	92.0				62.9	28.9			20.6	
LOS	D	D	F				E	C			C	
Approach Delay		76.3						38.4			20.6	
Approach LOS		E						D			C	
Queue Length 50th (m)	48.8	50.2	~161.5				54.1	185.1			99.5	
Queue Length 95th (m)	76.2	77.0	#243.3				m#78.6	m230.5			m110.7	
Internal Link Dist (m)		82.5			112.6			392.2			142.6	
Turn Bay Length (m)							40.0					
Base Capacity (vph)	280	305	579				494	1237			1682	
Starvation Cap Reductn	0	0	0				0	0			78	
Spillback Cap Reductn	0	0	0				0	47			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.66	0.63	1.08				0.84	0.90			0.79	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08
Intersection Signal Delay: 42.5 Intersection LOS: D
Intersection Capacity Utilization 82.9% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

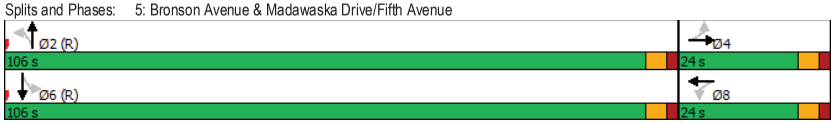
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	34	24	107	22	27	9	1219	27	19	1534	4
Future Volume (vph)	3	34	24	107	22	27	9	1219	27	19	1534	4
Satd. Flow (prot)	0	1523	0	0	1635	0	0	3300	0	0	3311	0
Flt Permitted		0.990			0.751			0.933			0.916	
Satd. Flow (perm)	0	1510	0	0	1239	0	0	3079	0	0	3035	0
Satd. Flow (RTOR)		21			7			5			1	
Lane Group Flow (vph)	0	68	0	0	173	0	0	1394	0	0	1729	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3		30.3	30.3		30.3	30.3	
Total Split (s)	24.0	24.0		24.0	24.0		106.0	106.0		106.0	106.0	
Total Split (%)	18.5%	18.5%		18.5%	18.5%		81.5%	81.5%		81.5%	81.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		18.6			18.6			100.8			100.8	
Actuated g/C Ratio		0.14			0.14			0.78			0.78	
v/c Ratio		0.29			0.95			0.58			0.73	
Control Delay		39.1			106.6			7.2			7.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		39.1			106.6			7.2			7.0	
LOS		D			F			A			A	
Approach Delay		39.1			106.6			7.2			7.0	
Approach LOS		D			F			A			A	
Queue Length 50th (m)		10.8			42.8			65.7			73.1	
Queue Length 95th (m)		24.9			#87.3			80.1			m75.4	
Internal Link Dist (m)		190.1			132.1			94.8			392.2	
Turn Bay Length (m)												
Base Capacity (vph)		235			184			2388			2353	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.29			0.94			0.58			0.73	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 55 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95
Intersection Signal Delay: 12.9 — Intersection LOS: B
Intersection Capacity Utilization 84.0% — ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue



Appendix D

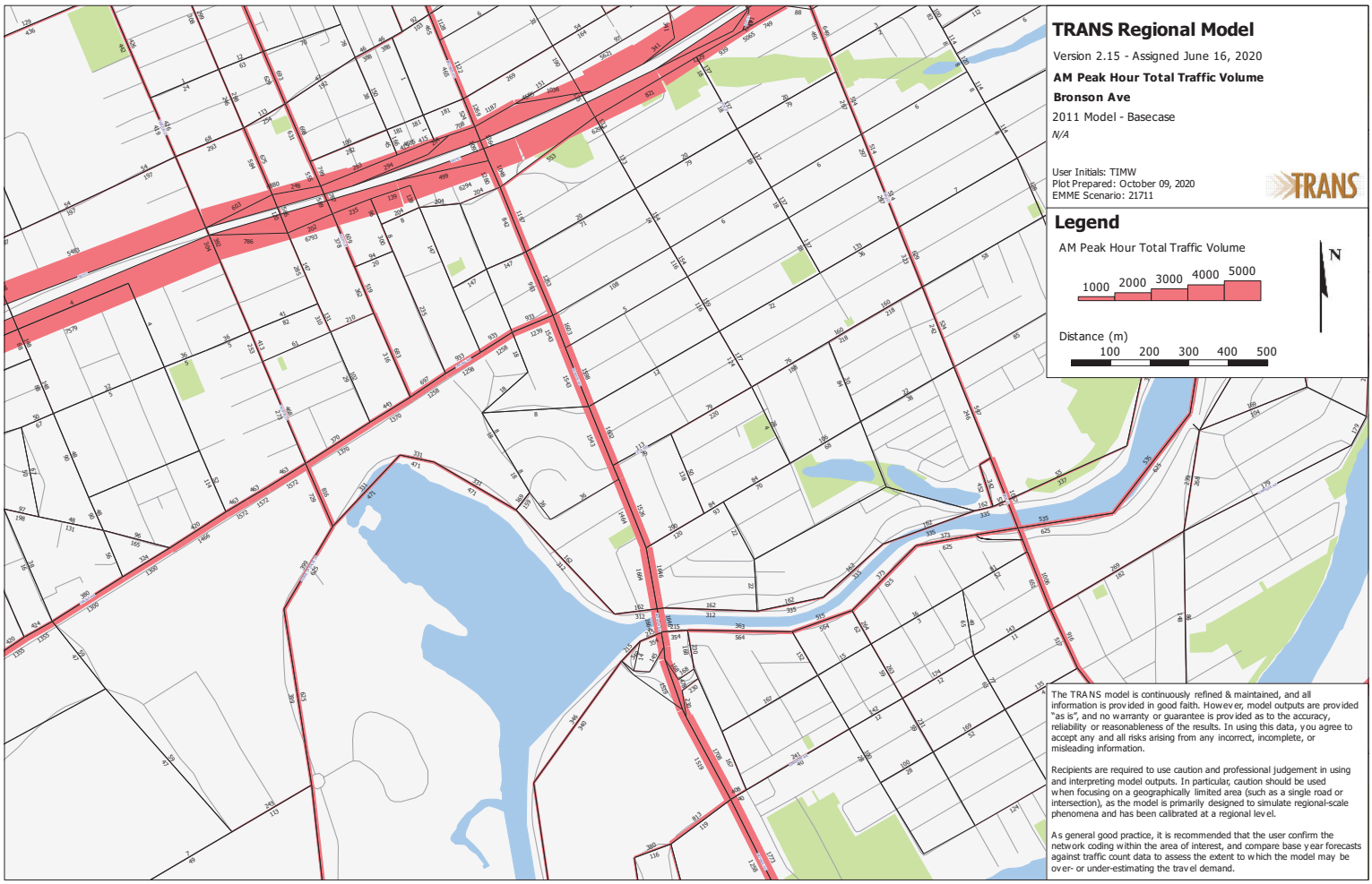
Collision Data

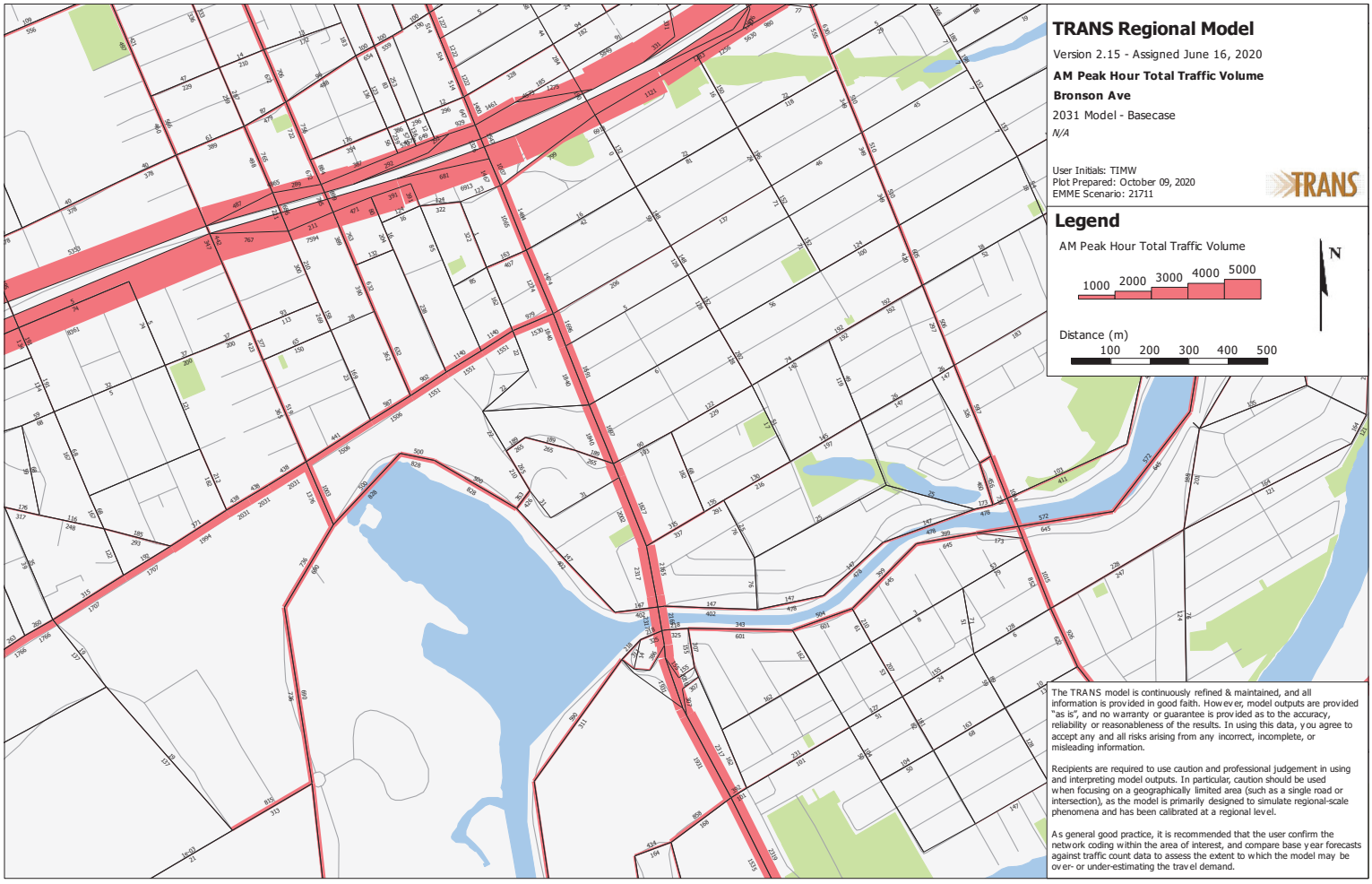
Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-04-01	2014	14:00	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2014-08-16	2014	13:20	BRONSON AVE @ CARLING AVE/GLEBE AVE	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2014-08-20	2014	10:52	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2014-10-11	2014	16:46	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2014-11-28	2014	17:06	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-05-19	2015	17:23	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-07-06	2015	14:24	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-09-30	2015	15:00	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-01-20	2015	14:12	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2015-02-19	2015	8:45	BRONSON AVE @ CARLING AVE/GLEBE AVE	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	04 - Slush
2015-07-18	2015	12:33	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-01-29	2015	15:45	BRONSON AVE @ CARLING AVE/GLEBE AVE	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	03 - Loose snow
2015-02-10	2015	17:15	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-02-21	2015	21:53	BRONSON AVE @ CARLING AVE/GLEBE AVE	03 - Snow	07 - Dark	01 - Traffic signal		03 - P.D. only	02 - Angle	03 - Loose snow
2015-01-14	2015	21:10	BRONSON AVE @ CARLING AVE/GLEBE AVE	03 - Snow	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	03 - Loose snow
2015-08-04	2015	9:56	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-09-16	2015	13:00	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-09-30	2015	18:13	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-05-17	2016	18:07	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	02 - Angle	01 - Dry
2016-05-17	2016	11:45	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-09-23	2016	14:46	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	02 - Angle	01 - Dry
2016-09-19	2016	22:29	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2016-10-28	2016	16:45	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2016-01-27	2016	11:59	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2016-09-16	2016	15:58	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2016-04-15	2016	18:10	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-12-12	2016	17:05	BRONSON AVE @ CARLING AVE/GLEBE AVE	03 - Snow	07 - Dark	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2016-12-28	2016	19:19	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-11-24	2016	9:26	BRONSON AVE @ CARLING AVE/GLEBE AVE	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	03 - Loose snow
2016-11-25	2016	18:29	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-11-30	2016	20:00	BRONSON AVE @ CARLING AVE/GLEBE AVE	02 - Rain	07 - Dark	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2016-09-29	2016	23:15	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-05-30	2017	12:13	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-06-22	2017	19:10	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-05-14	2017	9:47	BRONSON AVE @ CARLING AVE/GLEBE AVE	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	02 - Wet
2017-07-06	2017	13:20	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-09-14	2017	18:43	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2017-08-12	2017	11:00	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-10-10	2017	10:53	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-10-02	2017	19:43	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-11-09	2017	10:57	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-11-14	2017	18:16	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-12-11	2017	16:40	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	05 - Dusk	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-01-05	2017	14:06	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2017-01-13	2017	9:55	BRONSON AVE @ CARLING AVE/GLEBE AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2017-12-23	2017	13:28	BRONSON AVE @ CARLING AVE/GLEBE AVE	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	05 - Packed snow
2018-02-21	2018	16:27	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2018-03-26	2018	18:54	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	05 - Dusk	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-04-03	2018	15:20	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-05-18	2018	2:11	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	01 - Dry
2018-09-09	2018	12:43	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-10-09	2018	7:36	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-11-30	2018	8:50	BRONSON AVE @ CARLING AVE/GLEBE AVE (0002134)	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2014-05-15	2014	18:45	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	05 - Turning movement	01 - Dry
2014-01-31	2014	11:16	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2014-04-02	2014	8:30	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	04 - Sideswipe	01 - Dry
2014-12-04	2014	12:57	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-03-27	2015	13:36	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	03 - Loose snow
2015-08-13	2015	18:18	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2016-01-29	2016	12:42	BRONSON AVE @ FIRST AVE	03 - Snow	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2016-10-20	2016	11:59	BRONSON AVE @ FIRST AVE	02 - Rain	01 - Daylight	02 - Stop sign		03 - P.D. only	04 - Sideswipe	02 - Wet
2016-11-16	2016	15:00	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2017-06-05	2017	17:10	BRONSON AVE @ FIRST AVE	01 - Clear	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-05-13	2017	10:56	BRONSON AVE @ FIRST AVE	02 - Rain	01 - Daylight	02 - Stop sign		03 - P.D. only	05 - Turning movement	02 - Wet
2017-11-30	2017	15:47	BRONSON AVE @ FIRST AVE	04 - Freezing Rain	01 - Daylight	02 - Stop sign		03 - P.D. only	04 - Sideswipe	06 - Ice
2017-12-12	2017	13:45	BRONSON AVE @ FIRST AVE	03 - Snow	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	03 - Loose snow
2018-02-11	2018	16:45	BRONSON AVE @ FIRST AVE (0007719)	04 - Freezing Rain	05 - Dusk	02 - Stop sign		03 - P.D. only	04 - Sideswipe	02 - Wet
2018-08-21	2018	12:39	BRONSON AVE @ FIRST AVE (0007719)	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	05 - Turning movement	01 - Dry
2018-08-31	2018	19:23	BRONSON AVE @ FIRST AVE (0007719)	01 - Clear	05 - Dusk	02 - Stop sign		02 - Non-fatal injury	02 - Angle	01 - Dry
2018-10-01	2018	19:56	BRONSON AVE @ FIRST AVE (0007719)	01 - Clear	07 - Dark	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2018-11-09	2018	10:15	BRONSON AVE @ FIRST AVE (0007719)	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2018-11-23	2018	16:05	BRONSON AVE @ FIRST AVE (0007719)	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2014-04-29	2014	12:30	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2014-08-08	2014	15:50	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2014-10-24	2014	19:15	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	02 - Angle	01 - Dry
2015-06-01	2015	19:53	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-04-27	2015	15:20	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2015-06-22	2015	8:46	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2015-10-15	2015	22:10	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-03-09	2016	16:50	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	02 - Wet
2016-06-17	2016	19:09	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-05-24	2017	9:14	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	01 - Daylight	10 - No control		02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2017-03-22	2017	21:32	BRONSON AVE btwn CARLING AVE & FIRST AVE	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2018-06-29	2018	14:30	BRONSON AVE btwn CARLING AVE & FIRST AVE (__3ZA3OQ)	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2018-11-09	2018	17:37	BRONSON AVE btwn CARLING AVE & FIRST AVE (__3ZA3OQ)	02 - Rain	07 - Dark	10 - No control		03 - P.D. only	04 - Sideswipe	02 - Wet
2014-12-02	2014	11:02	BRONSON AVE btwn CLEMOW AVE & CARLING AVE	01 - Clear	01 - Daylight	10 - No control		02 - Non-fatal injury	02 - Angle	01 - Dry
2014-04-08	2014	15:30	BRONSON AVE btwn CLEMOW AVE & CARLING AVE	02 - Rain	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	02 - Wet
2016-02-18	2016	12:15	BRONSON AVE btwn CLEMOW AVE & CARLING AVE	01 - Clear	01 - Daylight	10 - No control		02 - Non-fatal injury	01 - Approaching	01 - Dry
2017-06-19	2017	12:45	BRONSON AVE btwn CLEMOW AVE & CARLING AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	02 - Angle	01 - Dry
2018-04-16	2018	13:43	BRONSON AVE btwn CLEMOW AVE & CARLING AVE (__3ZA3OV)	04 - Freezing Rain	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	02 - Wet
2018-04-18	2018	7:42	BRONSON AVE btwn CLEMOW AVE & CARLING AVE (__3ZA3OV)	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2018-06-15	2018	12:34	BRONSON AVE btwn CLEMOW AVE & CARLING AVE (__3ZA3OV)	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2014-05-08	2014	8:30	BRONSON AVE btwn FIRST AVE & SECOND AVE	01 - Clear	01 - Daylight	10 - No control		02 - Non-fatal injury	03 - Rear end	01 - Dry
2014-08-07	2014	16:35	BRONSON AVE btwn FIRST AVE & SECOND AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2015-05-10	2015	19:30	BRONSON AVE btwn FIRST AVE & SECOND AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	02 - Angle	01 - Dry

2016-07-05	2016	14:05	BRONSON AVE btwn FIRST AVE & SECOND AVE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2016-05-22	2016	17:54	BRONSON AVE btwn FIRST AVE & SECOND AVE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2017-11-16	2017	9:09	BRONSON AVE btwn FIRST AVE & SECOND AVE	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2018-08-16	2018	12:57	BRONSON AVE btwn FIRST AVE & SECOND AVE (__3ZA3OO)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2014-01-07	2014	16:40	CAMBRIDGE ST @ CARLING AVE	01 - Clear	05 - Dusk	02 - Stop sign	03 - P.D. only	03 - Rear end	06 - Ice
2014-04-23	2014	16:17	CAMBRIDGE ST @ CARLING AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2014-09-04	2014	18:11	CAMBRIDGE ST @ CARLING AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2015-07-08	2015	9:16	CAMBRIDGE ST @ CARLING AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2016-07-12	2016	20:54	CAMBRIDGE ST @ CARLING AVE	01 - Clear	05 - Dusk	02 - Stop sign	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2015-05-06	2015	15:22	CARLING AVE btwn BOOTH ST & CAMBRIDGE ST S	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2017-05-15	2017	17:09	CARLING AVE btwn CAMBRIDGE ST S & BRONSON AVE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2018-02-09	2018	9:47	CARLING AVE btwn CAMBRIDGE ST S & BRONSON AVE (__3ZA4S3)	01 - Clear	01 - Daylight	10 - No control	01 - Fatal injury	07 - SMV other	01 - Dry

Appendix E

TRANS Model Plots


TRANS Regional Model
Version 2.15 - Assigned June 16, 2020
AM Peak Hour Total Traffic Volume
Bronson Ave
2011 Model - Basecase
N/A
User Initials: TIMW
Plot Prepared: October 09, 2020
EMME Scenario: 21711
TRANS
Legend
AM Peak Hour Total Traffic Volume
1000 2000 3000 4000 5000
Distance (m)
100 200 300 400 500
N
The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.
Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.
As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.


TRANS Regional Model
Version 2.15 - Assigned June 16, 2020
AM Peak Hour Total Traffic Volume
Bronson Ave
2031 Model - Basecase
N/A
User Initials: TIMW
Plot Prepared: October 09, 2020
EMME Scenario: 21711
TRANS
Legend
AM Peak Hour Total Traffic Volume
1000 2000 3000 4000 5000
Distance (m)
100 200 300 400 500
N
The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.
Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.
As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

Appendix F

Background Development Volumes

CGH TRANSPORTATION

The 'new' auto trips generated by the proposed development are depicted in Figure 4.

Figure 4: 'New' Auto Trips

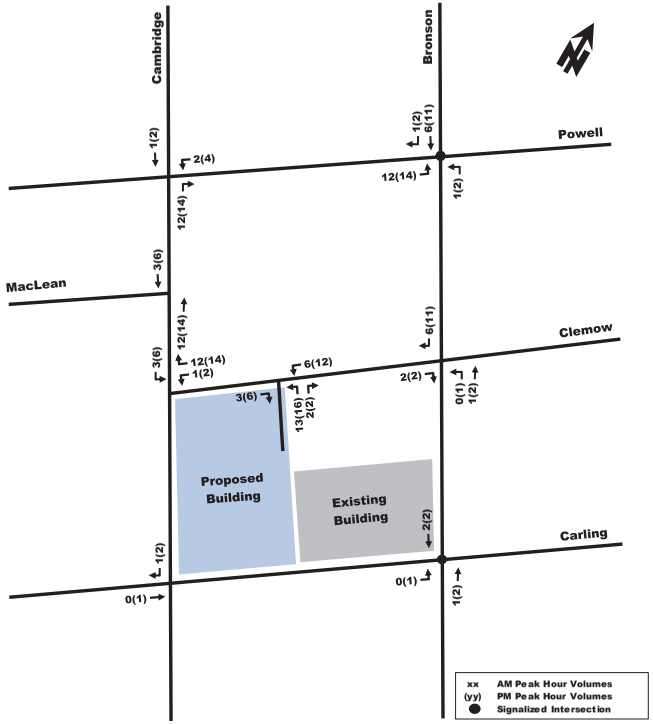
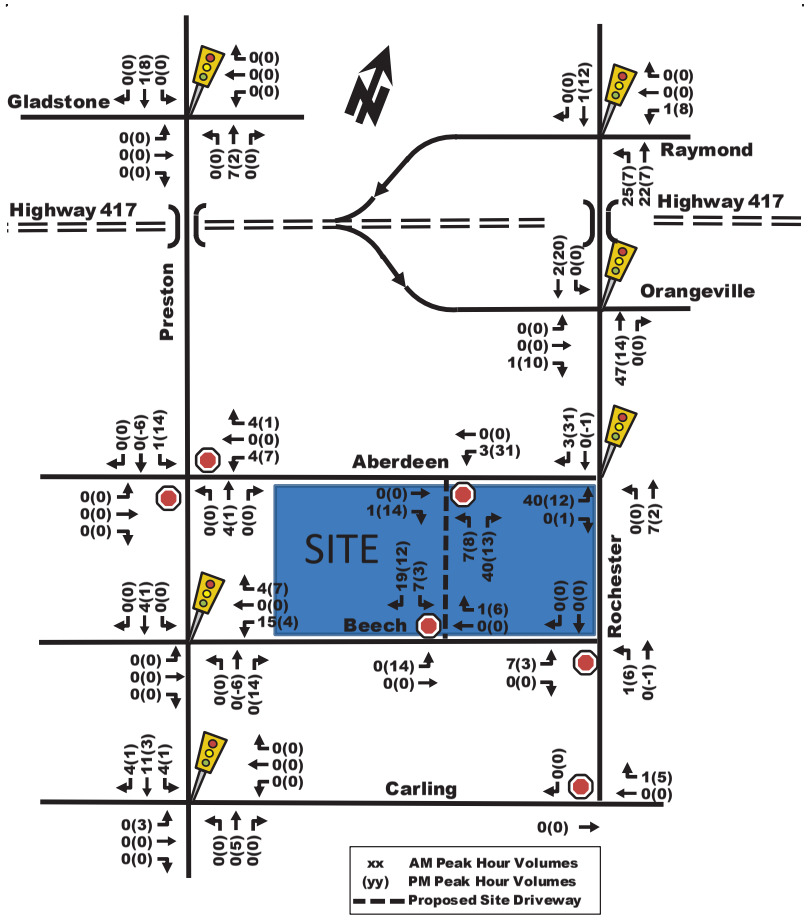
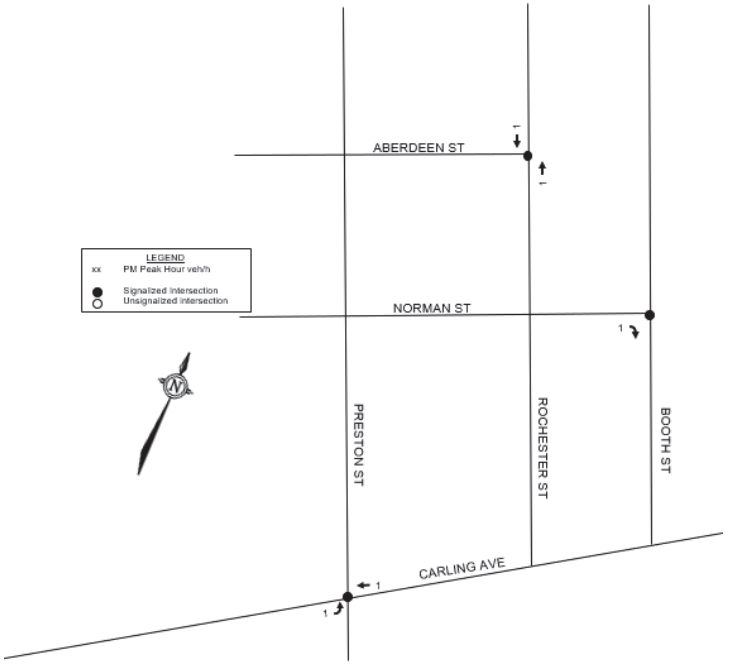


Figure 11: Site-Generated Traffic at Full Buildout (Phase 1 & 2)



Note: values in negative reflect changes in routes based on pass-by trips or net change between trips generated and reduction in public parking lot.

Figure 5: Site Generated Traffic Volumes



Appendix G

Synchro Intersection Worksheets – 2025 Future Background Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	282	935	679	120	160	113
Future Volume (vph)	282	935	679	120	160	113
Satd. Flow (prot)	1658	3283	4530	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1592	3283	4530	0	1633	1258
Satd. Flow (RTOR)			32			113
Lane Group Flow (vph)	282	935	799	0	160	113
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	34.0	81.0	47.0		39.0	39.0
Total Split (%)	28.3%	67.5%	39.2%		32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	24.3	75.3	45.1		33.0	33.0
Actuated g/C Ratio	0.20	0.63	0.38		0.28	0.28
v/c Ratio	0.84	0.45	0.46		0.36	0.26
Control Delay	67.3	12.5	28.8		37.8	7.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	67.3	12.5	28.8		37.8	7.8
LOS	E	B	C		D	A
Approach Delay		25.2	28.8		25.3	
Approach LOS		C	C		C	
Queue Length 50th (m)	63.4	56.1	50.4		30.4	0.0
Queue Length 95th (m)	#93.1	70.3	65.0		49.8	13.6
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	388	2060	1722		449	427
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.73	0.45	0.46		0.36	0.26

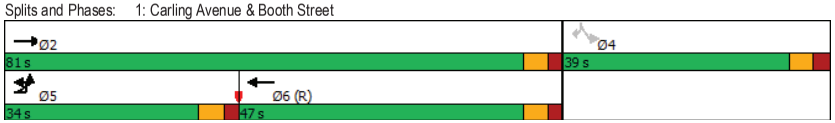
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 26.5	Intersection LOS: C
Intersection Capacity Utilization 77.8%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 1: Carling Avenue & Booth Street



Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1093	5	0	633	12	0	0	10	0	0	56
Future Vol, veh/h	0	1093	5	0	633	12	0	0	10	0	0	56
Conflicting Peds, #/hr	0	0	45	0	0	38	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1093	5	0	633	12	0	0	10	0	0	56

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	595	-	-	355
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	383	0	0	633
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	367	-	-	611
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	15.1	11.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	367	-	-	-	-	611
HCM Lane V/C Ratio	0.027	-	-	-	-	0.092
HCM Control Delay (s)	15.1	-	-	-	-	11.5
HCM Lane LOS	C	-	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	25	51	17	53	17	45	1644	8	11	997	68
Future Volume (vph)	111	25	51	17	53	17	45	1644	8	11	997	68
Satd. Flow (prot)	0	1586	0	0	1642	0	0	3275	0	0	3241	0
Flt Permitted		0.776			0.921			0.879			0.926	
Satd. Flow (perm)	0	1227	0	0	1518	0	0	2882	0	0	3004	0
Satd. Flow (RTOR)		15			10			1			16	
Lane Group Flow (vph)	0	187	0	0	87	0	0	1697	0	0	1076	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	26.0	26.0		26.0	26.0		84.0	84.0		84.0	84.0	
Total Split (%)	23.6%	23.6%		23.6%	23.6%		76.4%	76.4%		76.4%	76.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		18.4			18.4			80.6			80.6	
Actuated g/C Ratio		0.17			0.17			0.73			0.73	
v/c Ratio		0.86			0.33			0.80			0.49	
Control Delay		74.9			38.5			7.2			7.2	
Queue Delay		0.0			0.0			8.6			0.0	
Total Delay		74.9			38.5			15.8			7.2	
LOS		E			D			B			A	
Approach Delay		74.9			38.5			15.8			7.2	
Approach LOS		E			D			B			A	
Queue Length 50th (m)		35.6			14.4			63.8			46.3	
Queue Length 95th (m)		#71.3			29.0			m48.2			59.1	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		238			288			2112			2205	
Starvation Cap Reductn		0			0			396			0	
Spillback Cap Reductn		0			0			0			97	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.79			0.30			0.99			0.51	

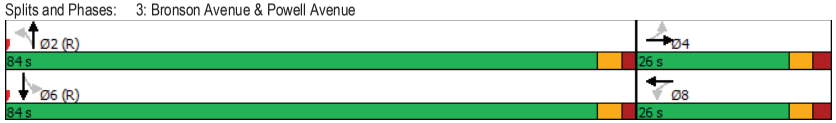
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 110.1%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 3: Bronson Avenue & Powell Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	391	152	525	0	0	0	443	1397	38	0	934	110
Future Volume (vph)	391	152	525	0	0	0	443	1397	38	0	934	110
Satd. Flow (prot)	1530	1583	1483	0	0	0	3216	1730	0	0	3246	0
Flt Permitted	0.950	0.978					0.950					
Satd. Flow (perm)	1459	1551	1271	0	0	0	3182	1730	0	0	3246	0
Satd. Flow (RTOR)			30					3			13	
Lane Group Flow (vph)	270	273	525	0	0	0	443	1435	0	0	1044	0
Turn Type	Perm	NA	pm+ov				Prot	NA			NA	
Protected Phases		4	5				5	2			6	
Permitted Phases	4		4									
Detector Phase	4	4	5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0				5.0	10.0			10.0	
Minimum Split (s)	31.0	31.0	11.0				11.0	24.0			33.0	
Total Split (s)	31.0	31.0	34.0				34.0	79.0			45.0	
Total Split (%)	28.2%	28.2%	30.9%				30.9%	71.8%			40.9%	
Yellow Time (s)	3.3	3.3	3.3				3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7	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	6.0				6.0	6.0			6.0	
Lead/Lag			Lead				Lead				Lag	
Lead-Lag Optimize?			Yes				Yes				Yes	
Recall Mode	None	None	Min				Min	C-Max			C-Max	
Act Effct Green (s)	23.5	23.5	45.9				22.3	74.5			46.1	
Actuated g/C Ratio	0.21	0.21	0.42				0.20	0.68			0.42	
v/c Ratio	0.87	0.82	0.89				0.68	1.22			0.76	
Control Delay	68.3	61.8	43.3				36.2	136.6			28.0	
Queue Delay	0.0	0.0	0.0				0.0	0.1			0.1	
Total Delay	68.3	61.8	43.3				36.2	136.7			28.1	
LOS	E	E	D				D	F			C	
Approach Delay		54.4						113.0			28.1	
Approach LOS		D						F			C	
Queue Length 50th (m)	58.2	58.2	81.5				45.9	~398.4			102.4	
Queue Length 95th (m)	#102.4	#98.4	109.4				50.8	#478.8			#148.9	
Internal Link Dist (m)		82.5			112.6			392.2			142.6	
Turn Bay Length (m)							40.0					
Base Capacity (vph)	331	352	665				818	1172			1368	
Starvation Cap Reductn	0	0	0				0	0			15	
Spillback Cap Reductn	0	0	0				0	24			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.82	0.78	0.79				0.54	1.25			0.77	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 53 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

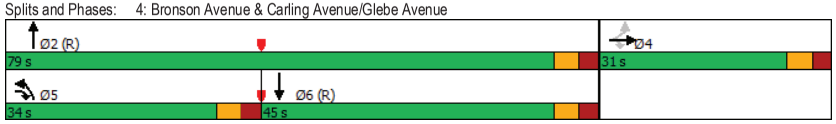
Maximum v/c Ratio: 1.22

Intersection Signal Delay: 75.1	Intersection LOS: E
Intersection Capacity Utilization 110.7%	ICU Level of Service H
Analysis Period (min) 15	

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

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

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	48	14	86	34	46	0	1723	34	22	1475	1
Future Volume (vph)	7	48	14	86	34	46	0	1723	34	22	1475	1
Satd. Flow (prot)	0	1623	0	0	1608	0	0	3302	0	0	3311	0
Flt Permitted		0.971			0.824						0.892	
Satd. Flow (perm)	0	1578	0	0	1333	0	0	3302	0	0	2956	0
Satd. Flow (RTOR)		10			16			4				
Lane Group Flow (vph)	0	69	0	0	166	0	0	1757	0	0	1498	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0			10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3			34.3		34.3	34.3	
Total Split (s)	28.0	28.0		28.0	28.0			82.0		82.0	82.0	
Total Split (%)	25.5%	25.5%		25.5%	25.5%			74.5%		74.5%	74.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3			3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)		17.2			17.2			82.2			82.2	
Actuated g/C Ratio		0.16			0.16			0.75			0.75	
v/c Ratio		0.27			0.75			0.71			0.68	
Control Delay		35.9			59.6			10.4			5.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		35.9			59.6			10.4			5.6	
LOS		D			E			B			A	
Approach Delay		35.9			59.6			10.4			5.6	
Approach LOS		D			E			B			A	
Queue Length 50th (m)		11.1			30.9			94.0			37.4	
Queue Length 95th (m)		22.7			51.3			141.7			50.3	
Internal Link Dist (m)		190.1			132.1			94.8			392.2	
Turn Bay Length (m)												
Base Capacity (vph)		333			287			2467			2207	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.21			0.58			0.71			0.68	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 85.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	216	788	995	59	317	527
Future Volume (vph)	216	788	995	59	317	527
Satd. Flow (prot)	1658	3283	4673	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1581	3283	4673	0	1632	1230
Satd. Flow (RTOR)			9			100
Lane Group Flow (vph)	216	788	1054	0	317	527
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	23.0	90.0	67.0		40.0	40.0
Total Split (%)	17.7%	69.2%	51.5%		30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	17.1	84.3	61.3		34.0	34.0
Actuated g/C Ratio	0.13	0.65	0.47		0.26	0.26
v/c Ratio	0.99	0.37	0.48		0.74	1.33
Control Delay	114.8	11.2	40.0		56.0	198.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	114.8	11.2	40.0		56.0	198.1
LOS	F	B	D		E	F
Approach Delay		33.5	40.0		144.8	
Approach LOS		C	D		F	
Queue Length 50th (m)	56.1	45.7	87.5		74.8	~156.1
Queue Length 95th (m)	#106.4	57.1	102.0		108.8	#224.2
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	218	2128	2208		426	395
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.99	0.37	0.48		0.74	1.33

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 110 (85%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.33

Intersection Signal Delay: 68.2	Intersection LOS: E
Intersection Capacity Utilization 89.0%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Carling Avenue & Booth Street

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1053	17	0	589	6	0	0	25	0	0	291
Future Vol, veh/h	0	1053	17	0	589	6	0	0	25	0	0	291
Conflicting Peds, #/hr	0	0	42	0	0	33	0	0	4	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1053	17	0	589	6	0	0	25	0	0	291

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	581	-	-	329
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	391	0	0	658
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	374	-	-	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	15.3	15.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	374	-	-	-	-	637
HCM Lane V/C Ratio	0.067	-	-	-	-	0.457
HCM Control Delay (s)	15.3	-	-	-	-	15.3
HCM Lane LOS	C	-	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	-	2.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	82	150	58	89	5	73	1127	19	6	945	57
Future Volume (vph)	141	82	150	58	89	5	73	1127	19	6	945	57
Satd. Flow (prot)	0	1575	0	0	1699	0	0	3261	0	0	3248	0
Flt Permitted		0.782			0.684			0.768			0.947	
Satd. Flow (perm)	0	1239	0	0	1184	0	0	2511	0	0	3076	0
Satd. Flow (RTOR)		25			1			3			10	
Lane Group Flow (vph)	0	373	0	0	152	0	0	1219	0	0	1008	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	38.0	38.0		38.0	38.0		92.0	92.0		92.0	92.0	
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		32.3			32.3			86.7			86.7	
Actuated g/C Ratio		0.25			0.25			0.67			0.67	
v/c Ratio		1.14			0.52			0.73			0.49	
Control Delay		135.9			49.1			17.2			11.6	
Queue Delay		0.0			0.0			2.8			0.0	
Total Delay		135.9			49.1			19.9			11.6	
LOS		F			D			B			B	
Approach Delay		135.9			49.1			19.9			11.6	
Approach LOS		F			D			B			B	
Queue Length 50th (m)		~106.8			33.5			110.3			61.4	
Queue Length 95th (m)		#167.9			55.9			34.6			75.9	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		326			294			1675			2054	
Starvation Cap Reductn		0			0			332			0	
Spillback Cap Reductn		0			0			0			44	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.14			0.52			0.91			0.50	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14
Intersection Signal Delay: 34.2 — Intersection LOS: C
Intersection Capacity Utilization 108.7% — ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Bronson Avenue & Powell Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	247	133	666	0	0	0	435	1094	26	0	1040	104
Future Volume (vph)	247	133	666	0	0	0	435	1094	26	0	1040	104
Satd. Flow (prot)	1530	1597	1483	0	0	0	3216	1732	0	0	3253	0
Flt Permitted	0.950	0.985					0.950					
Satd. Flow (perm)	1456	1573	1406	0	0	0	3175	1732	0	0	3253	0
Satd. Flow (RTOR)			63					2			12	
Lane Group Flow (vph)	188	192	666	0	0	0	435	1120	0	0	1144	0
Turn Type	Perm	NA	pm+ov				Prot	NA			NA	
Protected Phases		4	5				5	2			6	
Permitted Phases	4		4									
Detector Phase	4	4	5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0				5.0	10.0			10.0	
Minimum Split (s)	31.0	31.0	11.0				11.0	24.0			33.0	
Total Split (s)	31.0	31.0	26.0				26.0	99.0			73.0	
Total Split (%)	23.8%	23.8%	20.0%				20.0%	76.2%			56.2%	
Yellow Time (s)	3.3	3.3	3.3				3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7	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	6.0				6.0	6.0			6.0	
Lead/Lag			Lead				Lead				Lag	
Lead-Lag Optimize?			Yes				Yes				Yes	
Recall Mode	None	None	Min				Min	C-Max			C-Max	
Act Effct Green (s)	21.5	21.5	45.0				23.5	96.5			67.0	
Actuated g/C Ratio	0.17	0.17	0.35				0.18	0.74			0.52	
v/c Ratio	0.78	0.74	1.23				0.75	0.87			0.68	
Control Delay	61.8	56.8	149.1				53.9	27.4			18.4	
Queue Delay	0.0	0.0	0.0				0.0	0.0			0.2	
Total Delay	61.8	56.8	149.1				53.9	27.4			18.6	
LOS	E	E	F				D	C			B	
Approach Delay		116.5						34.8			18.6	
Approach LOS		F						C			B	
Queue Length 50th (m)	49.5	50.3	~204.9				57.0	198.9			61.7	
Queue Length 95th (m)	m74.3	m75.2	#212.9				m#83.2	m#250.0			m79.7	
Internal Link Dist (m)		82.5			112.6			392.2			142.6	
Turn Bay Length (m)							40.0					
Base Capacity (vph)	280	302	541				581	1286			1682	
Starvation Cap Reductn	0	0	0				0	0			93	
Spillback Cap Reductn	0	0	0				0	0			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.67	0.64	1.23				0.75	0.87			0.72	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23
Intersection Signal Delay: 52.7 Intersection LOS: D
Intersection Capacity Utilization 89.8% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	66	47	121	22	27	9	1415	27	19	1536	4
Future Volume (vph)	3	66	47	121	22	27	9	1415	27	19	1536	4
Satd. Flow (prot)	0	1521	0	0	1637	0	0	3301	0	0	3310	0
Flt Permitted		0.994			0.580			0.940			0.916	
Satd. Flow (perm)	0	1513	0	0	963	0	0	3103	0	0	3035	0
Satd. Flow (RTOR)		22			6			5			1	
Lane Group Flow (vph)	0	116	0	0	170	0	0	1451	0	0	1559	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3		34.3	34.3		34.3	34.3	
Total Split (s)	24.0	24.0		24.0	24.0		106.0	106.0		106.0	106.0	
Total Split (%)	18.5%	18.5%		18.5%	18.5%		81.5%	81.5%		81.5%	81.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		18.7			18.7			100.7			100.7	
Actuated g/C Ratio		0.14			0.14			0.77			0.77	
v/c Ratio		0.49			1.19			0.60			0.66	
Control Delay		49.2			180.5			7.4			6.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		49.2			180.5			7.4			6.2	
LOS		D			F			A			A	
Approach Delay		49.2			180.5			7.4			6.2	
Approach LOS		D			F			A			A	
Queue Length 50th (m)		22.3			~51.1			70.3			70.1	
Queue Length 95th (m)		41.9			#97.0			85.7			m67.6	
Internal Link Dist (m)		190.1			132.1			94.8			392.2	
Turn Bay Length (m)												
Base Capacity (vph)		236			143			2404			2351	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			1.19			0.60			0.66	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 55 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 17.3	Intersection LOS: B
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue

Appendix H

Synchro Intersection Worksheets – 2030 Future Background Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	351	1165	806	142	197	139
Future Volume (vph)	351	1165	806	142	197	139
Satd. Flow (prot)	1658	3283	4535	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1575	3283	4535	0	1633	1258
Satd. Flow (RTOR)			32			139
Lane Group Flow (vph)	351	1165	948	0	197	139
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	34.0	81.0	47.0		39.0	39.0
Total Split (%)	28.3%	67.5%	39.2%		32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	27.2	75.3	42.2		33.0	33.0
Actuated g/C Ratio	0.23	0.63	0.35		0.28	0.28
v/c Ratio	0.93	0.57	0.59		0.44	0.31
Control Delay	78.3	14.2	32.6		39.6	7.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	78.3	14.2	32.6		39.6	7.5
LOS	E	B	C		D	A
Approach Delay		29.1	32.6		26.3	
Approach LOS		C	C		C	
Queue Length 50th (m)	80.8	77.6	64.8		38.3	0.0
Queue Length 95th (m)	#134.2	95.6	79.3		60.6	15.0
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	388	2060	1614		449	446
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.90	0.57	0.59		0.44	0.31

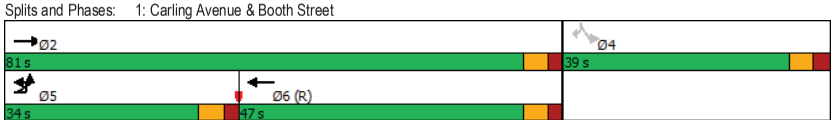
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 29.9	Intersection LOS: C
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Carling Avenue & Booth Street



Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1362	8	0	752	12	0	0	10	0	0	56
Future Vol, veh/h	0	1362	8	0	752	12	0	0	10	0	0	56
Conflicting Peds, #/hr	0	0	45	0	0	38	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1362	8	0	752	12	0	0	10	0	0	56

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	731	-	-	414
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	312	0	0	579
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	299	-	-	559
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.5	12.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	299	-	-	-	-	559
HCM Lane V/C Ratio	0.033	-	-	-	-	0.1
HCM Control Delay (s)	17.5	-	-	-	-	12.2
HCM Lane LOS	C	-	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	25	87	17	53	17	45	1644	8	11	1074	73
Future Volume (vph)	180	25	87	17	53	17	45	1644	8	11	1074	73
Satd. Flow (prot)	0	1577	0	0	1642	0	0	3275	0	0	3244	0
Flt Permitted		0.772			0.915			0.871			0.928	
Satd. Flow (perm)	0	1214	0	0	1517	0	0	2855	0	0	3011	0
Satd. Flow (RTOR)		17			10			1			16	
Lane Group Flow (vph)	0	292	0	0	87	0	0	1697	0	0	1158	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	26.0	26.0		26.0	26.0		84.0	84.0		84.0	84.0	
Total Split (%)	23.6%	23.6%		23.6%	23.6%		76.4%	76.4%		76.4%	76.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		20.3			20.3			78.7			78.7	
Actuated g/C Ratio		0.18			0.18			0.72			0.72	
v/c Ratio		1.23			0.30			0.83			0.54	
Control Delay		172.4			37.5			9.3			8.2	
Queue Delay		0.0			0.0			22.3			0.1	
Total Delay		172.4			37.5			31.6			8.3	
LOS		F			D			C			A	
Approach Delay		172.4			37.5			31.6			8.3	
Approach LOS		F			D			C			A	
Queue Length 50th (m)		~74.7			14.4			86.7			52.0	
Queue Length 95th (m)		#127.6			29.0			m60.0			66.0	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		237			288			2042			2158	
Starvation Cap Reductn		0			0			407			0	
Spillback Cap Reductn		0			0			0			165	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.23			0.30			1.04			0.58	

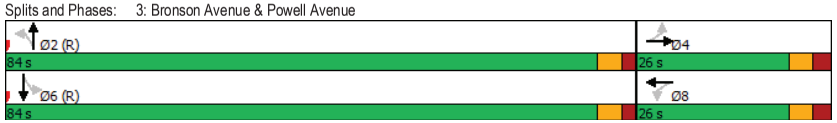
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

Intersection Signal Delay: 36.1	Intersection LOS: D
Intersection Capacity Utilization 116.5%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 3: Bronson Avenue & Powell Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	488	152	654	0	0	0	443	1397	38	0	1006	118
Future Volume (vph)	488	152	654	0	0	0	443	1397	38	0	1006	118
Satd. Flow (prot)	1530	1576	1483	0	0	0	3216	1730	0	0	3246	0
Flt Permitted	0.950	0.974					0.950					
Satd. Flow (perm)	1459	1537	1271	0	0	0	3187	1730	0	0	3246	0
Satd. Flow (RTOR)			30					3			13	
Lane Group Flow (vph)	317	323	654	0	0	0	443	1435	0	0	1124	0
Turn Type	Perm	NA	pm+ov				Prot	NA			NA	
Protected Phases		4	5				5	2			6	
Permitted Phases	4		4									
Detector Phase	4	4	5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0				5.0	10.0			10.0	
Minimum Split (s)	31.0	31.0	11.0				11.0	24.0			33.0	
Total Split (s)	31.0	31.0	34.0				34.0	79.0			45.0	
Total Split (%)	28.2%	28.2%	30.9%				30.9%	71.8%			40.9%	
Yellow Time (s)	3.3	3.3	3.3				3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7	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	6.0				6.0	6.0			6.0	
Lead/Lag			Lead				Lead				Lag	
Lead-Lag Optimize?			Yes				Yes				Yes	
Recall Mode	None	None	Min				Min	C-Max			C-Max	
Act Effct Green (s)	25.0	25.0	52.2				27.3	73.0			39.8	
Actuated g/C Ratio	0.23	0.23	0.47				0.25	0.66			0.36	
v/c Ratio	0.96	0.93	0.97				0.56	1.25			0.95	
Control Delay	83.4	75.6	55.4				29.5	146.8			44.5	
Queue Delay	0.0	0.0	0.0				0.0	0.1			0.0	
Total Delay	83.4	75.6	55.4				29.5	147.0			44.5	
LOS	F	E	E				C	F			D	
Approach Delay		67.3						119.3			44.5	
Approach LOS		E						F			D	
Queue Length 50th (m)	71.1	71.7	105.5				42.7	~398.3			124.3	
Queue Length 95th (m)	#127.7	#126.5	#206.0				50.8	#479.1			m#162.6	
Internal Link Dist (m)		82.5			112.6			392.2			142.6	
Turn Bay Length (m)							40.0					
Base Capacity (vph)	331	349	681				818	1150			1182	
Starvation Cap Reductn	0	0	0				0	0			0	
Spillback Cap Reductn	0	0	0				0	37			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.96	0.93	0.96				0.54	1.29			0.95	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 53 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 84.1	Intersection LOS: F
Intersection Capacity Utilization 110.8%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	114	34	86	34	46	0	1723	34	22	1710	1
Future Volume (vph)	7	114	34	86	34	46	0	1723	34	22	1710	1
Satd. Flow (prot)	0	1617	0	0	1608	0	0	3302	0	0	3311	0
Flt Permitted		0.984			0.619						0.899	
Satd. Flow (perm)	0	1592	0	0	1006	0	0	3302	0	0	2980	0
Satd. Flow (RTOR)		12			16			4				
Lane Group Flow (vph)	0	155	0	0	166	0	0	1757	0	0	1733	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0			10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3			34.3		34.3	34.3	
Total Split (s)	28.0	28.0		28.0	28.0			82.0		82.0	82.0	
Total Split (%)	25.5%	25.5%		25.5%	25.5%			74.5%		74.5%	74.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3			3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)		19.3			19.3			80.1			80.1	
Actuated g/C Ratio		0.18			0.18			0.73			0.73	
v/c Ratio		0.54			0.88			0.73			0.80	
Control Delay		44.3			79.3			11.6			8.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		44.3			79.3			11.6			8.8	
LOS		D			E			B			A	
Approach Delay		44.3			79.3			11.6			8.8	
Approach LOS		D			E			B			A	
Queue Length 50th (m)		27.4			31.0			109.1			56.0	
Queue Length 95th (m)		47.1			#63.6			141.7			m193.4	
Internal Link Dist (m)		190.1			132.1			94.8			392.2	
Turn Bay Length (m)												
Base Capacity (vph)		338			220			2405			2169	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.46			0.75			0.73			0.80	

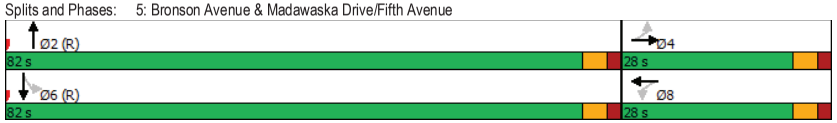
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 14.6	Intersection LOS: B
Intersection Capacity Utilization 105.4%	ICU Level of Service G
Analysis Period (min) 15	

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

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	257	936	1240	72	420	697
Future Volume (vph)	257	936	1240	72	420	697
Satd. Flow (prot)	1658	3283	4674	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1594	3283	4674	0	1632	1230
Satd. Flow (RTOR)			9			82
Lane Group Flow (vph)	257	936	1312	0	420	697
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	23.0	90.0	67.0		40.0	40.0
Total Split (%)	17.7%	69.2%	51.5%		30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	17.1	84.3	61.3		34.0	34.0
Actuated g/C Ratio	0.13	0.65	0.47		0.26	0.26
v/c Ratio	1.18	0.44	0.59		0.99	1.82
Control Delay	165.9	12.0	43.7		88.1	407.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	165.9	12.0	43.7		88.1	407.4
LOS	F	B	D		F	F
Approach Delay		45.2	43.7		287.3	
Approach LOS		D	D		F	
Queue Length 50th (m)	~78.8	57.7	111.2		107.5	~255.2
Queue Length 95th (m)	#131.4	71.1	m126.6		#172.2	#328.8
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	218	2128	2208		426	382
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	1.18	0.44	0.59		0.99	1.82

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 110 (85%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.82

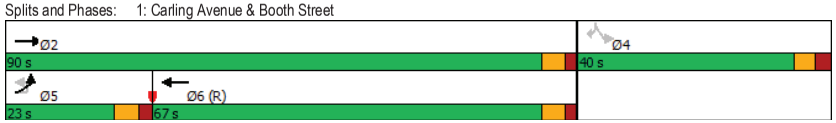
Intersection Signal Delay: 119.3	Intersection LOS: F
Intersection Capacity Utilization 107.9%	ICU Level of Service G
Analysis Period (min) 15	

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

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

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

Splits and Phases: 1: Carling Avenue & Booth Street



Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1251	17	0	735	6	0	0	41	0	0	291
Future Vol, veh/h	0	1251	17	0	735	6	0	0	41	0	0	291
Conflicting Peds, #/hr	0	0	42	0	0	33	0	0	4	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1251	17	0	735	6	0	0	41	0	0	291

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	680	-	-	402
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	337	0	0	590
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	323	-	-	571
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.8	17.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	323	-	-	-	-	571
HCM Lane V/C Ratio	0.127	-	-	-	-	0.51
HCM Control Delay (s)	17.8	-	-	-	-	17.7
HCM Lane LOS	C	-	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	-	2.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	82	150	58	89	5	79	1214	19	6	945	57
Future Volume (vph)	141	82	150	58	89	5	79	1214	19	6	945	57
Satd. Flow (prot)	0	1575	0	0	1699	0	0	3262	0	0	3248	0
Flt Permitted		0.782			0.684			0.756			0.946	
Satd. Flow (perm)	0	1239	0	0	1184	0	0	2472	0	0	3073	0
Satd. Flow (RTOR)		25			1			2			10	
Lane Group Flow (vph)	0	373	0	0	152	0	0	1312	0	0	1008	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	38.0	38.0		38.0	38.0		92.0	92.0		92.0	92.0	
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		32.3			32.3			86.7			86.7	
Actuated g/C Ratio		0.25			0.25			0.67			0.67	
v/c Ratio		1.14			0.52			0.80			0.49	
Control Delay		135.9			49.1			17.8			11.6	
Queue Delay		0.0			0.0			12.5			0.0	
Total Delay		135.9			49.1			30.3			11.6	
LOS		F			D			C			B	
Approach Delay		135.9			49.1			30.3			11.6	
Approach LOS		F			D			C			B	
Queue Length 50th (m)		~106.8			33.5			114.6			61.5	
Queue Length 95th (m)		#167.9			55.9			m119.8			75.9	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		326			294			1649			2052	
Starvation Cap Reductn		0			0			338			0	
Spillback Cap Reductn		0			0			0			44	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.14			0.52			1.00			0.50	

Intersection Summary

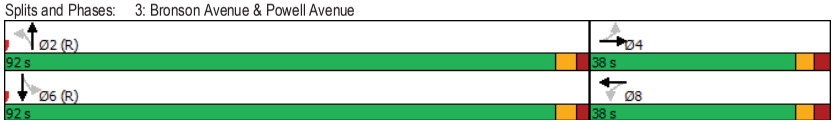
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 38.5	Intersection LOS: D
Intersection Capacity Utilization 111.4%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 3: Bronson Avenue & Powell Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	293	133	791	0	0	0	504	1268	26	0	1040	104
Future Volume (vph)	293	133	791	0	0	0	504	1268	26	0	1040	104
Satd. Flow (prot)	1530	1589	1483	0	0	0	3216	1733	0	0	3253	0
Flt Permitted	0.950	0.981					0.950					
Satd. Flow (perm)	1456	1560	1406	0	0	0	3179	1733	0	0	3253	0
Satd. Flow (RTOR)			63					2			12	
Lane Group Flow (vph)	211	215	791	0	0	0	504	1294	0	0	1144	0
Turn Type	Perm	NA	pm+ov				Prot	NA			NA	
Protected Phases		4	5				5	2			6	
Permitted Phases	4		4									
Detector Phase	4	4	5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0				5.0	10.0			10.0	
Minimum Split (s)	31.0	31.0	11.0				11.0	24.0			33.0	
Total Split (s)	31.0	31.0	26.0				26.0	99.0			73.0	
Total Split (%)	23.8%	23.8%	20.0%				20.0%	76.2%			56.2%	
Yellow Time (s)	3.3	3.3	3.3				3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7	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	6.0				6.0	6.0			6.0	
Lead/Lag			Lead				Lead				Lag	
Lead-Lag Optimize?			Yes				Yes				Yes	
Recall Mode	None	None	Min				Min	C-Max			C-Max	
Act Effct Green (s)	22.4	22.4	45.0				22.6	95.6			67.0	
Actuated g/C Ratio	0.17	0.17	0.35				0.17	0.74			0.52	
v/c Ratio	0.84	0.80	1.46				0.90	1.02			0.68	
Control Delay	64.7	58.9	244.8				63.5	51.0			18.4	
Queue Delay	0.0	0.0	0.0				0.0	17.1			0.2	
Total Delay	64.7	58.9	244.8				63.5	68.1			18.6	
LOS	E	E	F				E	E			B	
Approach Delay		180.8						66.8			18.6	
Approach LOS		F						E			B	
Queue Length 50th (m)	56.5	56.5	~207.7				~70.7	~266.7			61.7	
Queue Length 95th (m)	m77.0	m76.8	m#265.0				m#103.4	m#426.6			m79.4	
Internal Link Dist (m)		82.5			112.6			392.2			142.6	
Turn Bay Length (m)							40.0					
Base Capacity (vph)	280	300	541				558	1274			1682	
Starvation Cap Reductn	0	0	0				0	0			93	
Spillback Cap Reductn	0	0	0				0	58			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	0.75	0.72	1.46				0.90	1.06			0.72	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.46
Intersection Signal Delay: 86.9 Intersection LOS: F
Intersection Capacity Utilization 99.0% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	129	91	137	22	27	9	1640	27	19	1536	4
Future Volume (vph)	3	129	91	137	22	27	9	1640	27	19	1536	4
Satd. Flow (prot)	0	1520	0	0	1637	0	0	3305	0	0	3310	0
Flt Permitted		0.997			0.264			0.942			0.905	
Satd. Flow (perm)	0	1517	0	0	442	0	0	3113	0	0	2999	0
Satd. Flow (RTOR)		22			5			4			1	
Lane Group Flow (vph)	0	223	0	0	186	0	0	1676	0	0	1559	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3		34.3	34.3		34.3	34.3	
Total Split (s)	24.0	24.0		24.0	24.0		106.0	106.0		106.0	106.0	
Total Split (%)	18.5%	18.5%		18.5%	18.5%		81.5%	81.5%		81.5%	81.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		18.7			18.7			100.7			100.7	
Actuated g/C Ratio		0.14			0.14			0.77			0.77	
v/c Ratio		0.94			2.78			0.69			0.67	
Control Delay		94.7			859.7			9.0			7.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		94.7			859.7			9.0			7.0	
LOS		F			F			A			A	
Approach Delay		94.7			859.7			9.0			7.0	
Approach LOS		F			F			A			A	
Queue Length 50th (m)		52.1			~80.8			93.8			78.0	
Queue Length 95th (m)		#101.1			#128.3			114.4			m71.5	
Internal Link Dist (m)		190.1			132.1			94.8			392.2	
Turn Bay Length (m)												
Base Capacity (vph)		237			67			2412			2323	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.94			2.78			0.69			0.67	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 55 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.78
Intersection Signal Delay: 56.8 — Intersection LOS: E
Intersection Capacity Utilization 99.6% — ICU Level of Service F
Analysis Period (min) 15

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

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

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

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue

Appendix I

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation Inc.**	**Project**	**2020-64**
Scenario	**Existing/Future Conditions**	**Date**	**2020-10-31**
Comments			

SEGMENTS		**Street A**	Cambridge St bwtn Carling Ave & Frederick Pl	Carling Ave btwn Cambridge St & Bronson Ave	Bronson Ave btwn Carling Ave & First Ave
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width	**F**	1.8 m < 0.5 m	1.5 m < 0.5 m	1.5 m < 0.5 m
	Avg Daily Curb Lane Traffic Volume		≤ 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 50 to 60 km/h yes	> 60 km/h no	> 60 km/h no
	Exposure to Traffic PLoS		**C**	**F**	**F**
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		**A**	**A**	**A**
	Level of Service		**C**	**F**	**F**
Bicycle	Type of Cycling Facility	**F**	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes		≤ 2 (no centreline)	≥ 6 lanes total	4-5 lanes total
	Operating Speed		≤ 40 km/h	≥ 50 to 60 km/h	≥ 50 to 60 km/h
	# of Lanes & Operating Speed LoS		**A**	**F**	**E**
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS		-	-	-
	Bike Lane Blockages				
	Blockage LoS		-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes
	Sidestreet Operating Speed		≤ 40 km/h	≤ 40 km/h	≤ 40 km/h
	Unsignalized Crossing - Lowest LoS		**A**	**A**	**A**
	Level of Service		**A**	**F**	**E**
Transit	Facility Type	**D**		Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed			Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		**-**	**D**	**D**
Truck	Truck Lane Width	**A**		≤ 3.5 m	≤ 3.5 m
	Travel Lanes per Direction			> 1	> 1
	Level of Service		**-**	**A**	**A**

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation Inc.**	**Project**	**2020-64**
Scenario	**Existing Conditions**	**Date**	**2020-10-31**
Comments			

Unlocked Rows for Replicating

	INTERSECTIONS	Carling Ave at Booth St				Bronson Ave at Powell Ave				Bronson Ave at Carling Ave / Glebe Ave				Bronson Ave at Fifth Ave / Madawaska Dr			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	5	0 - 2	8	8	4	4	3	4	5	6	0 - 2	7	5	5	4	4
	Median	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Protected	No left turn / Prohib.	Protected	No left turn / Prohib.	Permissive	Permissive	Permissive	Permissive	No left turn / Prohib.	Permissive	No left turn / Prohib.	Protected	Permissive	Permissive	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	No right turn	No right turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Protected/ Permissive	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No
	Right Turn Channel	No Channel	No Right Turn	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	3-5m	No Right Turn	No Right Turn	3-5m	3-5m	3-5m	5-10m	3-5m	No Right Turn	5-10m	5-10m	5-10m	3-5m	3-5m	3-5m	3-5m
	Crosswalk Type	Std transverse markings	Raised crosswalk	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings
	PETSI Score	**47**	**118**	**21**	**-2**	**55**	**55**	**73**	**57**	**66**	**24**	**96**	**18**	**42**	**42**	**58**	**63**
	Ped. Exposure to Traffic LoS	**D**	**A**	**F**	**F**	**D**	**D**	**C**	**D**	**C**	**F**	**A**	**F**	**E**	**E**	**D**	**C**
	Cycle Length																
	Effective Walk Time																
	Average Pedestrian Delay																
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Level of Service	**D**	**A**	**F**	**F**	**D**	**D**	**C**	**D**	**C**	**F**	**A**	**F**	**E**	**E**	**D**	**C**
		F				**D**				**F**				**E**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic		Mixed Traffic									Mixed Traffic				
	Right Turn Lane Configuration	≤ 50 m		≤ 50 m									> 50 m				
	Right Turning Speed	≤ 25 km/h		≤ 25 km/h									≤ 25 km/h				
	Cyclist relative to RT motorists	**D**	**-**	**D**	**A**	**A**	**A**	**A**	**A**	**-**	**-**	**-**	**F**	**A**	**A**	**A**	**A**
	Separated or Mixed Traffic	**Mixed Traffic**	**-**	**Mixed Traffic**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**Mixed Traffic**	**-**	**-**	**-**	**-**
	Left Turn Approach	No lane crossed		No lane crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed			No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 50 to < 60 km/h		≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 50 to < 60 km/h		≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	**C**	**-**	**C**	**F**	**C**	**C**	**C**	**C**	**-**	**C**	**-**	**C**	**C**	**C**	**B**	**B**
	Level of Service	**D**	**-**	**D**	**F**	**C**	**C**	**C**	**C**	**-**	**-**	**-**	**F**	**C**	**C**	**B**	**B**
		F				**C**				**F**				**C**			
Transit	Average Signal Delay	> 40 sec		≤ 20 sec	> 40 sec	≤ 20 sec	≤ 40 sec			≤ 40 sec	> 40 sec		> 40 sec	≤ 10 sec	≤ 20 sec		
	Level of Service	**F**	**-**	**C**	**F**	**C**	**E**	**-**	**-**	**E**	**F**	**-**	**F**	**B**	**C**	**-**	**-**
		F				**E**				**F**				**C**			
Truck	Effective Corner Radius	< 10 m		< 10 m		< 10 m	< 10 m			10 - 15 m			< 10 m		< 10 m		
	Number of Receiving Lanes on Departure from Intersection	≥ 2		≥ 2		1	1			≥ 2			≥ 2		1		
	Level of Service	**D**	**-**	**D**	**-**	**F**	**F**	**-**	**-**	**B**	**-**	**-**	**D**	**-**	**F**	**-**	**-**
		D				**F**				**D**				**F**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.81 - 0.90				> 1.00				0.71 - 0.80			
	Level of Service	**C**				**D**				**F**				**C**			

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation Inc.**	**Project**	**2020-64**
Scenario	**Future Conditions**	**Date**	**2020-10-31**
Comments			

Unlocked Rows for Replicating

	INTERSECTIONS	Carling Ave at Booth St				Bronson Ave at Powell Ave				Bronson Ave at Carling Ave / Glebe Ave				Bronson Ave at Fifth Ave / Madawaska Dr			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	5	0 - 2	8	8	4	4	3	4	5	6	0 - 2	7	5	5	4	4
	Median	No Median - 2.4 m	Median > 2.4 m	Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Protected	No left turn / Prohib.	Protected	No left turn / Prohib.	Permissive	Permissive	Permissive	Permissive	No left turn / Prohib.	Permissive	No left turn / Prohib.	Protected	Permissive	Permissive	Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	No right turn	No right turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Protected/ Permissive	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No
	Right Turn Channel	No Channel	No Right Turn	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	3-5m	No Right Turn	No Right Turn	3-5m	3-5m	3-5m	5-10m	3-5m	No Right Turn	5-10m	5-10m	5-10m	3-5m	3-5m	3-5m	3-5m
	Crosswalk Type	Std transverse markings	Raised crosswalk	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings
	PETSI Score	**47**	**118**	**21**	**-2**	**55**	**55**	**73**	**57**	**66**	**24**	**96**	**18**	**42**	**42**	**58**	**63**
	Ped. Exposure to Traffic LoS	**D**	**A**	**F**	**F**	**D**	**D**	**C**	**D**	**C**	**F**	**A**	**F**	**E**	**E**	**D**	**C**
	Cycle Length																
	Effective Walk Time																
	Average Pedestrian Delay																
	Pedestrian Delay LoS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Level of Service	**D**	**A**	**F**	**F**	**D**	**D**	**C**	**D**	**C**	**F**	**A**	**F**	**E**	**E**	**D**	**C**
		F				**D**				**F**				**E**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic		Mixed Traffic									Mixed Traffic				
	Right Turn Lane Configuration	≤ 50 m		≤ 50 m									> 50 m				
	Right Turning Speed	≤ 25 km/h		≤ 25 km/h									≤ 25 km/h				
	Cyclist relative to RT motorists	**D**	**-**	**D**	**A**	**A**	**A**	**A**	**A**	**-**	**-**	**-**	**F**	**A**	**A**	**A**	**A**
	Separated or Mixed Traffic	**Mixed Traffic**	**-**	**Mixed Traffic**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**Mixed Traffic**	**-**	**-**	**-**	**-**
	Left Turn Approach	No lane crossed		No lane crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed		No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 50 to < 60 km/h		≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 50 to < 60 km/h		≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	**C**	**-**	**C**	**F**	**C**	**C**	**C**	**C**	**-**	**C**	**-**	**C**	**C**	**C**	**B**	**B**
	Level of Service	**D**	**-**	**D**	**F**	**C**	**C**	**C**	**C**	**-**	**-**	**-**	**F**	**C**	**C**	**B**	**B**
		F				**C**				**F**				**C**			
Transit	Average Signal Delay	≤ 40 sec		≤ 20 sec	> 40 sec	≤ 20 sec	> 40 sec			> 40 sec	≤ 40 sec		> 40 sec	≤ 10 sec	≤ 20 sec		
	Level of Service	**E**	**-**	**C**	**F**	**C**	**F**	**-**	**-**	**F**	**E**	**-**	**F**	**B**	**C**	**-**	**-**
		F				**F**				**F**				**C**			
Truck	Effective Corner Radius	< 10 m		< 10 m		< 10 m	< 10 m			10 - 15 m			< 10 m		< 10 m		
	Number of Receiving Lanes on Departure from Intersection	≥ 2		≥ 2		1	1			≥ 2			≥ 2		1		
	Level of Service	**D**	**-**	**D**	**-**	**F**	**F**	**-**	**-**	**B**	**-**	**-**	**D**	**-**	**F**	**-**	**-**
		D				**F**				**D**				**F**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				> 1.00				> 1.00				> 1.00			
	Level of Service	**C**				**F**				**F**				**F**			

Appendix J

Synchro Intersection Worksheets – 2025 Future Total Conditions

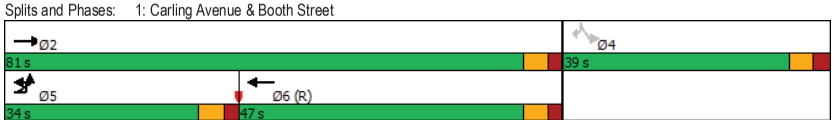
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	282	937	684	120	160	113
Future Volume (vph)	282	937	684	120	160	113
Satd. Flow (prot)	1658	3283	4535	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1578	3283	4535	0	1633	1258
Satd. Flow (RTOR)			31			113
Lane Group Flow (vph)	282	937	804	0	160	113
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	34.0	81.0	47.0		39.0	39.0
Total Split (%)	28.3%	67.5%	39.2%		32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	24.3	75.3	45.1		33.0	33.0
Actuated g/C Ratio	0.20	0.63	0.38		0.28	0.28
v/c Ratio	0.84	0.45	0.47		0.36	0.26
Control Delay	67.3	12.5	28.9		37.8	7.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	67.3	12.5	28.9		37.8	7.8
LOS	E	B	C		D	A
Approach Delay		25.2	28.9		25.3	
Approach LOS		C	C		C	
Queue Length 50th (m)	63.4	56.3	50.9		30.4	0.0
Queue Length 95th (m)	#93.1	70.4	65.4		49.8	13.6
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	388	2060	1723		449	427
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.73	0.45	0.47		0.36	0.26

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84
Intersection Signal Delay: 26.5 — Intersection LOS: C
Intersection Capacity Utilization 77.8% — ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Carling Avenue & Booth Street



Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1095	5	0	638	12	0	0	44	0	0	56
Future Vol, veh/h	0	1095	5	0	638	12	0	0	44	0	0	56
Conflicting Peds, #/hr	0	0	45	0	0	38	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1095	5	0	638	12	0	0	44	0	0	56

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	596	-	-	357
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	383	0	0	631
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	367	-	-	609
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	16.1	11.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	367	-	-	-	-	609
HCM Lane V/C Ratio	0.12	-	-	-	-	0.092
HCM Control Delay (s)	16.1	-	-	-	-	11.5
HCM Lane LOS	C	-	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	25	51	17	53	17	45	1678	8	11	1008	68
Future Volume (vph)	111	25	51	17	53	17	45	1678	8	11	1008	68
Satd. Flow (prot)	0	1586	0	0	1642	0	0	3275	0	0	3241	0
Flt Permitted		0.776			0.921			0.879			0.925	
Satd. Flow (perm)	0	1227	0	0	1518	0	0	2882	0	0	3001	0
Satd. Flow (RTOR)		15			10			1			16	
Lane Group Flow (vph)	0	187	0	0	87	0	0	1731	0	0	1087	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	26.0	26.0		26.0	26.0		84.0	84.0		84.0	84.0	
Total Split (%)	23.6%	23.6%		23.6%	23.6%		76.4%	76.4%		76.4%	76.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		18.4			18.4			80.6			80.6	
Actuated g/C Ratio		0.17			0.17			0.73			0.73	
v/c Ratio		0.86			0.33			0.82			0.49	
Control Delay		74.9			38.5			7.9			7.2	
Queue Delay		0.0			0.0			12.8			0.0	
Total Delay		74.9			38.5			20.7			7.3	
LOS		E			D			C			A	
Approach Delay		74.9			38.5			20.7			7.3	
Approach LOS		E			D			C			A	
Queue Length 50th (m)		35.6			14.4			76.5			47.1	
Queue Length 95th (m)		#71.3			29.0			m52.3			59.8	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		238			288			2112			2203	
Starvation Cap Reductn		0			0			395			0	
Spillback Cap Reductn		0			0			0			106	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.79			0.30			1.01			0.52	

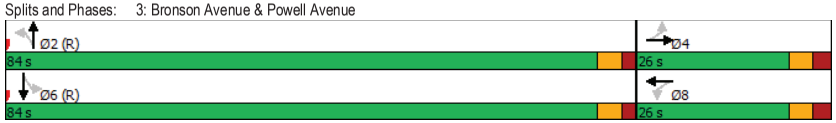
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 111.1%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 3: Bronson Avenue & Powell Avenue



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	422	152	527	0	0	0	446	1400	38	0	945
Future Volume (vph)	3	422	152	527	0	0	0	446	1400	38	0	945
Satd. Flow (prot)	0	1530	1581	1483	0	0	0	3216	1730	0	0	3246
Flt Permitted		0.950	0.977					0.950				
Satd. Flow (perm)	0	1460	1546	1271	0	0	0	3178	1730	0	0	3246
Satd. Flow (RTOR)				30					3			13
Lane Group Flow (vph)	0	286	291	527	0	0	0	446	1438	0	0	1055
Turn Type	Perm	Perm	NA	pm+ov				Prot	NA			NA
Protected Phases			4	5				5	2			6
Permitted Phases	4	4		4								
Detector Phase	4	4	4	5				5	2			6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0				5.0	10.0			10.0
Minimum Split (s)	31.0	31.0	31.0	11.0				11.0	24.0			33.0
Total Split (s)	31.0	31.0	31.0	34.0				34.0	79.0			45.0
Total Split (%)	28.2%	28.2%	28.2%	30.9%				30.9%	71.8%			40.9%
Yellow Time (s)	3.3	3.3	3.3	3.3				3.3	3.3			3.3
All-Red Time (s)	2.7	2.7	2.7	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	6.0				6.0	6.0			6.0
Lead/Lag				Lead				Lead				Lag
Lead-Lag Optimize?				Yes				Yes				Yes
Recall Mode	None	None	None	Min				Min	C-Max			C-Max
Act Effct Green (s)		23.9	23.9	46.3				22.4	74.1			45.7
Actuated g/C Ratio		0.22	0.22	0.42				0.20	0.67			0.42
v/c Ratio		0.91	0.87	0.89				0.68	1.23			0.78
Control Delay		73.7	66.8	42.6				36.2	140.3			28.7
Queue Delay		0.0	0.0	0.0				0.0	0.1			0.1
Total Delay		73.7	66.8	42.6				36.2	140.5			28.8
LOS		E	E	D				D	F			C
Approach Delay			57.0						115.8			28.8
Approach LOS			E						F			C
Queue Length 50th (m)		62.5	62.9	81.8				46.1	~400.3			104.2
Queue Length 95th (m)		#110.8	#109.0	110.1				51.3	#480.5			#151.8
Internal Link Dist (m)			82.5			112.6			59.6			142.6
Turn Bay Length (m)								40.0				
Base Capacity (vph)		331	351	669				818	1166			1355
Starvation Cap Reductn		0	0	0				0	0			14
Spillback Cap Reductn		0	0	0				0	33			0
Storage Cap Reductn		0	0	0				0	0			0
Reduced v/c Ratio		0.86	0.83	0.79				0.55	1.27			0.79

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 53 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	110
Future Volume (vph)	110
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 1.23

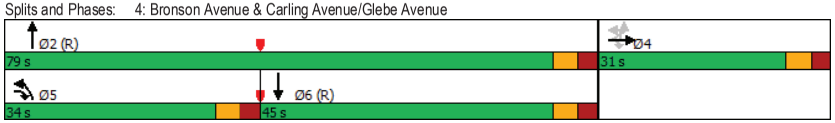
Intersection Signal Delay: 77.0	Intersection LOS: E
Intersection Capacity Utilization 110.9%	ICU Level of Service H

Analysis Period (min) 15

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

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

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	48	14	86	34	46	0	1727	34	22	1488	1
Future Volume (vph)	7	48	14	86	34	46	0	1727	34	22	1488	1
Satd. Flow (prot)	0	1623	0	0	1608	0	0	3302	0	0	3311	0
Flt Permitted		0.971			0.824						0.892	
Satd. Flow (perm)	0	1578	0	0	1333	0	0	3302	0	0	2956	0
Satd. Flow (RTOR)		10			16			4				
Lane Group Flow (vph)	0	69	0	0	166	0	0	1761	0	0	1511	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0			10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3			34.3		34.3	34.3	
Total Split (s)	28.0	28.0		28.0	28.0			82.0		82.0	82.0	
Total Split (%)	25.5%	25.5%		25.5%	25.5%			74.5%		74.5%	74.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3			3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)		17.2			17.2			82.2			82.2	
Actuated g/C Ratio		0.16			0.16			0.75			0.75	
v/c Ratio		0.27			0.75			0.71			0.68	
Control Delay		35.9			59.6			10.4			5.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		35.9			59.6			10.4			5.5	
LOS		D			E			B			A	
Approach Delay		35.9			59.6			10.4			5.5	
Approach LOS		D			E			B			A	
Queue Length 50th (m)		11.1			30.9			94.6			37.7	
Queue Length 95th (m)		22.7			51.3			142.4			50.6	
Internal Link Dist (m)		190.1			132.1			94.8			308.6	
Turn Bay Length (m)												
Base Capacity (vph)		333			287			2467			2207	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.21			0.58			0.71			0.68	

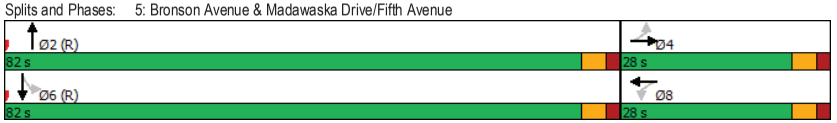
Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 86.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue



Intersection	
Int Delay, s/veh	5.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	34	10	0	0	5
Future Vol, veh/h	0	34	10	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	34	10	0	0	5

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	15	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	5	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	1004	1071	-	0	0	-
Stage 1	1013	-	-	0	0	-
Stage 2	1018	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	1004	1071	-	-	-	-
Mov Cap-2 Maneuver	1004	-	-	-	-	-
Stage 1	1013	-	-	-	-	-
Stage 2	1018	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1071	-
HCM Lane V/C Ratio	-	0.032	-
HCM Control Delay (s)	-	8.5	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	13	4	1878	1493	13
Future Vol, veh/h	5	13	4	1878	1493	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	13	4	1878	1493	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2447	753	1506	0	-	0
Stage 1	1500	-	-	-	-	-
Stage 2	947	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	26	352	441	-	-	-
Stage 1	171	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	26	352	441	-	-	-
Mov Cap-2 Maneuver	26	-	-	-	-	-
Stage 1	171	-	-	-	-	-
Stage 2	337	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	63.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	441	-	79	-	-
HCM Lane V/C Ratio	0.009	-	0.228	-	-
HCM Control Delay (s)	13.2	0	63.5	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	216	793	998	59	317	527
Future Volume (vph)	216	793	998	59	317	527
Satd. Flow (prot)	1658	3283	4674	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1611	3283	4674	0	1632	1230
Satd. Flow (RTOR)			9			100
Lane Group Flow (vph)	216	793	1057	0	317	527
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	23.0	90.0	67.0		40.0	40.0
Total Split (%)	17.7%	69.2%	51.5%		30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	17.1	84.3	61.3		34.0	34.0
Actuated g/C Ratio	0.13	0.65	0.47		0.26	0.26
v/c Ratio	0.99	0.37	0.48		0.74	1.33
Control Delay	114.8	11.2	41.5		56.0	198.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	114.8	11.2	41.5		56.0	198.1
LOS	F	B	D		E	F
Approach Delay		33.4	41.5		144.8	
Approach LOS		C	D		F	
Queue Length 50th (m)	56.1	46.1	87.8		74.8	~156.1
Queue Length 95th (m)	#106.4	57.5	102.1		108.8	#224.2
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	218	2128	2208		426	395
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.99	0.37	0.48		0.74	1.33

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 110 (85%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.33

Intersection Signal Delay: 68.6	Intersection LOS: E
Intersection Capacity Utilization 89.1%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Carling Avenue & Booth Street

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1058	17	0	592	6	0	0	48	0	0	291
Future Vol, veh/h	0	1058	17	0	592	6	0	0	48	0	0	291
Conflicting Peds, #/hr	0	0	42	0	0	33	0	0	4	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1058	17	0	592	6	0	0	48	0	0	291

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	584	-	-	330
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	390	0	0	657
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	373	-	-	636
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	16.1	15.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	373	-	-	-	-	636
HCM Lane V/C Ratio	0.129	-	-	-	-	0.458
HCM Control Delay (s)	16.1	-	-	-	-	15.3
HCM Lane LOS	C	-	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	-	2.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	82	150	58	89	5	73	1149	19	6	976	57
Future Volume (vph)	141	82	150	58	89	5	73	1149	19	6	976	57
Satd. Flow (prot)	0	1575	0	0	1699	0	0	3261	0	0	3249	0
Flt Permitted		0.782			0.684			0.761			0.947	
Satd. Flow (perm)	0	1239	0	0	1184	0	0	2488	0	0	3076	0
Satd. Flow (RTOR)		25			1			2			10	
Lane Group Flow (vph)	0	373	0	0	152	0	0	1241	0	0	1039	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	38.0	38.0		38.0	38.0		92.0	92.0		92.0	92.0	
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		32.3			32.3			86.7			86.7	
Actuated g/C Ratio		0.25			0.25			0.67			0.67	
v/c Ratio		1.14			0.52			0.75			0.51	
Control Delay		135.9			49.1			18.1			11.8	
Queue Delay		0.0			0.0			3.6			0.0	
Total Delay		135.9			49.1			21.7			11.8	
LOS		F			D			C			B	
Approach Delay		135.9			49.1			21.7			11.8	
Approach LOS		F			D			C			B	
Queue Length 50th (m)		~106.8			33.5			120.0			64.3	
Queue Length 95th (m)		#167.9			55.9			136.4			79.3	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		326			294			1659			2054	
Starvation Cap Reductn		0			0			322			0	
Spillback Cap Reductn		0			0			0			48	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.14			0.52			0.93			0.52	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 34.7	Intersection LOS: C
Intersection Capacity Utilization 110.2%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 3: Bronson Avenue & Powell Avenue

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	267	133	671	0	0	0	436	1096	26	0	1071
Future Volume (vph)	3	267	133	671	0	0	0	436	1096	26	0	1071
Satd. Flow (prot)	0	1531	1593	1483	0	0	0	3216	1732	0	0	3257
Flt Permitted		0.950	0.983					0.950				
Satd. Flow (perm)	0	1387	1566	1406	0	0	0	3172	1732	0	0	3257
Satd. Flow (RTOR)				58					2			12
Lane Group Flow (vph)	0	198	205	671	0	0	0	436	1122	0	0	1175
Turn Type	Perm	Perm	NA	pm+ov				Prot	NA			NA
Protected Phases			4	5				5	2			6
Permitted Phases	4	4		4								
Detector Phase	4	4	4	5				5	2			6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0				5.0	10.0			10.0
Minimum Split (s)	31.0	31.0	31.0	11.0				11.0	24.0			33.0
Total Split (s)	31.0	31.0	31.0	26.0				26.0	99.0			73.0
Total Split (%)	23.8%	23.8%	23.8%	20.0%				20.0%	76.2%			56.2%
Yellow Time (s)	3.3	3.3	3.3	3.3				3.3	3.3			3.3
All-Red Time (s)	2.7	2.7	2.7	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	6.0				6.0	6.0			6.0
Lead/Lag				Lead				Lead				Lag
Lead-Lag Optimize?				Yes				Yes				Yes
Recall Mode	None	None	None	Min				Min	C-Max			C-Max
Act Effct Green (s)		22.3	22.3	45.0				22.7	95.7			67.0
Actuated g/C Ratio		0.17	0.17	0.35				0.17	0.74			0.52
v/c Ratio		0.84	0.76	1.25				0.78	0.88			0.70
Control Delay		68.5	58.6	156.3				55.7	28.3			18.7
Queue Delay		0.0	0.0	0.0				0.0	1.0			0.2
Total Delay		68.5	58.6	156.3				55.7	29.3			18.9
LOS		E	E	F				E	C			B
Approach Delay			121.5						36.7			18.9
Approach LOS			F						D			B
Queue Length 50th (m)		52.9	54.1	~146.1				57.1	199.2			62.8
Queue Length 95th (m)		m#84.1	m80.2	#217.6				m#83.5	m#251.2			m84.7
Internal Link Dist (m)			82.5			112.6			62.3			142.6
Turn Bay Length (m)								40.0				
Base Capacity (vph)		266	301	538				562	1275			1684
Starvation Cap Reductn		0	0	0				0	0			82
Spillback Cap Reductn		0	0	0				0	41			0
Storage Cap Reductn		0	0	0				0	0			0
Reduced v/c Ratio		0.74	0.68	1.25				0.78	0.91			0.73

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	104
Future Volume (vph)	104
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 55.1	Intersection LOS: E
Intersection Capacity Utilization 91.0%	ICU Level of Service F
Analysis Period (min) 15	

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

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

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

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	66	47	121	22	27	9	1427	27	19	1545	4
Future Volume (vph)	3	66	47	121	22	27	9	1427	27	19	1545	4
Satd. Flow (prot)	0	1521	0	0	1637	0	0	3301	0	0	3310	0
Flt Permitted		0.994			0.580			0.940			0.915	
Satd. Flow (perm)	0	1513	0	0	963	0	0	3103	0	0	3032	0
Satd. Flow (RTOR)		22			6			4			1	
Lane Group Flow (vph)	0	116	0	0	170	0	0	1463	0	0	1568	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3		34.3	34.3		34.3	34.3	
Total Split (s)	24.0	24.0		24.0	24.0		106.0	106.0		106.0	106.0	
Total Split (%)	18.5%	18.5%		18.5%	18.5%		81.5%	81.5%		81.5%	81.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		18.7			18.7			100.7			100.7	
Actuated g/C Ratio		0.14			0.14			0.77			0.77	
v/c Ratio		0.49			1.19			0.61			0.67	
Control Delay		49.2			180.5			7.5			6.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		49.2			180.5			7.5			6.1	
LOS		D			F			A			A	
Approach Delay		49.2			180.5			7.5			6.1	
Approach LOS		D			F			A			A	
Queue Length 50th (m)		22.3			~51.1			71.4			70.1	
Queue Length 95th (m)		41.9			#97.0			87.1			m67.3	
Internal Link Dist (m)		190.1			132.1			94.8			305.9	
Turn Bay Length (m)												
Base Capacity (vph)		236			143			2404			2348	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			1.19			0.61			0.67	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 55 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19
Intersection Signal Delay: 17.2 — Intersection LOS: B
Intersection Capacity Utilization 85.2% — ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	23	25	0	0	17
Future Vol, veh/h	0	23	25	0	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	25	0	0	17

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	42	25	0	-	-	-
Stage 1	25	-	-	-	-	-
Stage 2	17	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	969	1051	-	0	0	-
Stage 1	998	-	-	0	0	-
Stage 2	1006	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	969	1051	-	-	-	-
Mov Cap-2 Maneuver	969	-	-	-	-	-
Stage 1	998	-	-	-	-	-
Stage 2	1006	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1051	-
HCM Lane V/C Ratio	-	0.022	-
HCM Control Delay (s)	-	8.5	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	9	12	1559	1601	36
Future Vol, veh/h	3	9	12	1559	1601	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	9	12	1559	1601	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2423	819	1637	0	-	0
Stage 1	1619	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	27	319	392	-	-	-
Stage 1	147	-	-	-	-	-
Stage 2	401	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	21	319	392	-	-	-
Mov Cap-2 Maneuver	21	-	-	-	-	-
Stage 1	113	-	-	-	-	-
Stage 2	401	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	66.8	1.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	392	-	70	-	-
HCM Lane V/C Ratio	0.031	-	0.171	-	-
HCM Control Delay (s)	14.5	1.6	66.8	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Appendix K

Synchro Intersection Worksheets – 2030 Future Total Conditions

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	351	1167	811	142	197	139
Future Volume (vph)	351	1167	811	142	197	139
Satd. Flow (prot)	1658	3283	4536	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1593	3283	4536	0	1633	1258
Satd. Flow (RTOR)			31			139
Lane Group Flow (vph)	351	1167	953	0	197	139
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	34.0	81.0	47.0		39.0	39.0
Total Split (%)	28.3%	67.5%	39.2%		32.5%	32.5%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	27.2	75.3	42.2		33.0	33.0
Actuated g/C Ratio	0.23	0.63	0.35		0.28	0.28
v/c Ratio	0.93	0.57	0.59		0.44	0.31
Control Delay	78.3	14.3	32.7		39.6	7.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	78.3	14.3	32.7		39.6	7.5
LOS	E	B	C		D	A
Approach Delay		29.1	32.7		26.3	
Approach LOS		C	C		C	
Queue Length 50th (m)	80.8	77.8	65.4		38.3	0.0
Queue Length 95th (m)	#134.2	96.0	80.0		60.6	15.0
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	388	2060	1614		449	446
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.90	0.57	0.59		0.44	0.31

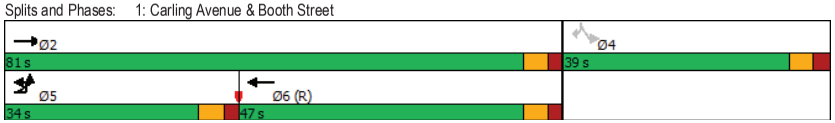
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 116 (97%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 30.0	Intersection LOS: C
Intersection Capacity Utilization 82.5%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Carling Avenue & Booth Street



Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1364	8	0	757	12	0	0	44	0	0	56
Future Vol, veh/h	0	1364	8	0	757	12	0	0	44	0	0	56
Conflicting Peds, #/hr	0	0	45	0	0	38	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1364	8	0	757	12	0	0	44	0	0	56

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	732	-	-	417
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	312	0	0	576
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	299	-	-	556
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	19.1	12.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	299	-	-	-	-	556
HCM Lane V/C Ratio	0.147	-	-	-	-	0.101
HCM Control Delay (s)	19.1	-	-	-	-	12.2
HCM Lane LOS	C	-	-	-	-	B
HCM 95th %tile Q(veh)	0.5	-	-	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	25	87	17	53	17	45	1678	8	11	1085	73
Future Volume (vph)	180	25	87	17	53	17	45	1678	8	11	1085	73
Satd. Flow (prot)	0	1577	0	0	1642	0	0	3275	0	0	3245	0
Flt Permitted		0.772			0.915			0.871			0.927	
Satd. Flow (perm)	0	1214	0	0	1517	0	0	2855	0	0	3008	0
Satd. Flow (RTOR)		17			10			1			15	
Lane Group Flow (vph)	0	292	0	0	87	0	0	1731	0	0	1169	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	26.0	26.0		26.0	26.0		84.0	84.0		84.0	84.0	
Total Split (%)	23.6%	23.6%		23.6%	23.6%		76.4%	76.4%		76.4%	76.4%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		20.3			20.3			78.7			78.7	
Actuated g/C Ratio		0.18			0.18			0.72			0.72	
v/c Ratio		1.23			0.30			0.85			0.54	
Control Delay		172.4			37.5			10.1			8.3	
Queue Delay		0.0			0.0			29.7			0.1	
Total Delay		172.4			37.5			39.8			8.4	
LOS		F			D			D			A	
Approach Delay		172.4			37.5			39.8			8.4	
Approach LOS		F			D			D			A	
Queue Length 50th (m)		~74.7			14.4			98.3			52.9	
Queue Length 95th (m)		#127.6			29.0			m65.0			67.2	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		237			288			2042			2156	
Starvation Cap Reductn		0			0			406			0	
Spillback Cap Reductn		0			0			0			173	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.23			0.30			1.06			0.59	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.23

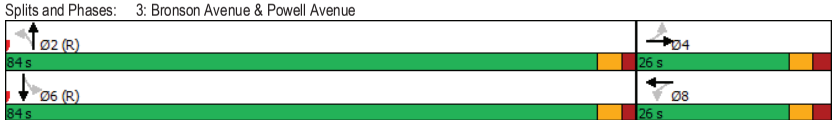
Intersection Signal Delay: 40.3	Intersection LOS: D
Intersection Capacity Utilization 117.5%	ICU Level of Service H
Analysis Period (min) 15	

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

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

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

Splits and Phases: 3: Bronson Avenue & Powell Avenue



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	519	152	656	0	0	0	446	1400	38	0	1017	118
Future Volume (vph)	519	152	656	0	0	0	446	1400	38	0	1017	118
Satd. Flow (prot)	1530	1574	1483	0	0	0	3216	1730	0	0	3246	0
Flt Permitted	0.950	0.973					0.950					
Satd. Flow (perm)	1459	1534	1271	0	0	0	3182	1730	0	0	3246	0
Satd. Flow (RTOR)			30					3			12	
Lane Group Flow (vph)	332	339	656	0	0	0	446	1438	0	0	1135	0
Turn Type	Perm	NA	pm+ov				Prot	NA			NA	
Protected Phases		4	5				5	2			6	
Permitted Phases	4		4									
Detector Phase	4	4	5				5	2			6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	5.0				5.0	10.0			10.0	
Minimum Split (s)	31.0	31.0	11.0				11.0	24.0			33.0	
Total Split (s)	31.0	31.0	34.0				34.0	79.0			45.0	
Total Split (%)	28.2%	28.2%	30.9%				30.9%	71.8%			40.9%	
Yellow Time (s)	3.3	3.3	3.3				3.3	3.3			3.3	
All-Red Time (s)	2.7	2.7	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	6.0				6.0	6.0			6.0	
Lead/Lag			Lead				Lead				Lag	
Lead-Lag Optimize?			Yes				Yes				Yes	
Recall Mode	None	None	Min				Min	C-Max			C-Max	
Act Effct Green (s)	25.0	25.0	52.3				27.3	73.0			39.7	
Actuated g/C Ratio	0.23	0.23	0.48				0.25	0.66			0.36	
v/c Ratio	1.00	0.97	0.98				0.56	1.25			0.96	
Control Delay	93.7	85.4	55.8				29.6	148.2			46.4	
Queue Delay	0.0	0.0	0.0				0.0	0.2			0.0	
Total Delay	93.7	85.4	55.8				29.6	148.4			46.4	
LOS	F	F	E				C	F			D	
Approach Delay		72.8						120.3			46.4	
Approach LOS		E						F			D	
Queue Length 50th (m)	~75.5	76.4	106.1				43.0	~400.1			126.3	
Queue Length 95th (m)	#135.3	#135.1	#206.5				51.3	#480.7			m#165.4	
Internal Link Dist (m)		82.5			112.6			59.6			142.6	
Turn Bay Length (m)							40.0					
Base Capacity (vph)	331	348	681				818	1149			1179	
Starvation Cap Reductn	0	0	0				0	0			0	
Spillback Cap Reductn	0	0	0				0	46			0	
Storage Cap Reductn	0	0	0				0	0			0	
Reduced v/c Ratio	1.00	0.97	0.96				0.55	1.30			0.96	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 53 (48%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 86.5	Intersection LOS: F
Intersection Capacity Utilization 111.1%	ICU Level of Service H
Analysis Period (min) 15	

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

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	114	34	86	34	46	0	1727	34	22	1723	1
Future Volume (vph)	7	114	34	86	34	46	0	1727	34	22	1723	1
Satd. Flow (prot)	0	1617	0	0	1608	0	0	3302	0	0	3311	0
Flt Permitted		0.984			0.619						0.899	
Satd. Flow (perm)	0	1592	0	0	1006	0	0	3302	0	0	2980	0
Satd. Flow (RTOR)		12			16			4				
Lane Group Flow (vph)	0	155	0	0	166	0	0	1761	0	0	1746	0
Turn Type	Perm	NA		Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Detector Phase	4	4		8	8			2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0			10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3			34.3		34.3	34.3	
Total Split (s)	28.0	28.0		28.0	28.0			82.0		82.0	82.0	
Total Split (%)	25.5%	25.5%		25.5%	25.5%			74.5%		74.5%	74.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3			3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None			C-Max		C-Max	C-Max	
Act Effct Green (s)		19.3			19.3			80.1			80.1	
Actuated g/C Ratio		0.18			0.18			0.73			0.73	
v/c Ratio		0.54			0.88			0.73			0.80	
Control Delay		44.3			79.3			11.7			9.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		44.3			79.3			11.7			9.0	
LOS		D			E			B			A	
Approach Delay		44.3			79.3			11.7			9.0	
Approach LOS		D			E			B			A	
Queue Length 50th (m)		27.4			31.0			109.7			56.2	
Queue Length 95th (m)		47.1			#63.6			142.4			m193.4	
Internal Link Dist (m)		190.1			132.1			94.8			308.6	
Turn Bay Length (m)												
Base Capacity (vph)		338			220			2405			2169	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.46			0.75			0.73			0.80	

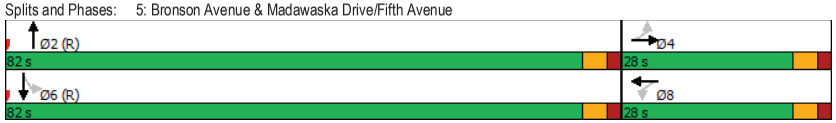
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 14.7	Intersection LOS: B
Intersection Capacity Utilization 105.8%	ICU Level of Service G
Analysis Period (min) 15	

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

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue



Intersection	
Int Delay, s/veh	5.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	34	10	0	0	8
Future Vol, veh/h	0	34	10	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	34	10	0	0	8

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	18	10	0	-	-	-
Stage 1	10	-	-	-	-	-
Stage 2	8	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	1000	1071	-	0	0	-
Stage 1	1013	-	-	0	0	-
Stage 2	1015	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	1000	1071	-	-	-	-
Mov Cap-2 Maneuver	1000	-	-	-	-	-
Stage 1	1013	-	-	-	-	-
Stage 2	1015	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1071	-
HCM Lane V/C Ratio	-	0.032	-
HCM Control Delay (s)	-	8.5	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	13	4	1878	1730	13
Future Vol, veh/h	5	13	4	1878	1730	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	13	4	1878	1730	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2684	872	1743	0	-	0
Stage 1	1737	-	-	-	-	-
Stage 2	947	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	18	294	357	-	-	-
Stage 1	127	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	18	294	357	-	-	-
Mov Cap-2 Maneuver	18	-	-	-	-	-
Stage 1	127	-	-	-	-	-
Stage 2	337	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	97.2	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	357	-	56	-	-
HCM Lane V/C Ratio	0.011	-	0.321	-	-
HCM Control Delay (s)	15.2	0	97.2	-	-
HCM Lane LOS	C	A	F	-	-
HCM 95th %tile Q(veh)	0	-	1.1	-	-

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	257	941	1243	72	420	697
Future Volume (vph)	257	941	1243	72	420	697
Satd. Flow (prot)	1658	3283	4675	0	1658	1427
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1611	3283	4675	0	1632	1230
Satd. Flow (RTOR)			9			82
Lane Group Flow (vph)	257	941	1315	0	420	697
Turn Type	Prot	NA	NA		Perm	Perm
Protected Phases	5	2	6			
Permitted Phases					4	4
Detector Phase	5	2	6		4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		10.0	10.0
Minimum Split (s)	10.9	22.5	29.7		39.0	39.0
Total Split (s)	23.0	90.0	67.0		40.0	40.0
Total Split (%)	17.7%	69.2%	51.5%		30.8%	30.8%
Yellow Time (s)	3.7	3.7	3.7		3.3	3.3
All-Red Time (s)	2.2	2.0	2.0		2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.9	5.7	5.7		6.0	6.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None	Max	C-Max		None	None
Act Effct Green (s)	17.1	84.3	61.3		34.0	34.0
Actuated g/C Ratio	0.13	0.65	0.47		0.26	0.26
v/c Ratio	1.18	0.44	0.60		0.99	1.82
Control Delay	165.9	12.1	44.4		88.1	407.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	165.9	12.1	44.4		88.1	407.4
LOS	F	B	D		F	F
Approach Delay		45.1	44.4		287.3	
Approach LOS		D	D		F	
Queue Length 50th (m)	~78.8	58.2	111.5		107.5	~255.2
Queue Length 95th (m)	#131.4	71.6	m124.4		#172.2	#328.8
Internal Link Dist (m)		107.6	286.6		178.3	
Turn Bay Length (m)	40.0					30.0
Base Capacity (vph)	218	2128	2209		426	382
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	1.18	0.44	0.60		0.99	1.82

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 110 (85%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.82

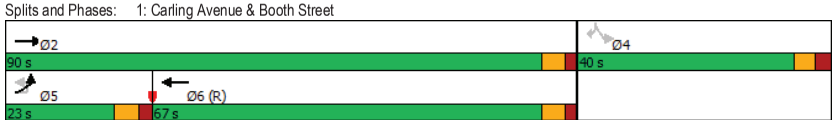
Intersection Signal Delay: 119.4	Intersection LOS: F
Intersection Capacity Utilization 107.9%	ICU Level of Service G
Analysis Period (min) 15	

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

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

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

Splits and Phases: 1: Carling Avenue & Booth Street



Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱			↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1256	17	0	738	6	0	0	64	0	0	291
Future Vol, veh/h	0	1256	17	0	738	6	0	0	64	0	0	291
Conflicting Peds, #/hr	0	0	42	0	0	33	0	0	4	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	1000	-	-	350	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	3	2	2	4	8	2	2	2	2	2	5
Mvmt Flow	0	1256	17	0	738	6	0	0	64	0	0	291

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	683	-	-	403
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.14	-	-	7
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.92	-	-	3.35
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	336	0	0	589
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	322	-	-	570
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	18.9	17.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	322	-	-	-	-	570
HCM Lane V/C Ratio	0.199	-	-	-	-	0.511
HCM Control Delay (s)	18.9	-	-	-	-	17.7
HCM Lane LOS	C	-	-	-	-	C
HCM 95th %tile Q(veh)	0.7	-	-	-	-	2.9

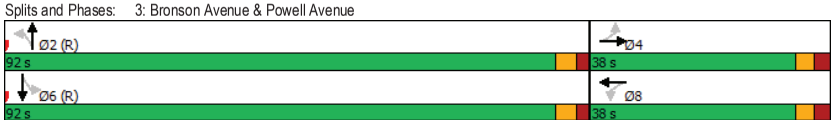
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	82	150	58	89	5	79	1236	19	6	976	57
Future Volume (vph)	141	82	150	58	89	5	79	1236	19	6	976	57
Satd. Flow (prot)	0	1575	0	0	1699	0	0	3262	0	0	3249	0
Flt Permitted		0.782			0.684			0.749			0.946	
Satd. Flow (perm)	0	1239	0	0	1184	0	0	2449	0	0	3073	0
Satd. Flow (RTOR)		25			1			2			10	
Lane Group Flow (vph)	0	373	0	0	152	0	0	1334	0	0	1039	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.7	23.7		23.7	23.7		32.3	32.3		32.3	32.3	
Total Split (s)	38.0	38.0		38.0	38.0		92.0	92.0		92.0	92.0	
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.7			5.7			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		32.3			32.3			86.7			86.7	
Actuated g/C Ratio		0.25			0.25			0.67			0.67	
v/c Ratio		1.14			0.52			0.82			0.51	
Control Delay		135.9			49.1			18.5			11.8	
Queue Delay		0.0			0.0			18.2			0.0	
Total Delay		135.9			49.1			36.7			11.8	
LOS		F			D			D			B	
Approach Delay		135.9			49.1			36.7			11.8	
Approach LOS		F			D			D			B	
Queue Length 50th (m)		~106.8			33.5			124.3			64.3	
Queue Length 95th (m)		#167.9			55.9			m126.0			79.3	
Internal Link Dist (m)		74.6			106.0			142.6			39.5	
Turn Bay Length (m)												
Base Capacity (vph)		326			294			1633			2052	
Starvation Cap Reductn		0			0			328			0	
Spillback Cap Reductn		0			0			0			48	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.14			0.52			1.02			0.52	

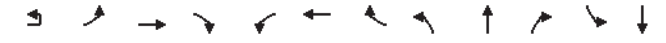
Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14
Intersection Signal Delay: 41.2 — Intersection LOS: D
Intersection Capacity Utilization 112.9% — ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Bronson Avenue & Powell Avenue





Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	3	313	133	796	0	0	0	505	1270	26	0	1071
Future Volume (vph)	3	313	133	796	0	0	0	505	1270	26	0	1071
Satd. Flow (prot)	0	1531	1587	1483	0	0	0	3216	1733	0	0	3257
Flt Permitted		0.950	0.980					0.950				
Satd. Flow (perm)	0	1387	1555	1406	0	0	0	3172	1733	0	0	3257
Satd. Flow (RTOR)				58					2			12
Lane Group Flow (vph)	0	222	227	796	0	0	0	505	1296	0	0	1175
Turn Type	Perm	Perm	NA	pm+ov				Prot	NA			NA
Protected Phases			4	5				5	2			6
Permitted Phases	4	4		4								
Detector Phase	4	4	4	5				5	2			6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0				5.0	10.0			10.0
Minimum Split (s)	31.0	31.0	31.0	11.0				11.0	24.0			33.0
Total Split (s)	31.0	31.0	31.0	26.0				26.0	99.0			73.0
Total Split (%)	23.8%	23.8%	23.8%	20.0%				20.0%	76.2%			56.2%
Yellow Time (s)	3.3	3.3	3.3	3.3				3.3	3.3			3.3
All-Red Time (s)	2.7	2.7	2.7	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	6.0				6.0	6.0			6.0
Lead/Lag				Lead				Lead				Lag
Lead-Lag Optimize?				Yes				Yes				Yes
Recall Mode	None	None	None	Min				Min	C-Max			C-Max
Act Effct Green (s)		23.4	23.4	45.0				21.6	94.6			67.0
Actuated g/C Ratio		0.18	0.18	0.35				0.17	0.73			0.52
v/c Ratio		0.89	0.81	1.48				0.95	1.03			0.70
Control Delay		72.3	59.8	253.5				70.8	54.8			18.7
Queue Delay		0.0	0.0	0.0				0.0	25.7			0.2
Total Delay		72.3	59.8	253.5				70.8	80.4			18.9
LOS		E	E	F				E	F			B
Approach Delay			185.9						77.7			18.9
Approach LOS			F						E			B
Queue Length 50th (m)		60.2	60.9	~212.6				~70.9	~267.9			62.8
Queue Length 95th (m)		m#88.2	m81.7	m#270.0				m#103.7	m#428.1			m84.7
Internal Link Dist (m)			82.5			112.6			62.3			142.6
Turn Bay Length (m)								40.0				
Base Capacity (vph)		266	299	537				534	1261			1684
Starvation Cap Reductn		0	0	0				0	0			82
Spillback Cap Reductn		0	0	0				0	77			0
Storage Cap Reductn		0	0	0				0	0			0
Reduced v/c Ratio		0.83	0.76	1.48				0.95	1.09			0.73

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 46 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	104
Future Volume (vph)	104
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 1.48

Intersection Signal Delay: 93.3	Intersection LOS: F
Intersection Capacity Utilization 99.4%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 4: Bronson Avenue & Carling Avenue/Glebe Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	129	91	137	22	27	9	1652	27	19	1545	4
Future Volume (vph)	3	129	91	137	22	27	9	1652	27	19	1545	4
Satd. Flow (prot)	0	1520	0	0	1637	0	0	3305	0	0	3310	0
Flt Permitted		0.997			0.264			0.942			0.905	
Satd. Flow (perm)	0	1517	0	0	442	0	0	3113	0	0	2999	0
Satd. Flow (RTOR)		22			5			4			1	
Lane Group Flow (vph)	0	223	0	0	186	0	0	1688	0	0	1568	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3		34.3	34.3		34.3	34.3	
Total Split (s)	24.0	24.0		24.0	24.0		106.0	106.0		106.0	106.0	
Total Split (%)	18.5%	18.5%		18.5%	18.5%		81.5%	81.5%		81.5%	81.5%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.3			5.3			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		18.7			18.7			100.7			100.7	
Actuated g/C Ratio		0.14			0.14			0.77			0.77	
v/c Ratio		0.94			2.78			0.70			0.67	
Control Delay		94.7			859.7			9.1			7.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		94.7			859.7			9.1			7.0	
LOS		F			F			A			A	
Approach Delay		94.7			859.7			9.1			7.0	
Approach LOS		F			F			A			A	
Queue Length 50th (m)		52.1			~80.8			95.2			77.8	
Queue Length 95th (m)		#101.1			#128.3			116.5			m71.2	
Internal Link Dist (m)		190.1			132.1			94.8			305.9	
Turn Bay Length (m)												
Base Capacity (vph)		237			67			2412			2323	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.94			2.78			0.70			0.67	

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 55 (42%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.78

Intersection Signal Delay: 56.6	Intersection LOS: E
Intersection Capacity Utilization 99.9%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 5: Bronson Avenue & Madawaska Drive/Fifth Avenue

Intersection						
Int Delay, s/veh	2.4					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	23	41	0	0	17
Future Vol, veh/h	0	23	41	0	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	41	0	0	17

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	58	41	0	-	-	-
Stage 1	41	-	-	-	-	-
Stage 2	17	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	-	-
Pot Cap-1 Maneuver	949	1030	-	0	0	-
Stage 1	981	-	-	0	0	-
Stage 2	1006	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	949	1030	-	-	-	-
Mov Cap-2 Maneuver	949	-	-	-	-	-
Stage 1	981	-	-	-	-	-
Stage 2	1006	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBT
Capacity (veh/h)	-	1030	-
HCM Lane V/C Ratio	-	0.022	-
HCM Control Delay (s)	-	8.6	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	9	12	1807	1601	36
Future Vol, veh/h	3	9	12	1807	1601	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	9	12	1807	1601	36

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2547	819	1637	0	-	0
Stage 1	1619	-	-	-	-	-
Stage 2	928	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	22	319	392	-	-	-
Stage 1	147	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	22	319	392	-	-	-
Mov Cap-2 Maneuver	22	-	-	-	-	-
Stage 1	147	-	-	-	-	-
Stage 2	345	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	63.8	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	392	-	73	-	-
HCM Lane V/C Ratio	0.031	-	0.164	-	-
HCM Control Delay (s)	14.5	0	63.8	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Appendix L

TDM Checklist

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☑
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☑
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

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		TDM measures: *Residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☑
BETTER	3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
	3.2	**Transit fare incentives**	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☑ Not applicable to the student housing component
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
	3.3	**Enhanced public transit service**	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
	3.4	**Private transit service**	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
	4.	**CARSHARING & BIKESHARING**	
	4.1	**Bikeshare stations & memberships**	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
	4.2	**Carshare vehicles & memberships**	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
	5.	**PARKING**	
	5.1	**Priced parking**	
BASIC ★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐
BASIC ★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☑

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☐
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☐
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☐
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☐
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☑
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐