18 Louisa Street

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report (Revision #1)

Prepared for:

Ironwood Fund Limited Partnership
18 Louisa Street, Suite 370
Ottawa, ON K1R 6Y6

Prepared by:

CGH TRANSPORTATION
13 Markham Avenue
Ottawa, ON K2G 3Z1

November 2021

PN: 2021-015

Table of Contents

List of Figures

Table of Tables

List of Appendices

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 the TIA Study PM. As shown in the Screening Form, a TIA is required for the Trip Generation Trigger and Location Trigger and will include the Design Review component and the Network Impact Component. The TIA will support the zoning bylaw and site plan applications.

2 Existing and Planned Conditions

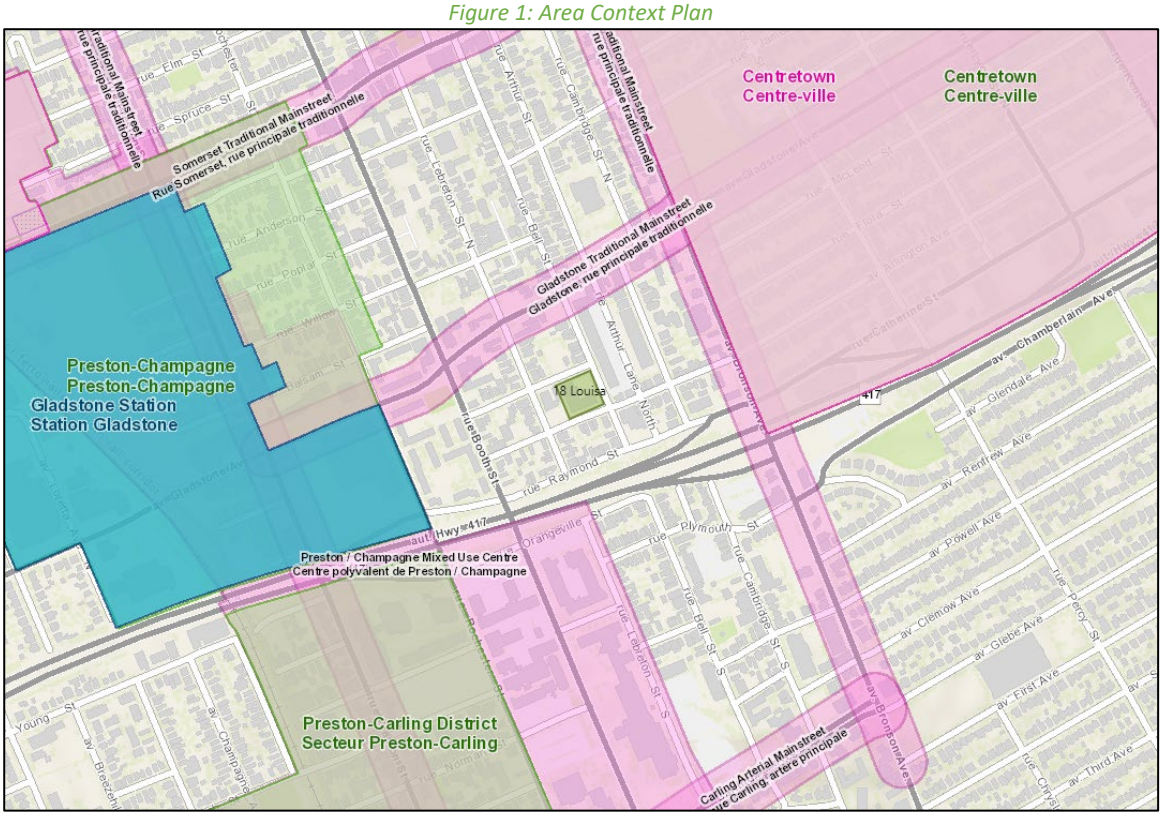
2.1 Proposed Development

The subject site, zoned as Institutional (I1A), is the location of the Gladstone Sports and Health Centre with a three-storey building, surface parking and a gym spanning part of the parking area. The existing accesses are located on Louisa Street and Arlington Avenue, with a one-way laneway at the rear of the existing building between Arlington Avenue and Louisa Street. The proposed redevelopment is for the eastern portion of the parcel and replace the surface parking and gyms with a ten-storey residential building, consisting of 139 apartment units. A total of 87 vehicle parking spaces in two underground levels and in existing surface stalls, and a total of 74 bike parking spaces will be provided. The two-way access on Louisa Street will be converted to a loading access only and the two-way access on Arlington Avenue will be converted to the underground parking ramp. The development is expected to be completed by 2025.

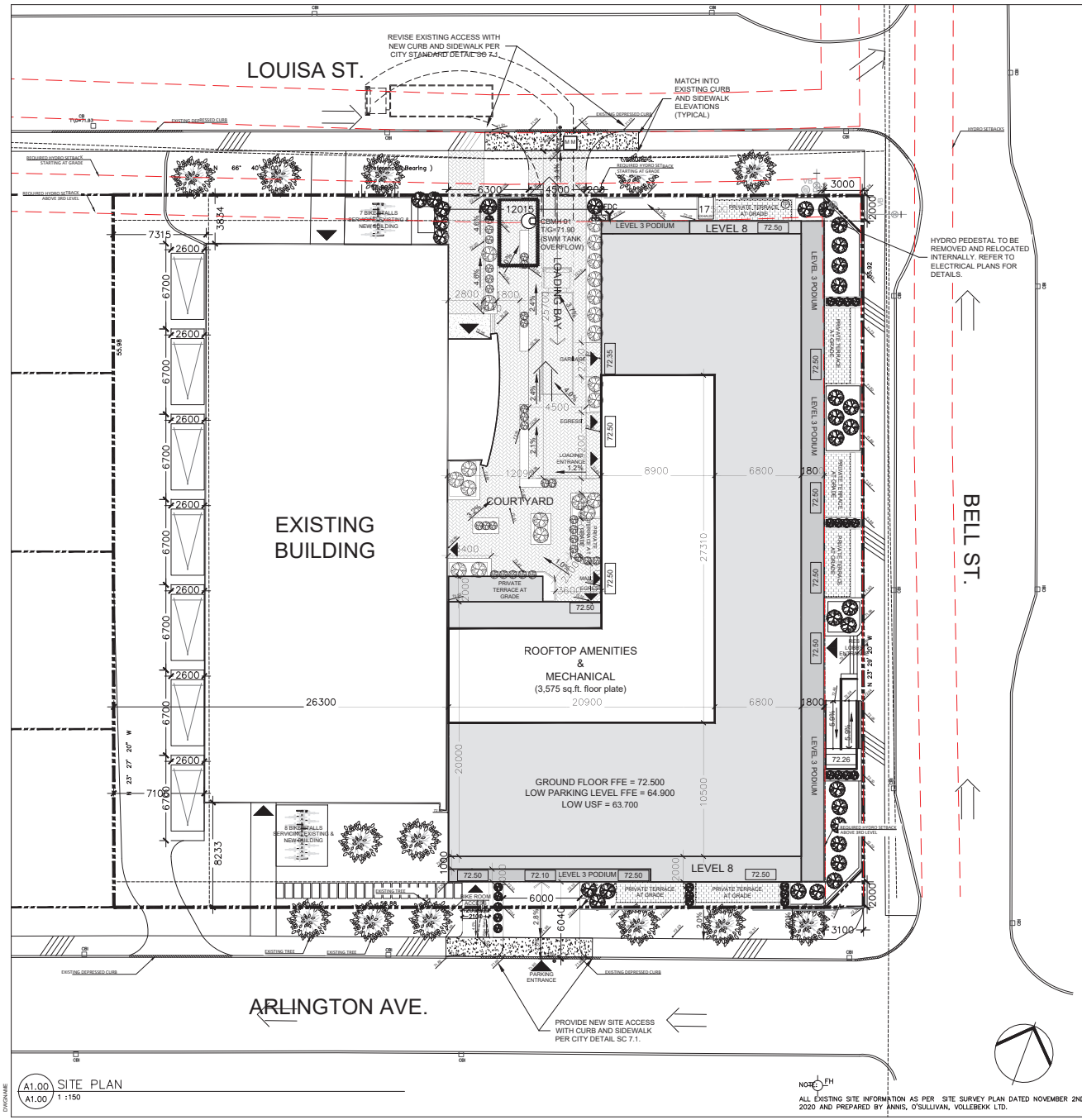
No functional changes are contemplated to the existing 3-storey building and rear lane behind the building.

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: March 4, 2021



A1.00 SITE PLAN
A1.00 1 :150

NOTE: ALL EXISTING SITE INFORMATION AS PER SITE SURVEY PLAN DATED NOVEMBER 2ND, 2020 AND PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

BUILDING AREA SUMMARY

BUILDING AREA	12540	SQ.FT.	
NUMBER OF STOREYS ABOVE GRADE	10	STOREYS	
TOTAL GROSS AREA	105,720	SQ.FT.	(**EXCLUDES AREA BELOW GRADE)
TOTAL NET/LEASEABLE AREA			
RESIDENTIAL	86,545	SQ.FT.	
COM/RET	-	SQ.FT.	
TOTAL GFA (AS PER CITY DEF.)	-	SQ.FT.	

UNIT SUMMARY

TOTAL UNITS 139

	QTY.	RATIO %	
STUDIO	34	24%	24.5%
1 BEDROOM	36	26%	
VALUE 1 BEDROOM	32	23%	54.0%
1 BEDROOM + DEN	7	5%	
VALUE 2 BEDROOM	3	2%	
2 BEDROOM	27	19%	21.6%
2 BEDROOM + DEN	-	0%	

AVERAGE UNIT SIZE 623 SQ.FT.

ZONING NOTES:

CURRENT ZONING: I1A - Minor Institutional Zone

LEGAL DESCRIPTION
LOT 18
REGISTERED PLAN XXXXXXX
CITY OF OTTAWA

LOT AREA : 3,292 m²
LOT WIDTH(Bell st.) : 55.91 m
LOT DEPTH(Louisa st. : 58.86 m

DEVELOPMENT STATS	REQUIRED	PROPOSED
LOT OF AREA 'A'	MIN 1150 m²	3,292 m²
% OF LANDSCAPED AREA		38.2%
TOTAL UNITS		139
SETBACK ALONG LOUISA	3 m	2 m
SETBACK ALONG BELL	3 m	3 m
SETBACK ALONG ARLINGTON	3 m	2 m
MAXIMUM HEIGHT	15 m	31 m
NUMBER OF STOREYS		10
BUILDING GFA		9,802 m²
ZONING GFA (as per city zoning def.)		7,612 m²

PARKING REQUIREMENTS

1. VEHICLE PARKING

Minimum Required Parking Spaces/use (Sections 101,102)

Use	Parking rate	GFA*/Units	Parkings
Office	1 per 100m2	689 sq.m.	6.89
Medical Facility	2 per 100m2	216 sq.m.	4.32
Instructional Facility	1.25 per 100m2	111 sq.m.	1.39
Residential	.5/unit (none required for first 12 units)	139 Units	63.50
Visitor Residential	.1/unit (none required for first 12 units)	139 Units	12.70

*GFA's exclude ground floor uses under 200m2 (provision 101.3B)

Total Parking Count Required (Including Shared Provisions)

Use	Required Parking Count
Residential	63.50
Instructional Facility	1.39
Office, Medical & Res.Visitor Shared (see chart below)	20.74
Total Required	**86**

Shared Parking Provisions (Section 104)

Land Use	Required Parking Count (as per section 101)	Weekday - Morning %	#	Weekday - Noon %	#	Weekday - Afternoon %	#	Weekday - Evening %	#	Saturday - Morning %	#	Saturday - Noon %	#	Saturday - Afternoon %	#	Saturday - Evening %	#
Office	6.89	100%	6.89	90%	6.201	100%	6.89	15%	1.0335	20%	1.378	20%	1.378	10%	0.689	5%	0.3445
Medical Facility	4.32	100%	4.32	90%	3.888	100%	4.32	15%	0.648	20%	0.864	20%	0.864	10%	0.432	5%	0.216
Visitor Parking	12.70	60%	4.38	60%	4.38	70%	9.53	100%	12.7	100%	12.7	100%	12.7	100%	12.7	100%	12.7
Total	23.91		17.56		16.44		20.74		14.38		14.94		14.94		13.82		13.26

LAND USE	PROVIDED PARKING	
RESIDENTIAL	64 PARKING SPACES PROVIDED	* LOCATED IN UNDERGROUND PARKING GARAGE
INSTRUCTIONAL FACILITY	2 PARKING SPACES PROVIDED	* LOCATED AT GRADE
OFFICE, MEDICAL & VISITOR	21 PARKING SPACES PROVIDED	* LOCATED IN UNDERGROUND PARKING GARAGE & AT GRADE
TOTAL PARKING PROVIDED	87 TOTAL PARKING PARKING SPACES PROVIDED: 80 UNDERGROUND+7 AT GRADE	

*12 REDUCED SIZE PARKING STALLS UNDERGROUND
*OADA STANDARDS REQUIRES 4 ACCESSIBLE PARKING STALLS; ALL ARE PROVIDED UNDERGROUND

2. BICYCLE PARKING

REQUIRED BICYCLE PARKING SPACES	
RESIDENTIAL(NEW)	(0.5 SPACE/UNIT – 69.5 SPACES REQUIRED FOR 139 UNITS)
INSTRUCTIONAL FACILITY(EXISTING)	(1 SPACE/1,500SQ.M – 0.2 SPACES REQUIRED FOR 308SQ.M)
MEDICAL FACILITY(EXISTING)	(1 SPACE/1,000SQ.M – 0.2 SPACES REQUIRED FOR 216SQ.M)
OFFICE SPACE(EXISTING)	(1 SPACE/250SQ.M – 3.8 SPACES REQUIRED FOR 952SQ.M)
PROVIDED BICYCLE PARKING SPACES	
59 INTERIOR+ 15 EXTERIOR SPACES = 74 TOTAL BIKE STALLS	

3. AMENITY REQUIREMENTS

REQUIRED AMENITY SPACE 6 m² REQUIRED PER UNIT	
139 UNITS X 6 SQ.M. = 834 SQ.M. TOTAL AMENITY REQUIRED	
REQUIRED AMENITY SPACE TO BE COMMON –	417 SQ.M.
PROVIDED COMMON AMENITY SPACE –	459 SQ.M.
PROVIDED AMENITY SPACE BREAKDOWN:	
–GROUND FLOOR COMMON AMENITY –	55 m² (INTERIOR)
–TOP FLOOR COMMON AMENITY –	88 m² (INTERIOR) + 316 m² (EXTERIOR) = 404 m²
–PRIVATE BALCONY AMENITY –	542 m²
TOTAL AMENITY SPACE PROVIDED	1,001 m²

LOCATION PLAN

LEGEND

PROPOSED FIRE ROUTE
PROPOSED BUILDING
BUILDING TO BE DEMOLISHED
HMH EXISTING TRAFFIC MAN HOLE
TMH EXISTING TRAFFIC MAN HOLE
MH EXISTING MAN HOLE
TSF EXISTING TRAFFIC LIGHT
FH EXISTING FIRE HYDRANT
CONC. CURB DETAIL TO CITY OF OTTAWA STANDARDS
BP BIKE PARKING SPACE
EDGE OF SIDEWALK
PROPERTY LINE
SETBACK
(SC) PROPOSED DEPRESSED CURB DETAIL TO CITY OF OTTAWA STANDARD SC–7
(TLS) SIGNAGE FOR TEMP. LOADING ONLY
EXTENT OF PRIVATELY OWNED PUBLIC SPACE
CURB TO BE REBUILT
ROLL CURB
UP EXISTING UTILITY POLE
FDC FIRE DEPARTMENT CONNECTION
PTD PARKING TICKET DISPENCER
PDS EXISTING PAY & DISPLAY
BS EXISTING TRANSIT STOP
CB EXISTING CATCH BASIN
CB PROPOSED CATCH BASIN
SIGNAGE FOR ACCESSIBLE PARKING SPACE
FRS SIGNAGE FOR FIRE ROUTE ACCESS
EXISTING SIGN
EXISTING BOLLARD
EXISTING LIGHT POLE
NEW LIGHT POLE
PROPOSED WALL MOUNTED LIGHT
SL EXISTING STREET LIGHTING BOX
TB EXISTING TRAFFIC SIGNAL BOX

PROJECT TEAM

ARCHITECT
HOBIN ARCHITECTURE
David Anderson
danderson@hobinarc.com
613.238.7200 x122
Patrick Bisson
pbisson@hobinarc.com
613.238.7200 x128

OWNERSHIP
IRONWOOD FUND LIMITED PARTNERSHIP
Kenneth Jennings
kjennings@jenningsdevelopments.com
613-648-3459

PLANING
FOTENN PLANNING + DESIGN
Ghada Zaki
zaki@fotenn.com
613.730.5709 ext. 226
Brian Casagrande
casagrande@fotenn.com
613-730-5709 ext. 235

CIVIL
NOVATECH
Francois Thauvette
f.thauvette@novatech-eng.com
613.254.9643 Ext: 219

LANDSCAPE ARCHITECT
RUHLAND & ASSOCIATES
Marietta Ruhland
mruhland@ralla.ca
613.224.4744 x 222

TRANSPORTATION
CGH TRANSPORTATION
Andrew Harte
andrew.harte@cghtransportation.com
343-999-9117

ENVIRONMENTAL
GRADIENT WIND
Justin Ferraro
justin.ferraro@gradientwind.com
Vincent Ferraro
vincent.ferraro@gradientwind.com
613 836 0934 x112

GEOTHECHNICAL
PATERSONGROUP
Faisal Abou-Seido
FAbou-Seido@Patersongroup.ca
(613) 226-7381 Ext. 210
David Gilbert
dgilbert@patersongroup.ca
(613) 226-7381 Ext. 205

no.	date	revision
2	2021XXXX	REZONING/SPA RESUBMISSION#1
1	20210528	ISSUED FOR REZONING & SPA

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and/or omissions to the architect.

All contractors must comply with all pertinent codes and by-laws.

Do not scale drawings.

This drawing may not be used for construction until signed.

HOBIN ARCHITECTURE

PROJECT/LOCATION:
18 LOUISA STREET

DRAWING TITLE:
SITE PLAN
18 LOUISA STREET

0m 2m 4m 6m 8m 10m

DRAWN BY: DA | DATE: 2021-05-28 | SCALE: 1:150

PROJECT: 2023

DRAWING NO.: A1-00

REVISION NO.:1

DWG #18564

DATE/PLOT DWGNAME

2021-12-21 01:02

2.2 Existing Conditions

2.2.1 Area Road Network

Bronson Avenue: Bronson Avenue is a City of Ottawa arterial road with a four-lane urban cross-section, sidewalks on both sides of the road, and no stopping is permitted during the peak hours. The posted speed limit is 50 km/h and the City-protected right-of-way is 23.0 metres. Bronson Avenue is a truck route.

Catherine Street: Catherine Street is a City of Ottawa arterial one-way road with a three-lane urban cross-section, sidewalks on both sides of the road, and no stopping is permitted during the peak hours. The posted speed limit is 50 km/h and the City-protected right-of-way is 23.0 metres. Catherine Street is a truck route.

Raymond Street: Raymond Street is a City of Ottawa arterial one-way road between Bronson Avenue and the Highway 417 on-ramp, and a one-way local road to the west of the on-ramp. The urban cross-section reduces from a three-lane width to a single lane west of the Highway 417 on-ramp with a parking bays located on the north side. Parking is restricted to one-hour between 7AM and 7PM. The unposted speed limit is 50 km/h and the existing right-of-way varies between 12.5 to 20.0 metres. Catherine Street is a truck route.

Booth Street: Booth Street is a City of Ottawa major collector road with a 2-lane urban cross-section, sidewalks on both sides of the road, and parking bays provided on the east side of the road. The posted speed limit is 40 km/h and the existing right-of-way is 20.0 metres.

Gladstone Avenue: Gladstone Avenue is a City of Ottawa City of Ottawa major collector road with a two-lane urban cross-section, sidewalks on both sides of the road and a parking lane located on the north side. The posted speed limit is 40 km/h and the existing right-of-way varies from 20.0 to approximately 36.0 metres. Gladstone Avenue is a truck route.

Arlington Avenue: Arlington Avenue is a City of Ottawa local road with a two-lane urban cross-section, sidewalks on both sides of the road and on-street parking is permitted on the north side of the road. The unposted speed limit is 50 km/h and the existing right-of-way is 15.5 metres.

Bell Street North: Bell Street North is a City of Ottawa local road with a two-lane urban cross-section, sidewalks on both sides of the road and on-street parking is permitted on the west side of the road, with a winter restriction between December 1st and March 31st. Between Arlington Street and Gladstone Avenue, the east side of the road is reserved for permit parking and valet service for the LIV apartments at 207 Bell Street. The unposted speed limit is 50 km/h and the existing right-of-way is 10.5 metres.

Lebreton Street North: Lebreton Street North is a City of Ottawa local road with a two-lane urban cross-section, sidewalks on both sides of the road. on-street parking, signed 1-hour between 7AM and 7PM, is permitted on the west side of the road north of Willow Street within the study area, between Louisa Street and Gladstone Avenue, and south of Arlington Avenue and on the east side of the road between Gladstone Avenue and Willow Street, and between Louisa Street and Arlington Avenue. The posted speed limit is 30 km/h north of Gladstone avenue and the unposted speed limit is 50 km/h to the south, and the existing right-of-way is 20.0 metres.

Louisa Street: Louisa Street is a City of Ottawa local road with a two-lane urban cross-section, sidewalks on both sides of the road and on-street parking is permitted on the south side of the road to the east of Lebreton Street North and on the north side to the west. The parking is signed 1-hour between 7AM and 7PM. The unposted speed limit is 50 km/h and the existing right-of-way is 20.0 metres.

Highway 417 is noted within the study area although no on/off ramp terminal are assessed within the proposed scope of the study.

2.2.2 Existing Intersections

The key signalized area intersections within 400 metres of the site have been summarized below:

Bronson Avenue at Catherine Street/Raymond Street	The intersection of Bronson Avenue at Catherin Street/Raymond Street is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and two through lanes, the southbound approach consists of a through and shared through/right-tun lane and the westbound approach consists of an auxiliary left-turn lane, an auxiliary shared left-turn/through lane, a through lane and a shared through/right-turn lane. No turn restrictions are noted beyond the one-way on Catherine Street/Raymond Street does not permit any movements from the west side of the intersection.
Bronson Avenue at Arlington Avenue	The intersection of Bronson Avenue at Arlington Avenue is a signalized intersection. The northbound and southbound approaches each consist of a shared left-turn/through lane and shared through/right-turn lane, and the eastbound and westbound approaches each consist of a shared all movement lane. No turn restrictions are noted.
Bronson Avenue at Gladstone Avenue	The intersection of Bronson Avenue at Gladstone Avenue is a signalized intersection. The northbound and southbound approaches each consist of an auxiliary left-turn lane, through lane and shared through/right-turn lane, and the eastbound and westbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane. Right turns on red are restricted at all approaches weekdays between 7:00AM and 7:00PM.
Booth Street at Gladstone Avenue	The intersection of Booth Street at Gladstone Avenue is a signalized intersection. The northbound and southbound approaches each consist of a shared all movement lanes of over five metres which operate as an auxiliary left-turn movement and a shared through/right turn movement, the eastbound approach consists of an auxiliary left-turn lane and a through lane, and the westbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. No right-turns are permitted on the eastbound direction from Gladstone Avenue onto Booth Street.
Arthur Street/Arthur Lane at Gladstone Avenue	The intersection of Arthur Street/Arthur Lane at Gladstone Avenue is a signalized intersection. The southbound, eastbound and westbound approaches all consist of a shared all movement lane. No turn restrictions are noted beyond the one-way on Arthur Lane south of Gladstone Avenue does not permit any movements from the south side of the intersection.
Booth Street at Raymond Street	The intersection of Booth Street at Raymond Street is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a through lane, the southbound approach consists of a shared through/right-turn lane, and the westbound approach consists of a shared left-turn/through lane and an auxiliary right-turn lane. No turn restrictions are noted beyond the one-way on Catherine

Street/Raymond Street does not permit any movements from the west side of the intersection.

2.2.3 Existing Driveways

Within 200 metres of the site access on study area roadways, driveways to attached, detached, and low-rise residential. On Bell Street North, driveways to a church, private parking, and to a high-rise residential building are additionally present. On Louisa Street, a driveway to the existing site, driveways to a church, private parking, attached, are additionally present. On Arlington Avenue, driveways to an automotive garage, and to private parking are additionally present. On Lebreton Street North, driveways to private parking are additionally present.

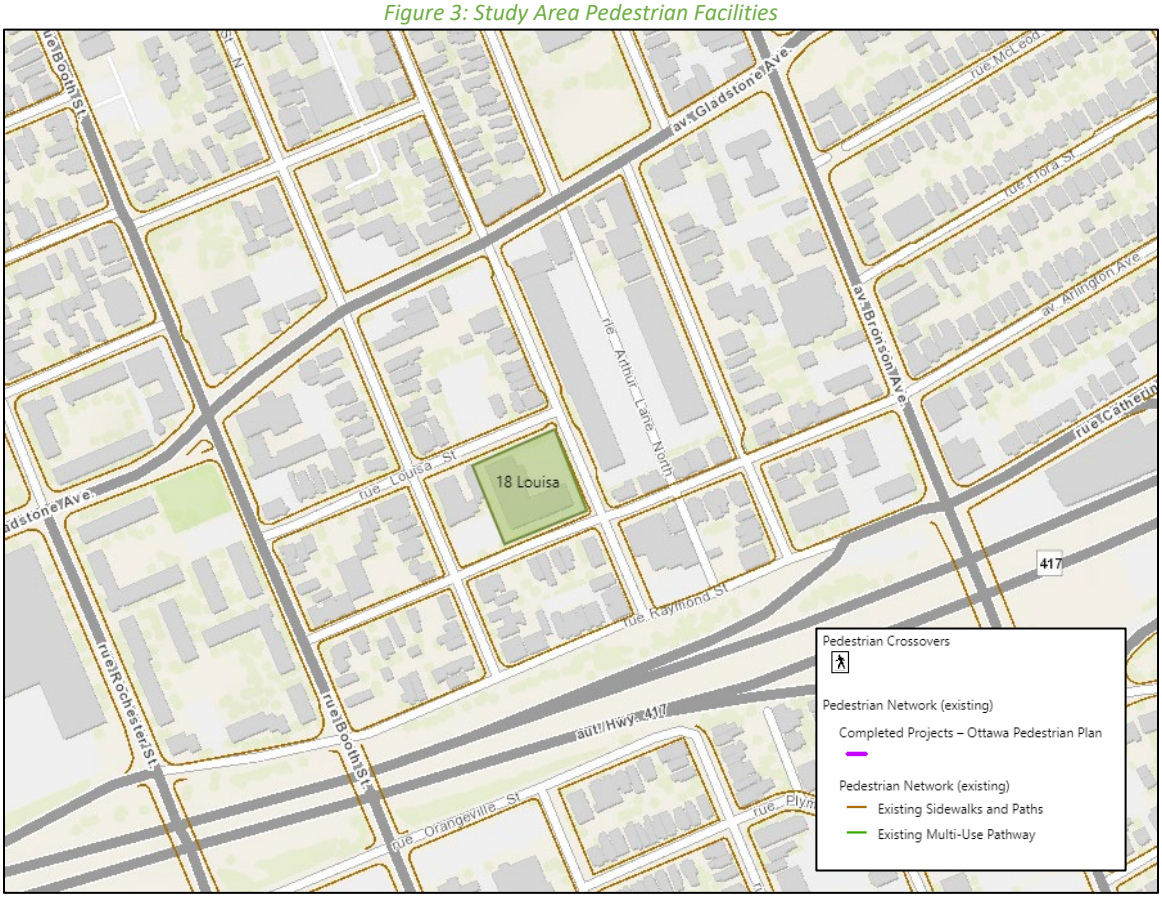
The existing one-way rear lane to the site accessing Arlington Avenue and Louisa Street is to be maintained.

2.2.4 Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities.

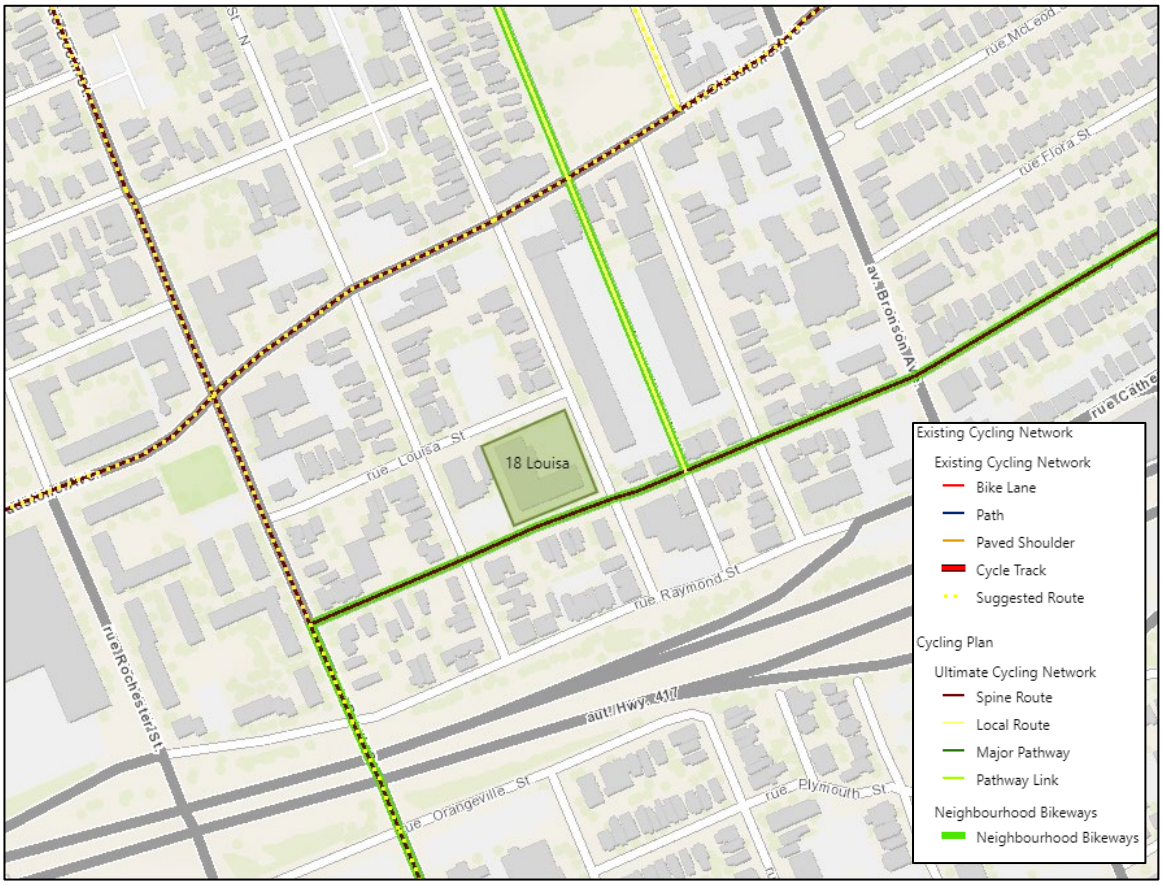
Sidewalks are generally provided along both sides of the study area roadways. Cycling facilities include the designations of Gladstone Avenue, Booth Street and Arlington Avenue as spine routes, and Arthur Lane as a local route. Arthur Lane and Arlington form the Centretown Neighbourhood Bikeway, which continues south on Booth Street from the intersection at Arlington Avenue.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: March 4, 2021

Figure 4: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: March 4, 2021

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 5 and Figure 6 respectively.

Figure 5: Existing Pedestrian Counts

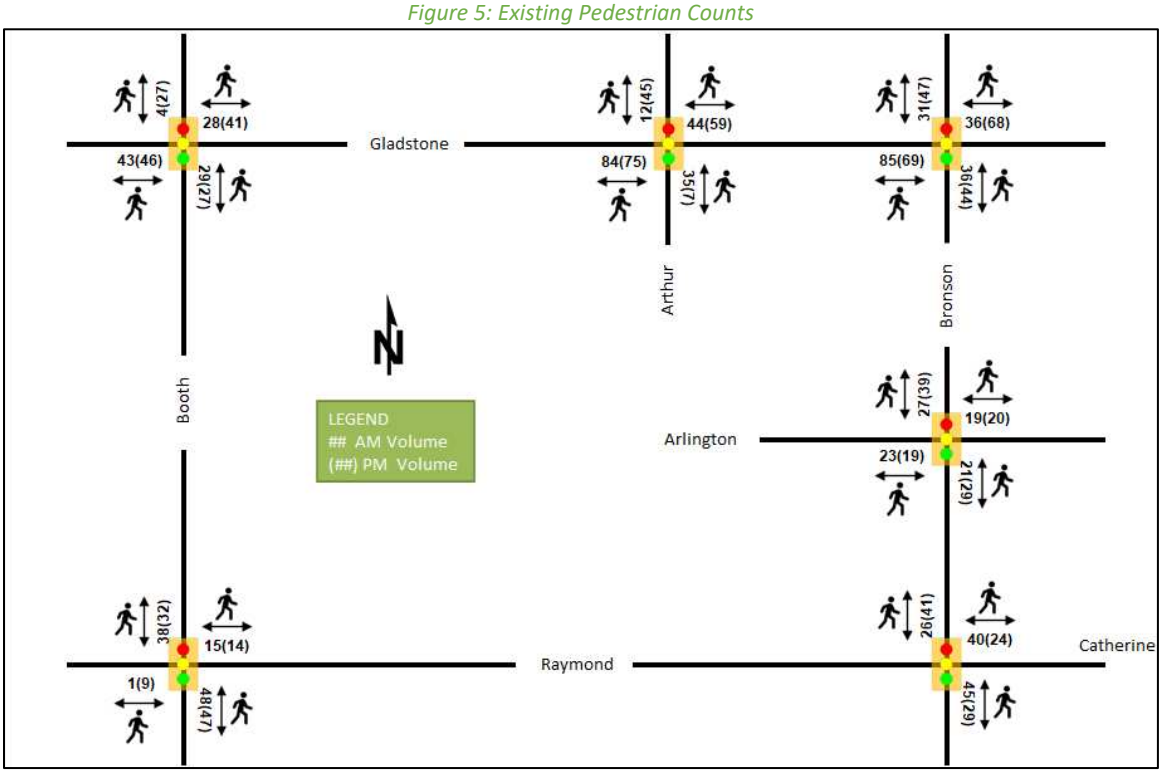
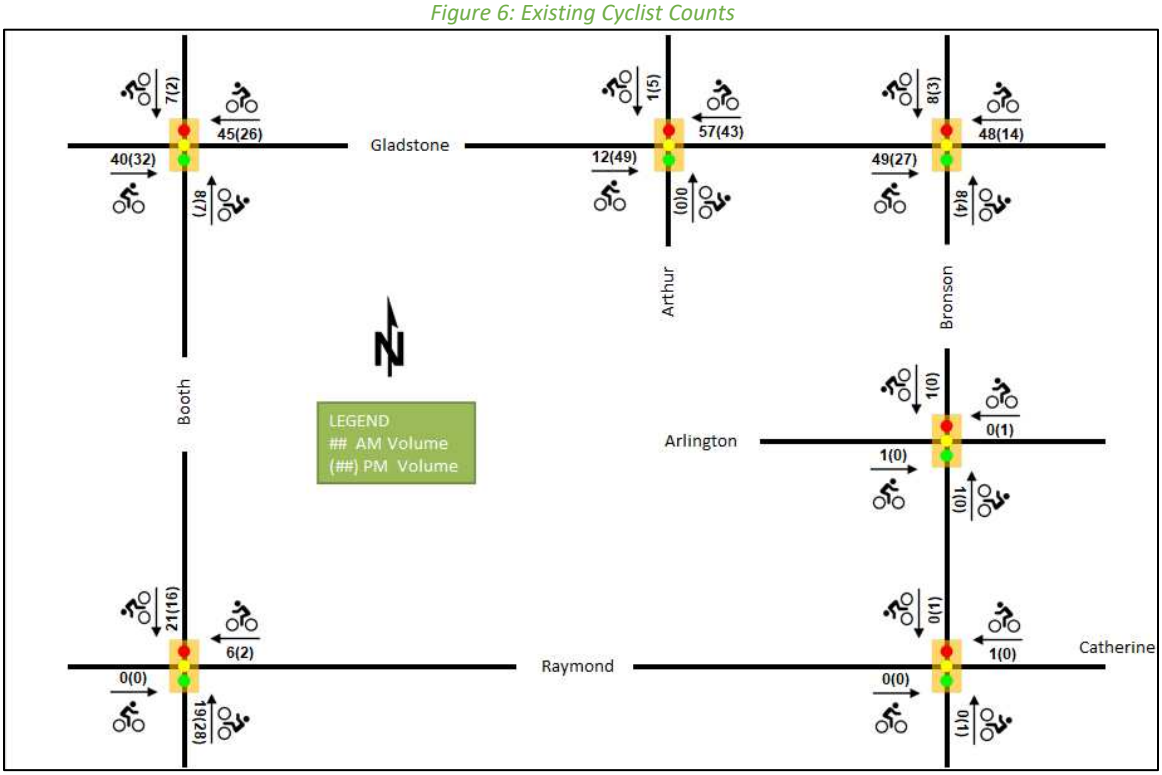


Figure 6: Existing Cyclist Counts



2.2.5 Existing Transit

Within the study area, the routes #10, 14, 55 and 114 area travel in proximity of the proposed site. The frequency of these routes within proximity of the proposed site currently are:

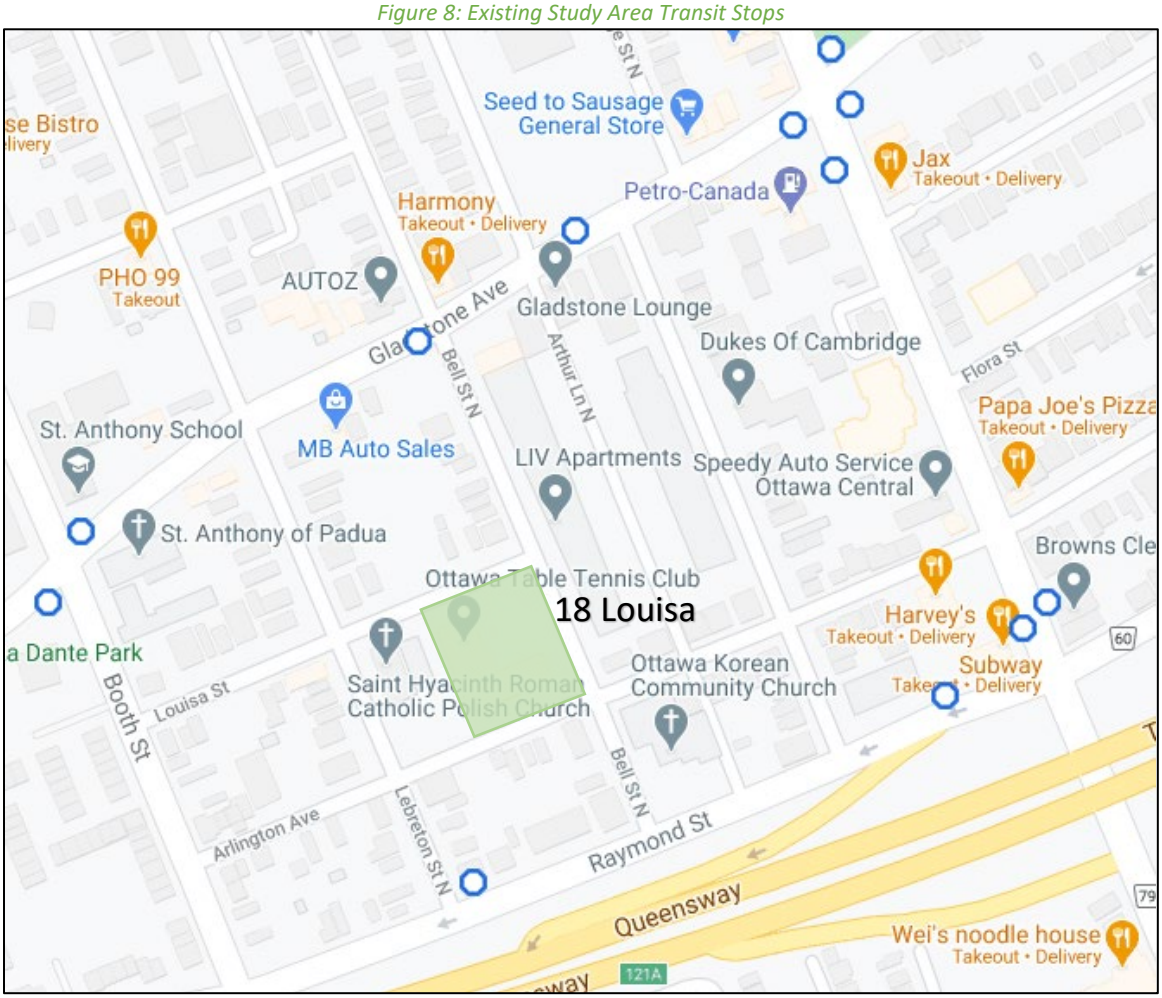
- Route #10 – 15-minute service during the day, 30-minute service during the early morning and evenings
- Route #14 – 15-minute service during the day, 30-minute service during the early morning and evenings
- Route #55 – 15 to 20-minute service during the day, 30-minute service during the evenings
- Route #114 – two trips downtown at 9:30 and 10:30AM, and two trips to Clarington at 1:30 and 2:30PM

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: March 4, 2021

Figure 8: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: March 4, 2021

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the Study Area.

2.2.7 Existing Peak Hour Travel Demand

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

Table 1: Intersection Count Date

Intersection	Count Date
Bronson Avenue at Catherine Street/Raymond Street	Thursday, April 19,2018
Bronson Avenue at Arlington Avenue	Wednesday, December 13, 2017
Bronson Avenue at Gladstone Avenue	Wednesday, July 27, 2016
Booth Street at Gladstone Avenue	Wednesday, July 27, 2016
Arthur Street/Arthur Lane at Gladstone Avenue	Wednesday, July 27, 2016
Booth Street at Raymond Street	Thursday, September 1, 2016

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 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

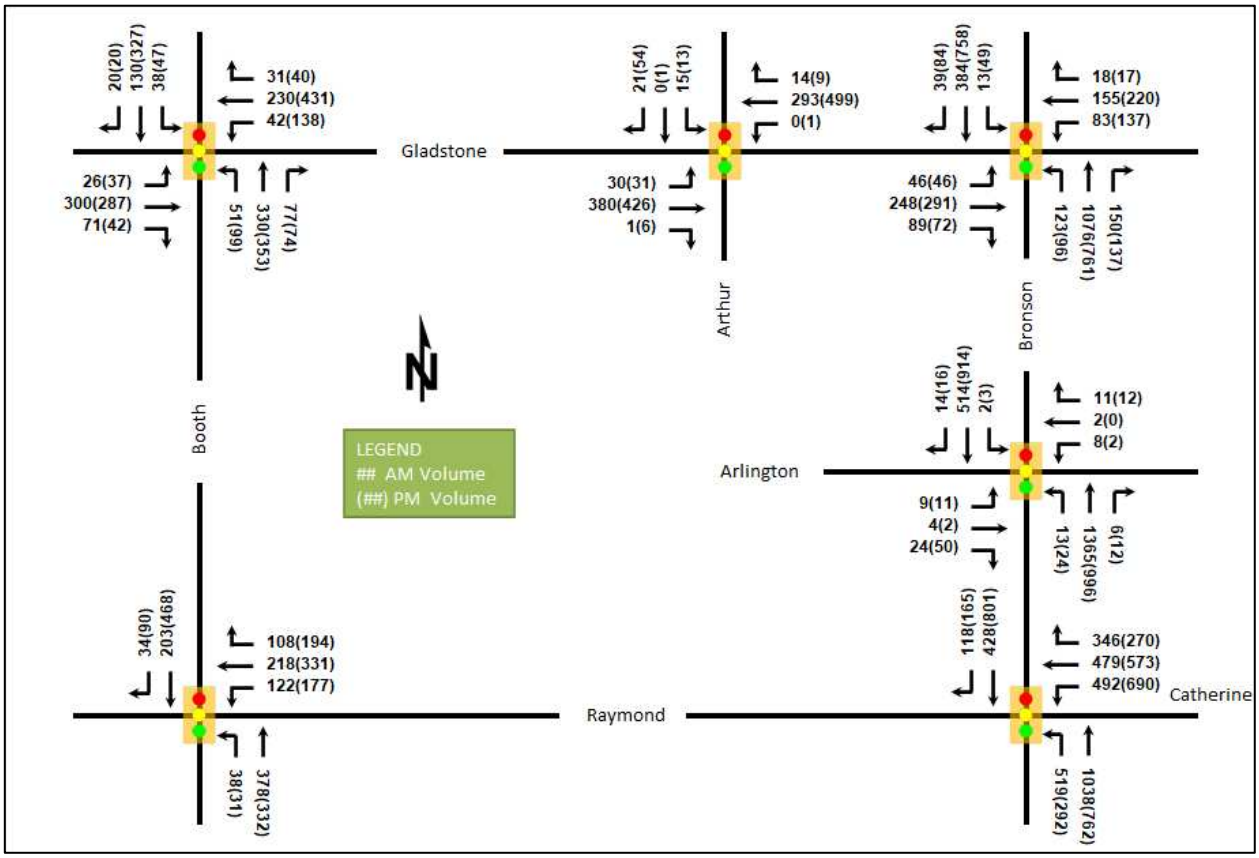


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Catherine Street/Raymond Street *Signalized*	WBL	**F**	**1.06**	**104.4**	**#168.1**	**F**	**1.13**	**122.4**	**#180.0**
	WBT/R	**F**	**1.01**	**69.0**	**#120.8**	**F**	**1.09**	**86.7**	**#134.1**
	NBL	E	0.98	54.6	**#142.4**	E	0.92	57.8	**#95.4**
	NBT	A	0.55	12.9	85.5	A	0.42	11.5	55.4
	SBT/R	D	0.82	63.0	**#85.8**	E	0.92	41.8	**#140.8**
	Overall	**F**	**1.06**	**52.3**	-	**F**	**1.02**	**59.9**	-
Bronson Avenue at Arlington Avenue *Signalized*	EB	A	0.22	23.9	12.3	A	0.31	17.4	14.2
	WB	A	0.15	28.6	9.4	A	0.08	10.1	4.0
	NB	A	0.60	5.0	m48.3	A	0.48	3.0	m32.5
	SB	A	0.24	3.4	23.3	A	0.41	2.1	17.1
	Overall	**A**	**0.56**	**5.2**	-	**A**	**0.45**	**3.1**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Gladstone Avenue *Signalized*	EBL	A	0.15	24.5	15.3	A	0.13	17.9	13.2
	EBT/R	C	0.73	38.0	93.3	A	0.57	24.8	86.0
	WBL	A	0.49	36.3	29.5	A	0.51	28.0	41.2
	WBT/R	A	0.36	27.0	44.9	A	0.36	20.5	52.2
	NBL	A	0.32	14.3	25.4	C	0.71	39.3	**#46.2**
	NBT/R	C	0.78	21.1	126.3	C	0.73	16.2	34.8
	SBL	A	0.14	14.7	4.9	A	0.41	30.9	19.4
	SBT/R	A	0.27	12.0	31.7	B	0.66	24.9	94.5
	Overall	**C**	**0.76**	**22.5**	-	**B**	**0.65**	**22.2**	-
Booth Street at Gladstone Avenue *Signalized*	EBL	A	0.09	13.5	6.6	A	0.16	14.7	9.7
	EBT/R	B	0.69	22.7	**#64.4**	A	0.47	16.9	57.6
	WBL	A	0.19	15.6	10.0	A	0.43	29.4	42.3
	WBT/R	A	0.48	17.2	41.3	B	0.66	31.5	114.6
	NBL	A	0.12	9.9	m6.7	A	0.42	24.5	26.5
	NBT/R	B	0.64	13.3	37.1	C	0.74	29.5	**#95.4**
	SBL	A	0.15	12.5	8.3	A	0.26	21.6	14.2
	SBT/R	A	0.23	11.2	20.6	A	0.59	24.4	72.8
	Overall	**B**	**0.65**	**16.3**	-	**B**	**0.70**	**26.1**	-
Arthur Street / Arthur Lane at Gladstone Avenue *Signalized*	EB	A	0.37	7.8	53.5	A	0.43	4.4	m25.8
	WB	A	0.27	6.8	36.6	A	0.44	7.9	62.2
	SB	A	0.10	5.0	4.2	A	0.25	12.1	11.9
	Overall	**A**	**0.34**	**7.3**	-	**A**	**0.40**	**6.6**	-
Booth Street at Raymond Street *Signalized*	WBL/T	B	0.69	25.4	**#63.8**	**F**	**1.18**	**127.5**	**#145.4**
	WBR	A	0.22	4.6	8.9	A	0.39	5.5	13.8
	NBL	A	0.09	8.9	6.6	A	0.12	8.5	5.9
	NBT	A	0.49	12.9	49.4	A	0.38	9.9	40.5
	SBT/R	A	0.32	15.0	m27.1	B	0.65	14.2	81.1
	Overall	**A**	**0.57**	**16.2**	-	**D**	**0.82**	**47.6**	-

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

Capacity issues are noted on several specific movements throughout the study area and generally at the intersection of Bronson Avenue at Catherine Street/Raymond Street. During the AM peak hour at this intersection, the westbound left and westbound through movements are shown to be over capacity with high delays and extended queues, the northbound left movement is shown to be approaching capacity with extended queues, extended queues are noted on the southbound through movement, and the overall intersection is over capacity. During the PM peak hour, the same issues are present, with the southbound through movement approaching capacity as well.

At the intersection of Booth Street and Gladstone Avenue, the eastbound through movement exhibits extended queues during the AM peak hour, and the northbound through/right movement exhibits extended queues during the PM peak hour.

Additionally, within the study area, at the intersection of Bronson Avenue and Gladstone Avenue, the northbound left movement exhibits extended queuing during the PM peak hour, and at the intersection of Booth Street and Raymond Street, the westbound through movement exhibits extended queuing during the AM peak hour and is over capacity with high delays and extended queues during the PM peak hour.

The City may consider signal timing adjustments at the Bronson Avenue at Catherine Street/Raymond Street intersection to shift green time from movements with residual capacity to the over capacity movements. While signal timing adjustments could be made to improve the Booth Street at Raymond Street intersection, it is not recommended to improve the westbound approach as it may increase cut through traffic adjacent to the highway and surrounding community.

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 are 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, 2015-2019

		Number	%
Total Collisions		**84**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	14	17%
	Property Damage Only	70	83%
Initial Impact Type	**Angled**	32	38%
	Rear end	13	15%
	Sideswipe	7	8%
	Turning Movement	9	11%
	SMV Unattended	17	20%
	SMV Other	4	5%
	Other	2	2%
Road Surface Condition	**Dry**	58	69%
	Wet	17	20%
	Loose Snow	5	6%
	Slush	2	2%
	Ice	2	2%
Pedestrian Involved		3	4%
Cyclists Involved		5	6%

Figure 10: Study Area Collision Records – Representation of 2015-2019

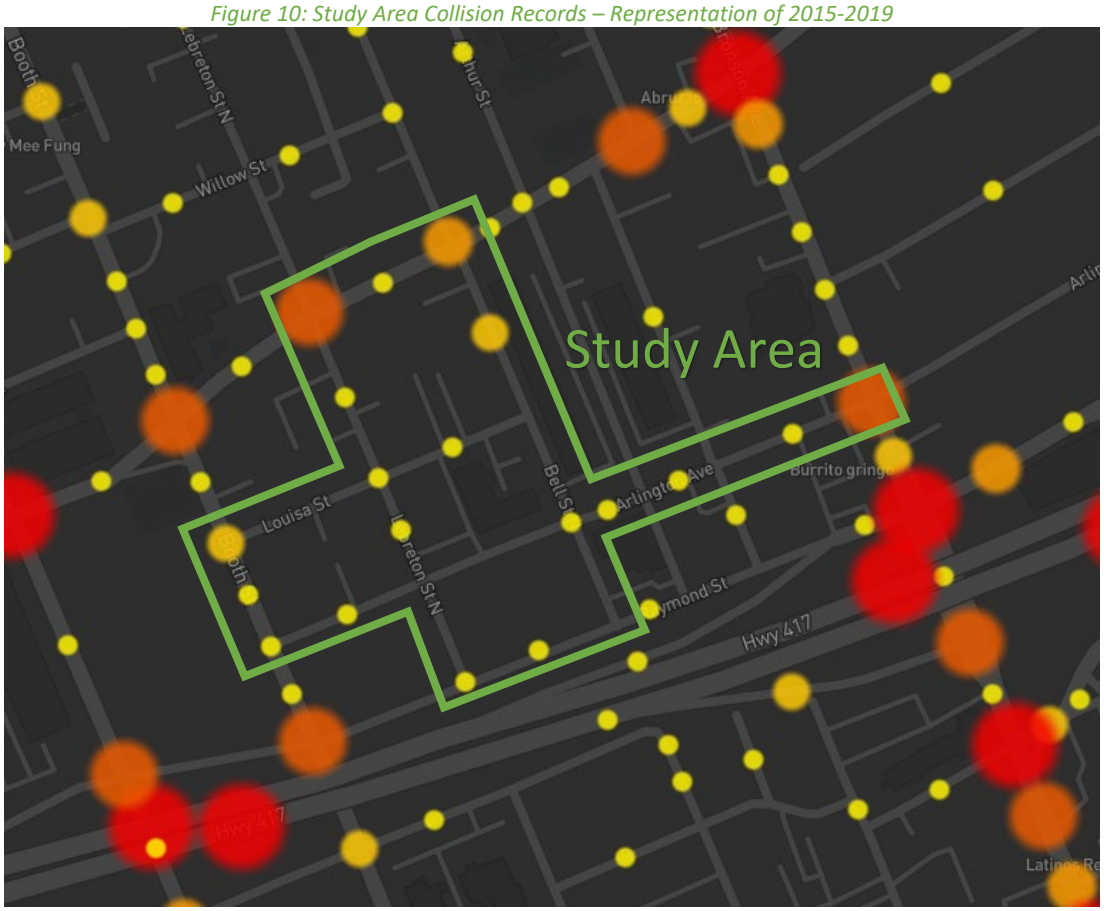


Table 4: Summary of Collision Locations, 2015-2019

	Number	%
Intersections / Segments	**84**	**100%**
Bell Street @ Arlington Avenue	1	1%
Bell Street @ Gladstone Avenue	9	11%
Booth Street @ Arlington Avenue	1	1%
Booth Street @ Louisa Street	4	5%
Bronson Avenue @ Arlington Avenue	20	24%
Lebreton Street @ Gladstone Avenue	21	25%
Lebreton Street @ Louisa Street	1	1%
Lebreton Street @ Raymond Street	2	2%
Arlington Avenue Btwn Arthur Lane N & Cambridge Street N	2	2%
Arlington Avenue Btwn Bell Street N & Arthur Lane N	1	1%
Arlington Avenue Btwn Booth Street & Lebreton Street N	3	4%
Arlington Avenue Btwn Cambridge Street N & Bronson Avenue	2	2%
Bell Street N Btwn Gladstone Avenue & Louisa Street	5	6%
Booth Street Btwn Louisa Street & Arlington Avenue	2	2%
Gladstone Avenue Btwn Lebreton Street N & Bell Street N	3	4%
Lebreton Street N Btwn Gladstone Avenue & Louisa Street	2	2%
Lebreton Street N Btwn Louisa Street & Arlington Avenue	2	2%
Louisa Street Btwn Lebreton Street N & Bell Street N	2	2%
Raymond Street Btwn Lebreton Street N & Bell Street N	1	1%

Within the study area, the intersections of Bronson Avenue at Arlington Avenue and Lebreton Street at Gladstone Avenue was noted to have experienced higher collisions than other intersections. Table 5 and Table 6 summarize the collision types and conditions for the Bronson Avenue at Arlington Avenue and Lebreton Street at Gladstone Avenue intersections.

Table 5: Bronson Avenue at Arlington Avenue Collision Summary

		Number	%
Total Collisions		**20**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	3	15%
	Property Damage Only	17	85%
Initial Impact Type	**Angle**	5	25%
	Rear end	7	35%
	Sideswipe	2	10%
	Turning Movement	6	30%
Road Surface Condition	**Dry**	13	65%
	Wet	5	25%
	Loose Snow	1	5%
	Slush	1	5%
Pedestrian Involved		0	0%
Cyclists Involved		2	10%

The Bronson Avenue at Arlington Avenue intersection had a total of 20 collisions during the 2015-2019 time period, with 17 involving property damage only and the remaining three having non-fatal injuries. The three primary collision types were rear end (seven collisions), turning movements (six collisions) and angled (five collisions). The distribution of collisions does not identify a geometric concern and is likely due to congestion along Bronson Avenue. Weather conditions do not affect collisions at this location.

Table 6: Lebreton Street at Gladstone Avenue Collision Summary

		Number	%
Total Collisions		**21**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	4	19%
	Property Damage Only	17	81%
Initial Impact Type	**Angled**	20	95%
	Turning Movement	1	5%
Road Surface Condition	**Dry**	14	67%
	Wet	5	29%
	Loose Snow	1	5%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Lebreton Street at Gladstone Avenue intersection had a total of 21 collisions during the 2015-2019 time period, with 17 involving property damage only and the remaining four having non-fatal injuries. Angled collisions (20 collisions) compromise the majority of the collisions are the intersection. The angles collisions are a result of the north and southbound movements entering Gladstone Avenue, primarily to cross Gladstone Avenue as only three are from left-turning vehicles. The vertical curve to the west of the intersection may influence the collisions with eastbound vehicles (nine total). No geometric issues noted to for westbound vehicles. The City may consider restricting the north and southbound through movements at this intersection, likely through signage to mitigate the angled collisions. Weather conditions do not affect collisions at this location.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is not within a CDP or design priority area.

Within the Transportation Master Plan (TMP), the Road Transit and Transit Priority (RTTP) Network's Affordable Network diagram shows a new station along the Trillium LRT line at Gladstone Avenue which is expected to be completed in 2021.

From the Planned Construction Projects portal, Gladstone Avenue is due to receive traffic safety improvements along the corridor to commence within four-to-seven years.

The Chamberlain Avenue, Catherine Street, and Isabella Street Functional Design Study, conducted in 2019, is currently planned for implementation after the build-out horizon, and notably includes pedestrian improvements at the Bronson Avenue at Catherine Street/Raymond Street intersection.

2.3.2 Other Study Area Developments

249-267 Rochester Street, 27-29 Balsam Street

The application includes the site plan for the construction of a three-storey 23-unit residential development with an internal private road. No TIA is available for the application.

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Bronson Avenue at:
    - Catherine Street/Raymond Street
    - Arlington Avenue
    - Gladstone Avenue
- Booth Street at:
    - Gladstone Avenue
    - Raymond Street
- Arthur Street/Arthur Lane at Gladstone Avenue

The boundary roads will be Bell Street, Louisa Street, and Arlington Avenue and no screenlines are present within proximity to the site.

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 7 summarizes the exemptions for this TIA.

Table 7: 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

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 residential units using the TRANS Trip Generation Study Report (2009). Table 8 summarizes the person trip rates for the proposed land use.

Table 8: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Mid-Rise Apartments	223 (TRANS)	AM	0.24	0.65
		PM	0.28	0.70

Using the above Person Trip rates, the total person trip generation has been estimates. Table 9 below illustrates the total person trip generation for the Mid-Rise Apartment dwelling type.

Table 9: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Mid-Rise Apartments	139	22	68	90	60	37	97

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. As the site is approximately 900 metres walk from the planned Gladstone LRT station and not designated as a TOD zone, no adjustments are recommended to the existing area mode shares targets. Table 10 summarizes these modal shares.

Table 10: Mode Shares

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

Using the above mode share targets for the AM/PM shares and person trip rates the person trips by mode have been projected. Table 11 summarizes the trip generation by mode.

Table 11: Trip Generation by Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto Driver	35%	8	24	32	21	13	34
Auto Passenger	10%	2	7	9	6	4	10
Transit	20%	4	14	18	12	7	19
Cycling	5%	1	3	5	3	2	5
Walking	30%	7	20	27	18	11	29
Total	**100%**	**22**	**68**	**90**	**60**	**37**	**97**

As shown above, 32 new AM and 34 new PM peak hour two-way vehicle trips are projected as a result of the proposed development.

5.2 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the existing district travel and these patterns were applied based on the build-out of Ottawa Inner. Table 12 below summarizes the distributions.

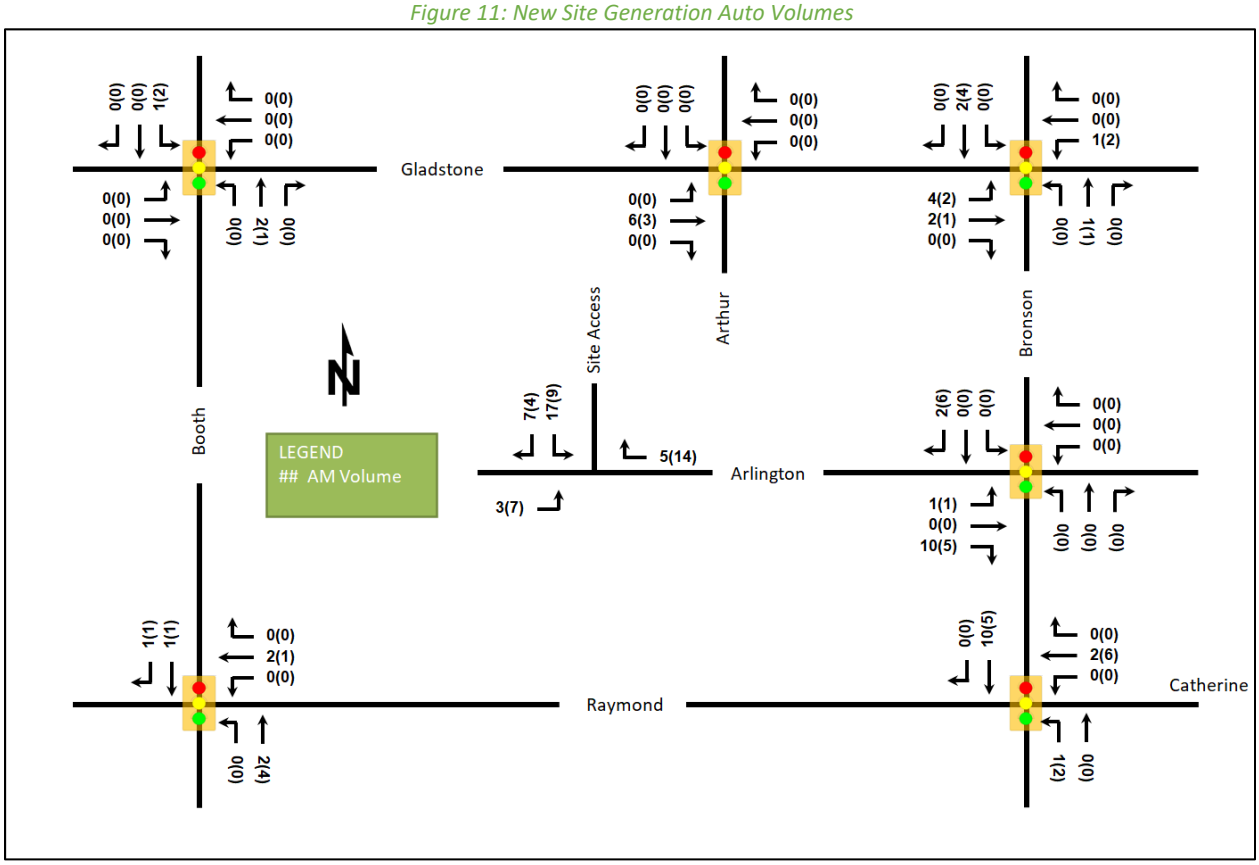
Table 12: OD Survey Distribution – Ottawa Inner

To/From	Residential % of Trips	Inbound Via	Outbound Via
North	30%	10% Booth St, 20% Bronson Ave	10% Booth St, 20% Bronson Ave
South	20%	10% Booth St, 10% Bronson Ave	5% Raymond, 5% Booth St, 10% Bronson Ave
East	40%	10% Gladstone Ave, 30% Catherine St	10% Gladstone Ave, 30% Bronson Ave (S)
West	10%	Booth St (S)	Raymond
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 11 illustrates the new site generated volumes.

Figure 11: 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. The Gladstone Avenue safety improvements are assumed not to change the lane and intersection arrangements.

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 13 summarizes the results of the model, and the projections are provided in Appendix E.

Table 13: TRANS Regional Model Projections – Study Area Growth Rates

Street	Direction Growth % from 2011 to 2031	
	Eastbound	**Westbound**
Gladstone Ave	2.95%	1.70%
Catherine St	-	1.04%
	Northbound	**Southbound**
Booth St	0.97%	0.86%
Bronson Ave	0.51%	0.84%

Within the study area, growth within the range of 0.5% to 3.0% is forecasted by the TRANS model on all links. The mainline arterial and major collector volumes throughout the study area, and the northbound and westbound left-turn volumes at the intersection of Bronson Avenue at Catherine Street/Raymond Street will be grown at the

annual rates identified in Table 13, rounded the nearest 0.25%. Growth will be applied in the appropriate directions during the AM peak hour and reversed during the PM peak hour.

6.3 Other Developments

As outlined in Section 6.2, as there are no active background development applications with TIAs, none will be explicitly considered within the future background volumes.

While the existing land use for the portion of the site that is to be redeveloped is estimated to generate 12-to-18 two-way people trips during the PM peak hour, these volumes will not be subtracted from the study area road network.

7 Demand Rationalization

7.1 2025 Future Background Operations

Figure 12 illustrates the 2025 background volumes and Table 14 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. The synchro worksheets for the 2025 future background horizon are provided in Appendix F.

Figure 12: 2025 Future Background Volumes

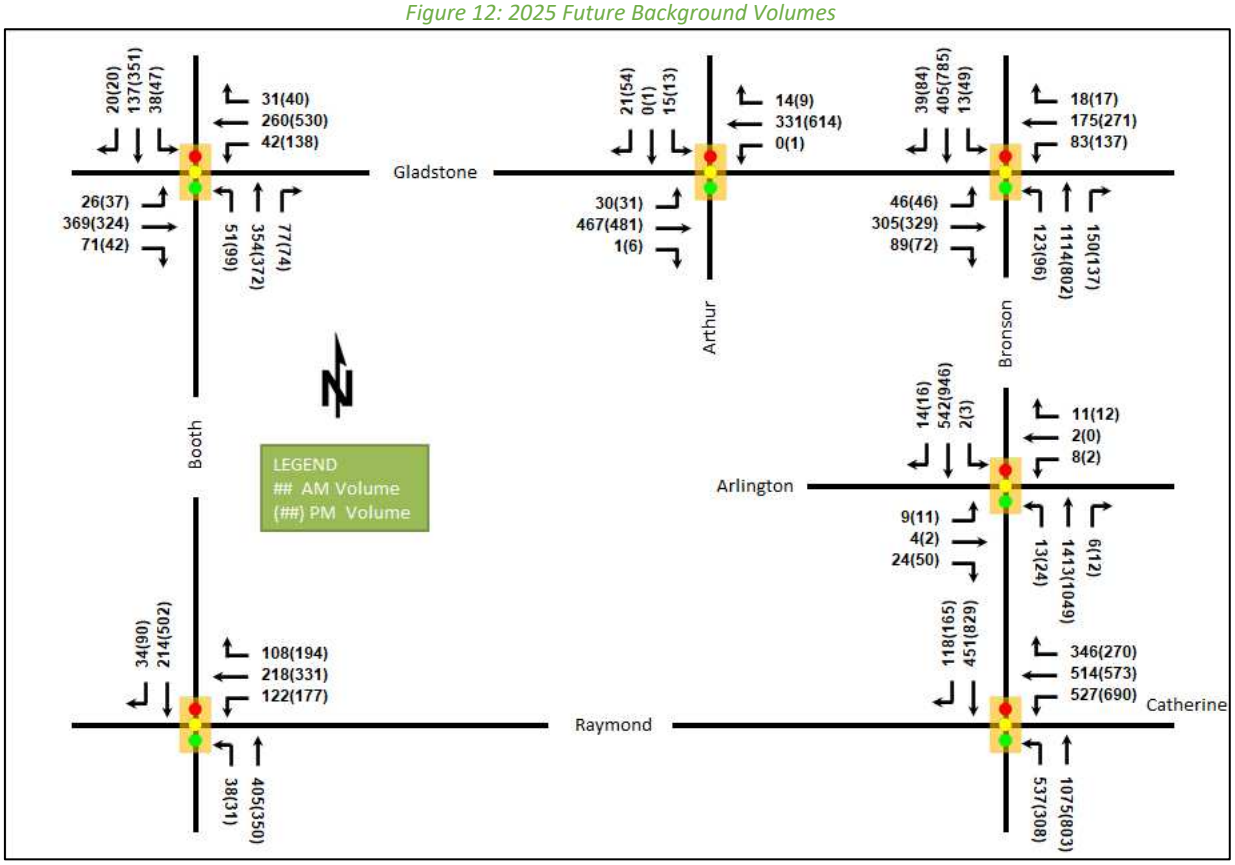


Table 14: 2025 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Catherine Street/Raymond Street *Signalized*	WBL	E	1.00	**90.9**	**#156.7**	**F**	**1.02**	**88.2**	**#156.3**
	WBT/R	E	0.95	54.4	**#108.0**	E	0.98	56.2	**#113.2**
	NBL	D	0.90	36.8	**#111.4**	D	0.86	44.5	**#79.6**
	NBT	A	0.52	12.3	77.2	A	0.40	11.2	51.8
	SBT/R	C	0.77	51.8	77.9	D	0.83	26.0	**#128.7**
	Overall	**E**	**0.97**	**42.2**	-	**E**	**0.94**	**40.4**	-
Bronson Avenue at Arlington Avenue *Signalized*	EB	A	0.20	24.3	11.7	A	0.28	17.7	13.3
	WB	A	0.13	29.0	9.0	A	0.07	9.4	3.7
	NB	A	0.56	4.4	m44.5	A	0.45	2.9	m29.4
	SB	A	0.23	3.3	22.0	A	0.38	2.0	16.5
	Overall	**A**	**0.52**	**4.7**	-	**A**	**0.42**	**3.0**	-
Bronson Avenue at Gladstone Avenue *Signalized*	EBL	A	0.14	24.2	14.2	A	0.12	17.9	12.3
	EBT/R	C	0.75	39.4	**#105.5**	A	0.56	24.7	85.3
	WBL	A	0.47	36.3	27.4	A	0.46	26.1	36.3
	WBT/R	A	0.36	27.0	45.3	A	0.39	21.0	57.4
	NBL	A	0.28	13.6	22.4	A	0.56	25.1	**#34.0**
	NBT/R	C	0.73	19.2	111.2	B	0.68	15.6	33.5
	SBL	A	0.10	12.9	4.4	A	0.33	26.0	16.2
	SBT/R	A	0.26	11.8	29.8	B	0.61	23.8	85.7
	Overall	**C**	**0.74**	**22.0**	-	**B**	**0.62**	**21.0**	-
Booth Street at Gladstone Avenue *Signalized*	EBL	A	0.08	13.4	6.1	A	0.17	15.1	9.2
	EBT/R	C	0.73	25.0	**#78.3**	A	0.47	16.9	57.6
	WBL	A	0.19	15.7	9.4	A	0.39	28.9	39.0
	WBT/R	A	0.48	17.3	41.6	C	0.72	34.0	124.6
	NBL	A	0.11	9.6	m6.0	A	0.36	22.7	23.4
	NBT/R	A	0.60	12.6	33.8	B	0.70	27.4	86.8
	SBL	A	0.12	12.1	7.5	A	0.21	20.1	12.7
	SBT/R	A	0.22	11.1	19.6	A	0.57	23.8	69.6
	Overall	**B**	**0.66**	**17.1**	-	**C**	**0.71**	**26.2**	-
Arthur Street / Arthur Lane at Gladstone Avenue *Signalized*	EB	A	0.40	8.0	60.0	A	0.43	5.8	30.5
	WB	A	0.27	6.7	36.8	A	0.49	8.5	72.5
	SB	A	0.09	4.5	3.7	A	0.23	12.3	11.3
	Overall	**A**	**0.37**	**7.4**	-	**A**	**0.43**	**7.5**	-
Booth Street at Raymond Street *Signalized*	WBL/T	B	0.62	22.7	54.3	**F**	**1.06**	**86.0**	**#127.5**
	WBR	A	0.20	4.7	8.4	A	0.36	5.5	13.1
	NBL	A	0.08	8.7	6.1	A	0.10	8.2	5.4
	NBT	A	0.48	12.6	47.1	A	0.36	9.7	38.0
	SBT/R	A	0.30	14.3	m25.1	B	0.62	13.5	75.4
	Overall	**A**	**0.53**	**15.1**	-	**C**	**0.77**	**33.7**	-

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 intersections at the 2025 future background horizon operate similarly to existing conditions with operational improvements noted generally with the peak hour factor of 1.00 for forecasted conditions.

The eastbound through/right movement at the intersection of Bronson Avenue and Gladstone Avenue may exhibit extended queuing during the AM peak hour at this horizon.

Signal timing optimization applied throughout the study area at both peak hours may reduce all movements v/c to 1.00 and below.

7.2 2030 Future Background Operations

Figure 13 illustrates the 2030 background volumes and Table 15 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. The synchro worksheets for the 2030 future background horizon are provided in Appendix G.

Figure 13: 2030 Future Background Volumes

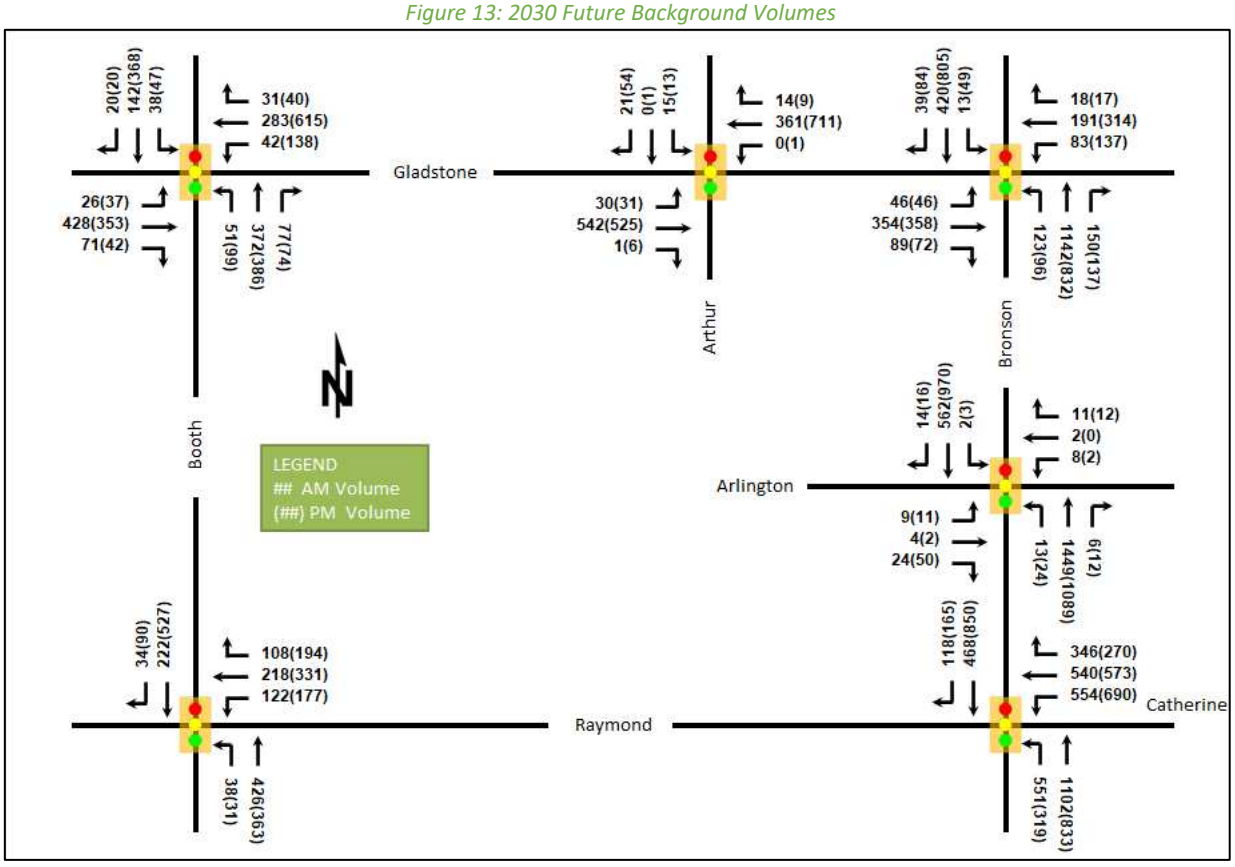


Table 15: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Catherine Street/Raymond Street *Signalized*	WBL	**F**	**1.04**	**99.8**	**#164.0**	**F**	**1.02**	**88.2**	**#156.3**
	WBT/R	E	0.99	62.0	**#115.8**	E	0.98	56.2	**#113.2**
	NBL	E	0.93	42.2	**#122.5**	D	0.90	51.7	**#88.2**
	NBT	A	0.53	12.5	80.0	A	0.42	11.4	54.2
	SBT/R	C	0.79	56.6	80.6	D	0.85	29.0	**#131.6**
	Overall	**F**	**1.01**	**47.1**	-	**E**	**0.96**	**41.6**	-
Bronson Avenue at Arlington Avenue *Signalized*	EB	A	0.20	24.3	11.7	A	0.28	17.7	13.3
	WB	A	0.13	29.0	9.0	A	0.07	9.4	3.7
	NB	A	0.57	4.4	m44.6	A	0.46	2.9	m30.0
	SB	A	0.23	3.4	22.9	A	0.39	1.9	15.2
	Overall	**A**	**0.54**	**4.7**	-	**A**	**0.43**	**2.9**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Gladstone Avenue *Signalized*	EBL	A	0.15	24.4	14.3	A	0.13	18.2	12.4
	EBT/R	D	0.84	46.0	**#125.4**	A	0.60	25.7	93.0
	WBL	A	0.58	45.8	**#33.2**	A	0.49	27.8	37.8
	WBT/R	A	0.39	27.6	48.8	A	0.45	22.1	67.1
	NBL	A	0.28	13.7	22.6	A	0.58	26.9	**#37.4**
	NBT/R	C	0.74	19.6	115.1	B	0.70	16.0	34.2
	SBL	A	0.11	13.2	4.5	A	0.35	27.3	16.7
	SBT/R	A	0.27	11.9	31.0	B	0.63	24.1	88.4
	Overall	**C**	**0.78**	**23.9**	**-**	**B**	**0.65**	**21.7**	**-**
Booth Street at Gladstone Avenue *Signalized*	EBL	A	0.08	13.5	6.2	A	0.22	17.3	10.0
	EBT/R	D	0.83	31.6	**#95.5**	A	0.51	17.6	63.5
	WBL	A	0.23	17.4	9.9	A	0.41	29.5	39.9
	WBT/R	A	0.51	18.1	45.5	D	0.83	39.2	**#150.1**
	NBL	A	0.11	10.0	m6.0	A	0.37	23.0	23.6
	NBT/R	B	0.63	13.3	36.8	C	0.72	28.3	90.5
	SBL	A	0.13	12.3	7.6	A	0.22	20.5	12.8
	SBT/R	A	0.22	11.2	20.2	A	0.60	24.5	73.3
	Overall	**C**	**0.72**	**19.8**	**-**	**C**	**0.78**	**28.4**	**-**
Arthur Street / Arthur Lane at Gladstone Avenue *Signalized*	EB	A	0.46	9.0	74.0	A	0.47	6.0	31.6
	WB	A	0.30	6.9	40.8	A	0.57	9.8	92.5
	SB	A	0.09	4.5	3.7	A	0.23	12.3	11.3
	Overall	**A**	**0.42**	**8.0**	**-**	**A**	**0.50**	**8.3**	**-**
Booth Street at Raymond Street *Signalized*	WBL/T	B	0.62	22.7	54.3	**F**	**1.06**	**86.0**	**#127.5**
	WBR	A	0.20	4.7	8.4	A	0.36	5.5	13.1
	NBL	A	0.08	8.7	6.1	A	0.11	8.3	5.4
	NBT	A	0.50	13.0	50.2	A	0.37	9.9	39.6
	SBT/R	A	0.31	14.6	m25.7	B	0.64	14.1	80.4
	Overall	**A**	**0.55**	**15.3**	**-**	**C**	**0.78**	**33.5**	**-**

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 intersections at the 2030 future background horizon operate similarly to the 2025 background and existing conditions.

In addition to the queueing noted at the 2025 horizon, extended queueing may be exhibited at this horizon on the westbound left movement at the intersection of Bronson Avenue and Gladstone Avenue during the AM peak hour, and on the westbound through/right movement at the intersection of Booth Street and Gladstone Avenue during the PM peak hour.

As in the existing conditions, the westbound left movement and the overall intersection are over theoretical capacity during the AM peak hour at the intersection of Bronson Avenue at Catherine Street/Raymond Street.

As in the 2025 background conditions, signal timing optimization may reduce all movements v/c to 1.00 and below.

7.3 Demand Rationalization Conclusions

While a few capacity constraints have been noted during both peak hours at the intersection of Bronson Avenue and Catherine Street/Raymond Street, and during the PM peak hour at the intersection of Booth Street and Raymond Street, signal optimization is a potential option to mitigate these constraints present at all horizons.

Given the unmodified district mode shares were applied, no further rationalization for the adjusted demand based upon the subject development is required.

8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a residential building. Parking is proposed across two underground levels and bike parking is proposed in a secure room adjacent to the Arlington Avenue access, in the underground parking facilities via the Arlington Avenue access, and in open racks adjacent to the loading bay and adjacent to the rear lane. Hard surface connections are provided between all building entrances and the surrounding pedestrian facilities. All local bus routes referenced in Section 2.2.5 are within 400 metres walk of the building entrances except for the eastbound route #55, and the future Gladstone LRT station is within 900 metres walk of the main building entrance.

The development design and infrastructure Transportation Demand Management (TDM) checklist is provided in Appendix H.

8.2 Circulation and Access

The site access is proposed via a full-movements access onto Arlington Avenue to the underground parking, and via a full-movements access onto Louisa Street to a loading bay and garbage storage.

Garbage collection is assumed to take place on Louisa Street, and as property fronts three public roadways, emergency services are assumed to be able to access the site via these rights of way.

9 Parking

9.1 Parking Supply

The site proposes the addition of 80 underground parking spaces across two parking levels and the retention of seven surface vehicle parking spaces in the rear lane for a total of 87 parking spaces.

The required vehicle parking for the entire site includes 64 residential tenants spaces, 13 residential visitor spaces, and 13 spaces for the existing land use. The shared use parking provisions reduce the existing land use (excluding 1.4 spaces for the instructional facility) and residential visitor parking to 21 total spaces. As a result, the site requires a total of 86 required parking spaces. Therefore, proposed redevelopment exceeds the minimum vehicle parking requirements.

Bicycle parking is proposed to include 74 spaces, 30 within the secure storage room on the first floor, 29 in storage rooms within the two parking levels, and 15 within the surface racks located near entrance locations.

The required bicycle parking for the proposed residential land use per the zoning by-law is 70 spaces and existing land use parking requirements are approximately four spaces for a total of 74 bicycle parking spaces. Therefore, the proposed redevelopment meets the minimum bicycle parking requirements.

The site plan provides a full breakdown of the parking requirements and numbers.

10 Boundary Street Design

Table 16 summarizes the MMLOS analysis for the boundary streets of Bell Street, Louisa Street, and Arlington Avenue. The existing and future conditions for each street 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" as each is within this distance of St. Anthony School. The MMLOS worksheets has been provided in Appendix I.

Table 16: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Bell Street	**C**	A	B	D	-	-	-	-
Louisa Street	**E**	A	B	D	-	-	-	-
Arlington Avenue	**E**	A	B	B	-	-	-	-

The boundary streets do not meet the pedestrian LOS targets. The existing sidewalks are 1.5-metres-wide, and to meet targets, sidewalks of 2.0 metres in width or more with boulevards of 0.5 metres in width or more would be required.

Given the local road context with low operating speeds and on-street parking, the boundary road pedestrian facilities are not recommended to be reconstructed. It is noted that the right-of-way may also reduce the ability to provide pedestrian facility upgrades, should the City explore those further in the future.

Crowding PLOS is not considered in the PLOS due to the excessively high-volume threshold. At the lowest threshold given, of 250 pedestrians per hour, the minimum effective sidewalk width required to achieve LOS A would be 3.0 metres, whereby nearly any sidewalk considered for installation in the City would not be able to meet this target.

11 Access Intersections Design

11.1 Location and Design of Access

The site plan uses the existing access locations on Arlington Avenue and Louisa Street. The Arlington Avenue access is a 6.0-metre full-movement access to the underground parking and the Louisa Avenue access will be reduced to a 4.5-metre full-movement access for the loading area.

11.2 Intersection Control

All accesses are assumed as being stop-controlled on the minor approaches with Louisa Street and Arlington Avenue operating under free-flow conditions.

11.3 Access Intersection Design

Due to the low site volumes at the site access and lack of pre-pandemic volumes for the local road network, the site access was not assessed for operational performance.

11.3.1 Access Intersection MMLOS

As the access intersections are unsignalized, no access intersection MMLOS analysis has been performed.

11.3.2 Recommended Design Elements

No design elements for the access intersections are proposed outside of the typical application of the provisions from the private approach by-law (by-law no. 2003-447).

12 Transportation Demand Management

12.1 Context for TDM

The mode shares used within the TIA represent the unmodified district mode shares. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided.

The subject site is not within a design priority area.

One hundred nine studio or one-bedroom units and 30 two-bedroom units are included in the site plan for a total bedroom count of 169. No age restrictions are noted.

12.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel followed by walking and transit. As the development is anticipated to generate 90 AM and 97 PM peak hour two-way person trips, risks associated with failure to achieve the area mode share targets are considered to be low for other network users.

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 H. The key TDM measures recommended include:

- Display local area information with walking/cycling maps and relevant transit schedules and route maps
- Provide a multimodal travel option information package to new residents
- Inclusion of a 1-year 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 purchase or rental costs

13 Neighbourhood Traffic Management

The proposed development will connect to the arterial road network through the local roads of Arlington Avenue, Bell Street, and Raymond Street, and the major collector roads of Gladstone Avenue and Booth Street. For the purposes of the NTM analysis, Booth Street, Gladstone Avenue, Raymond Street, and Bronson Avenue are considered the external study area roadways and Arlington Avenue, and Bell Street are considered the internal study area roadways.

As existing volumes are not available for Arlington Avenue west of the Bronson Avenue intersection, for Louisa Street, or for Bell Street, the projected site-generated proportion of total local road thresholds will be assessed for the internal study area roadways. The TIA guidelines prescribe a 120 vehicle per peak hour threshold for local road classification, which are considered two-way volumes per City guidance. The results of this analysis are summarized in Table 17.

Table 17: NTM Review of Internal Study Area Roadways – Relative Threshold Proportions

Segment	AM Peak				PM Peak			
	EB	WB	Two-Way	Threshold %	EB	WB	Two-Way	Threshold %
Arlington Ave (east of access)	17	5	22	18%	9	14	23	19%
Arlington Ave (west of access)	3	7	10	8%	7	4	11	9%
Bell St	0	6	6	5%	0	3	3	3%

Volumes along Arlington Avenue east of the site access represent the most concentrated impacts of site-generated traffic comprising up to 19% of the local road classification thresholds. In the 2030 future total conditions, two-way volumes along Arlington Avenue on the west leg of its intersection with Bronson Avenue are forecasted to be 66 AM and 103 PM vehicles, or 55% of the thresholds during the AM peak and 86% during the PM peak. Therefore, the site traffic along Arlington Avenue will not increase the local traffic beyond the TIA thresholds for a local road.

The external study area roadways of Gladstone Avenue and Booth Street are subject to the major collector thresholds, and Raymond Street to the local road thresholds. The TIA guidelines prescribe a 600 vehicle per peak hour threshold for major collector road classification, and a 120 vehicle per peak hour threshold for local road classification, which are considered two-way volumes per City guidance. The results of this analysis are summarized in Table 18.

Table 18: NTM Review of External Study Area Roadways

Segment	AM Peak			PM Peak		
	EB	WB	Two-Way	EB	WB	Two-Way
Gladstone Ave (east of Booth St)	415	303	718	408	609	1017
Gladstone Ave (west of Bronson Ave)	383	317	700	409	400	809
Raymond St (east of Booth St)	-	448	448	-	702	702
Segment	**AM Peak**			**PM Peak**		
	NB	**SB**	**Two-Way**	**NB**	**SB**	**Two-Way**
Booth St (south of Gladstone Ave)	458	243	701	526	507	1033
Booth St (north of Raymond St)	486	237	723	526	558	1084

All external study area roadways are over the thresholds for their classifications prescribed by the TIA guidelines. It is additionally noteworthy that one-way volumes on Raymond Street, a local road, are above even the major collector road thresholds. As the site-generated volumes are less than 1% of the existing two-way volumes on all study area roadways during both peak hours, and that no resultant functional change in the roadway classification is possible, no further NTM analysis is considered to be 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 19 summarizes the transit trip generation.

Table 19: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Transit	20%	4	14	18	12	7	19

The proposed development is anticipated to generate an additional 18 AM peak hour transit trips and 19 PM peak hour transit trips. Of these trips, 14 outbound AM trips and 12 inbound PM trips are anticipated. Given the number of area routes the increase in ridership anticipated is an averaged one-to-two riders per bus per route/direction.

14.2 Transit Priority

No transit priority is required explicitly for this study.

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 intersection volumes are illustrated in Figure 14 and the 2025 future total network intersection operations are summarized below in Table 20. 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 J.

Figure 14: 2025 Future Total Volumes

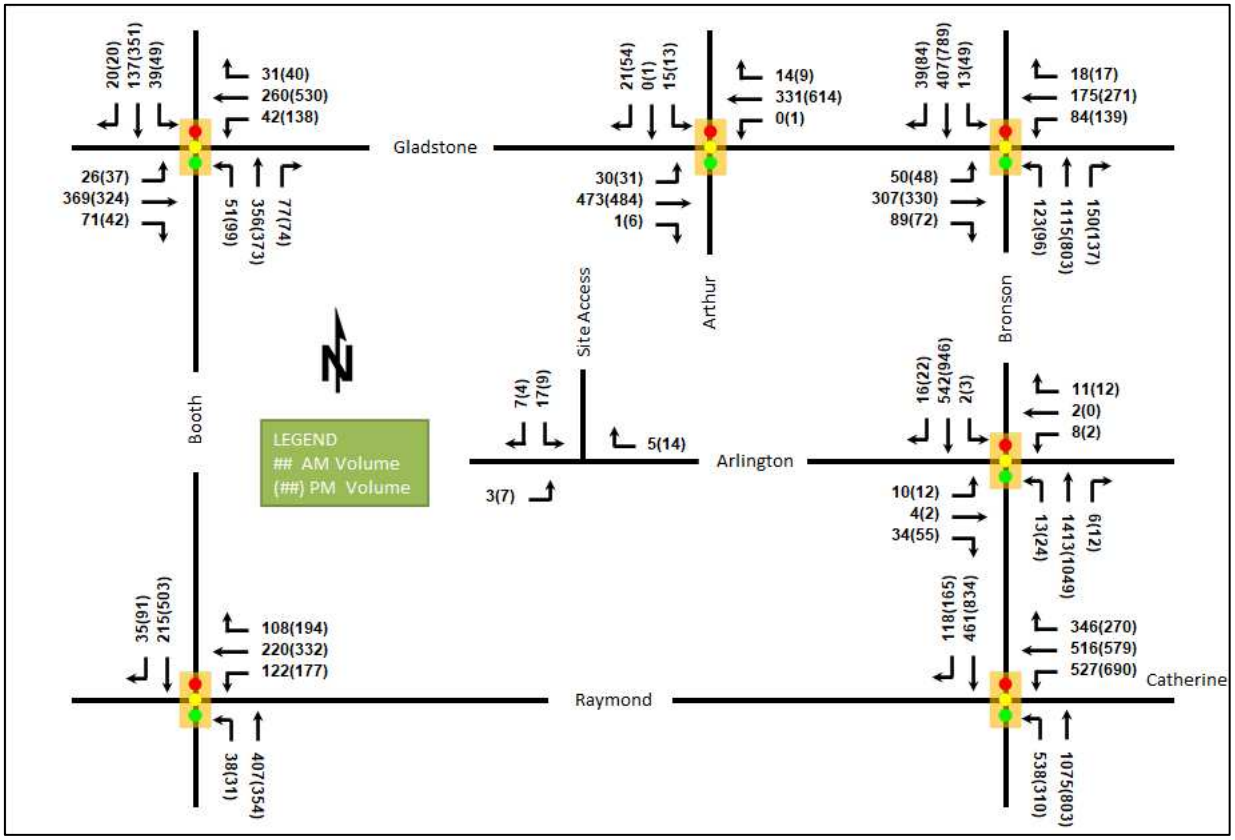


Table 20: 2025 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Catherine Street/Raymond Street *Signalized*	WBL	E	1.00	**90.9**	**#156.7**	**F**	**1.02**	**88.2**	**#156.3**
	WBT/R	E	0.95	55.0	**#108.7**	E	0.98	57.7	**#114.4**
	NBL	D	0.90	38.0	**#112.8**	D	0.87	46.0	**#81.5**
	NBT	A	0.52	12.3	77.2	A	0.40	11.2	51.8
	SBT/R	C	0.78	53.4	79.7	D	0.84	27.0	**#129.7**
	Overall	**E**	**0.98**	**42.9**	-	**E**	**0.95**	**41.3**	-
Bronson Avenue at Arlington Avenue *Signalized*	EB	A	0.23	21.7	13.1	A	0.31	17.6	14.0
	WB	A	0.12	28.1	9.0	A	0.07	9.4	3.7
	NB	A	0.57	4.9	m44.5	A	0.45	2.9	m29.4
	SB	A	0.23	3.7	22.0	A	0.39	2.0	16.3
	Overall	**A**	**0.52**	**5.2**	-	**A**	**0.42**	**3.0**	-
Bronson Avenue at Gladstone Avenue *Signalized*	EBL	A	0.15	24.5	15.2	A	0.13	18.0	12.5
	EBT/R	C	0.76	39.9	**#106.6**	A	0.56	24.8	85.6
	WBL	A	0.49	37.1	27.8	A	0.47	26.5	37.0
	WBT/R	A	0.36	27.0	45.3	A	0.39	21.0	57.4
	NBL	A	0.28	13.6	22.5	A	0.56	25.4	**#36.5**
	NBT/R	C	0.73	19.3	111.5	B	0.69	15.6	33.5
	SBL	A	0.10	12.9	4.4	A	0.33	26.1	16.3
	SBT/R	A	0.26	11.8	30.0	B	0.62	23.9	86.4
	Overall	**C**	**0.74**	**22.1**	-	**B**	**0.62**	**21.1**	-
Booth Street at Gladstone Avenue *Signalized*	EBL	A	0.08	13.4	6.1	A	0.17	15.1	9.2
	EBT/R	C	0.74	25.2	**#78.6**	A	0.47	16.9	57.7
	WBL	A	0.19	15.8	9.5	A	0.39	29.1	39.2
	WBT/R	A	0.48	17.3	41.6	C	0.72	34.0	124.5
	NBL	A	0.11	9.6	m6.0	A	0.36	22.7	23.4
	NBT/R	B	0.61	12.7	34.1	B	0.70	27.6	87.2
	SBL	A	0.13	12.2	7.7	A	0.22	20.4	13.0
	SBT/R	A	0.22	11.1	19.6	A	0.57	23.8	69.6
	Overall	**B**	**0.66**	**17.1**	-	**C**	**0.71**	**26.3**	-
Arthur Street / Arthur Lane at Gladstone Avenue *Signalized*	EB	A	0.40	8.1	61.1	A	0.43	5.9	31.0
	WB	A	0.27	6.7	36.9	A	0.49	8.5	72.5
	SB	A	0.09	4.5	3.7	A	0.23	12.4	11.3
	Overall	**A**	**0.37**	**7.4**	-	**A**	**0.43**	**7.6**	-
Booth Street at Raymond Street *Signalized*	WBL/T	B	0.62	22.9	54.6	**F**	**1.06**	**86.7**	**#127.8**
	WBR	A	0.20	4.7	8.4	A	0.36	5.5	13.1
	NBL	A	0.08	8.7	6.1	A	0.10	8.2	5.4
	NBT	A	0.48	12.6	47.5	A	0.36	9.8	38.5
	SBT/R	A	0.30	14.3	m25.2	B	0.62	13.5	75.8
	Overall	**A**	**0.54**	**15.2**	-	**C**	**0.77**	**33.8**	-

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

The network intersections at the 2025 future total horizon operate similarly to the 2025 future background conditions. No new operational issues are noted.

15.2.2 2030 Future Total Network Intersection Operations

The 2030 future total intersection volumes are illustrated in Figure 15 and the 2030 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 K.

Figure 15: 2030 Future Total Volumes

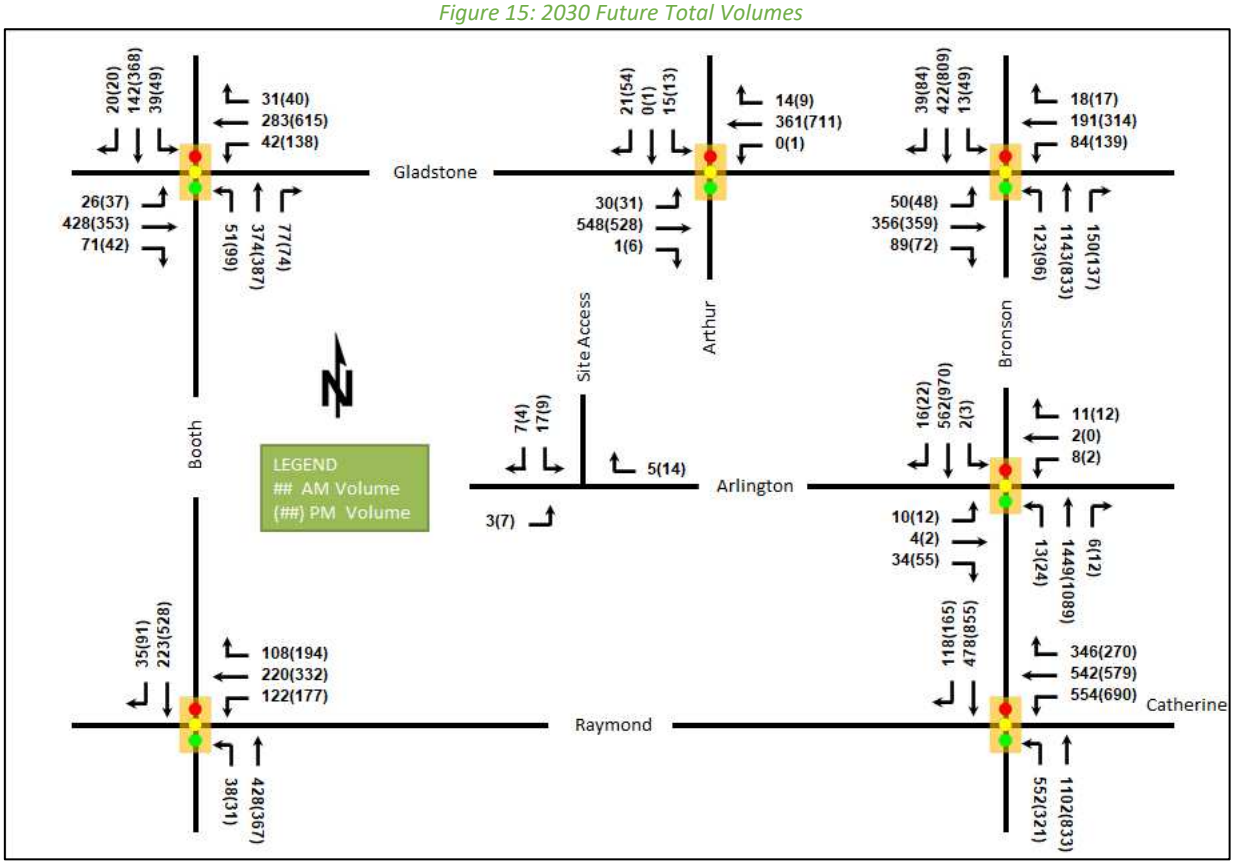


Table 21: 2030 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Catherine Street/Raymond Street ***Signalized***	WBL	**F**	**1.04**	**99.8**	**#164.0**	**F**	**1.02**	**88.2**	**#156.3**
	WBT/R	E	0.99	62.9	**#116.6**	E	0.98	57.7	**#114.4**
	NBL	E	0.94	43.7	**#124.3**	D	0.90	53.0	**#89.5**
	NBT	A	0.53	12.5	80.0	A	0.42	11.4	54.2
	SBT/R	D	0.81	58.0	**#83.0**	D	0.86	30.2	**#132.5**
	Overall	**F**	**1.02**	**47.9**	-	**E**	**0.97**	**42.5**	-
Bronson Avenue at Arlington Avenue ***Signalized***	EB	A	0.23	21.7	13.1	A	0.31	17.6	14.0
	WB	A	0.12	28.1	9.0	A	0.07	9.4	3.7
	NB	A	0.58	4.9	m44.6	A	0.47	2.9	m30.0
	SB	A	0.24	3.8	23.0	A	0.40	1.9	15.0
	Overall	**A**	**0.54**	**5.2**	-	**A**	**0.44**	**2.9**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Bronson Avenue at Gladstone Avenue *Signalized*	EBL	A	0.16	24.6	15.2	A	0.14	18.3	12.7
	EBT/R	D	0.85	46.8	**#126.9**	A	0.60	25.8	93.2
	WBL	A	0.60	47.3	**#34.0**	A	0.51	28.3	38.5
	WBT/R	A	0.39	27.6	48.8	A	0.45	22.1	67.1
	NBL	A	0.28	13.7	22.6	A	0.59	27.7	**#37.9**
	NBT/R	C	0.74	19.7	115.3	C	0.71	16.1	34.6
	SBL	A	0.11	13.2	4.5	A	0.35	27.5	16.8
	SBT/R	A	0.27	11.9	31.1	B	0.63	24.2	88.8
	Overall	**C**	**0.78**	**24.1**	-	**B**	**0.65**	**21.8**	-
Booth Street at Gladstone Avenue *Signalized*	EBL	A	0.08	13.5	6.2	A	0.22	17.3	10.0
	EBT/R	D	0.83	31.8	**#95.7**	A	0.51	17.7	63.5
	WBL	A	0.23	17.4	9.9	A	0.42	29.7	39.9
	WBT/R	A	0.52	18.1	45.5	D	0.83	39.2	**#150.0**
	NBL	A	0.11	10.0	m6.0	A	0.37	23.0	23.6
	NBT/R	B	0.63	13.4	37.2	C	0.72	28.5	90.9
	SBL	A	0.14	12.3	7.7	A	0.23	20.8	13.2
	SBT/R	A	0.22	11.2	20.2	A	0.60	24.5	73.3
	Overall	**C**	**0.72**	**19.8**	-	**C**	**0.78**	**28.5**	-
Arthur Street / Arthur Lane at Gladstone Avenue *Signalized*	EB	A	0.46	9.1	**#75.3**	A	0.47	6.1	32.0
	WB	A	0.30	6.9	40.8	A	0.57	9.8	92.5
	SB	A	0.09	4.5	3.7	A	0.23	12.4	11.3
	Overall	**A**	**0.43**	**8.1**	-	**A**	**0.50**	**8.4**	-
Booth Street at Raymond Street *Signalized*	WBL/T	B	0.62	22.9	54.6	**F**	**1.06**	**86.7**	**#127.8**
	WBR	A	0.20	4.7	8.4	A	0.36	5.5	13.1
	NBL	A	0.08	8.7	6.1	A	0.11	8.4	5.4
	NBT	A	0.50	13.0	50.6	A	0.37	9.9	40.2
	SBT/R	A	0.31	14.6	m0.0	B	0.65	14.2	81.2
	Overall	**A**	**0.55**	**15.3**	-	**C**	**0.79**	**33.6**	-

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

The network intersections at the 2030 future total horizon operate similarly to the 2030 future background conditions.

As in the existing conditions, during the AM peak hour at this horizon at the intersection of Bronson Avenue at Catherine Street/Raymond Street, the southbound through/right movement may exhibit extended queues.

The intersection of Arthur Street/Arthur Lane at Gladstone Avenue may also exhibit extended queues at this horizon.

15.2.3 Network Intersection MMLOS

Table 22 summarizes the MMLOS analysis for the network intersections of Bronson Avenue at Catherine Street/Raymond Street, Bronson Avenue at Arlington Avenue, Bronson Avenue at Gladstone Avenue, Arthur Street/Arthur Lane at Gladstone Avenue, Booth Street at Gladstone Avenue and Booth Street at Raymond Street. Where the existing and future conditions will be the same (all intersections except for Bronson Avenue at Catherine Street/Raymond Street), they are considered in one row. The intersection analysis is based on the policy area of "Within 300m of a school" (as being within this distance of either St. Anthony School or Cambridge Street Community Public School) for all but the Bronson Avenue at Catherine Street/Raymond Street intersection which

will be based upon the land use designation of "Traditional Main Street". The MMLOS worksheets has been provided in Appendix I.

Table 22: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Bronson Ave at Catherine St / Raymond St (Ex.)	**E**	B	**E**	D	**F**	D	D	D	**F**	D
Bronson Ave at Catherine St / Raymond St (Fut.)	**D**	B	**E**	D	**F**	D	D	D	**F**	D
Bronson Ave at Arlington Ave	**D**	A	**C**	B	B	D	-	-	A	E
Bronson Ave at Gladstone Ave	**D**	A	**E**	B	**F**	D	**F**	D	C	E
Arthur St / Arthur Ln at Gladstone Ave	**B**	A	**C**	B	B	D	-	-	A	E
Booth St at Gladstone Ave	**D**	A	**C**	B	**E**	D	-	-	**F**	E
Booth St at Raymond St	**C**	A	**C**	B	-	-	-	-	E	E

The MMLOS targets will not be met for the pedestrian and bicycle LOS at all study area network intersections, transit LOS at the Bronson Avenue at Catherine Street/Raymond Street, Bronson Avenue at Gladstone Avenue, and Booth Street at Gladstone Avenue intersection, truck LOS at the Bronson Avenue at Gladstone Avenue intersection, and auto LOS at the Bronson Avenue at Catherine Street/Raymond Street and Booth Street at Gladstone Avenue intersections.

For pedestrian LOS, a maximum crossing distance of two lane-widths at each crossing would be required to meet LOS A and a maximum crossing distance of three lane-widths would be required to meet LOS B.

Left-turn configurations govern the bicycle LOS on all approaches, and two-stage left turns or left-turn boxes would be required to meet LOS targets on all below-target approaches under the existing and planned lane arrangements.

To meet transit LOS, delay on the transit movements of the southbound and eastbound through movements at the Bronson Avenue at Catherine Street/Raymond Street intersection, the eastbound through and westbound through movements at the Bronson at Gladstone intersection, and the westbound through movement at the intersection of Booth Street at Gladstone Avenue would need to be reduced to 30 seconds or less.

To meet the truck LOS targets would require two receiving lanes on the Gladstone Avenue legs at its intersection with Bronson Avenue.

Pedestrian delay LOS is not considered in the PLOS calculation as it is not a suitable metric for the assessment of pedestrian LOS as formulated. This exclusion is consistent with City direction since 2015, and no alternative methodology has been provided for its assessment.

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 139 mid-rise apartment units
- Accesses to the underground parking will be provided onto Arlington Avenue, and a loading access is proposed onto Louisa Street, each at the location of an existing site access
- The development is proposed to be completed as a single phase by 2025
- The Trip Generation and Location Triggers were met for the TIA Screening
- This TIA is in support of a zoning by-law amendment and site plan application

Existing Conditions

- Bronson Avenue, Catherine Street, and Raymond Street east of the 417 on-ramp are arterial roads, and Booth Street and Gladstone Avenue are major collector roads in the study area
- Sidewalks are generally provided on both sides of the study area roadways, Gladstone Avenue, Booth Street, and Arlington Avenue are spine cycling routes, Arthur Street/Arthur Lane is a local route, and Arlington Avenue and Arthur Street/Arthur Lane are neighbourhood bikeways
- The high volumes roadways have produced a high number of collisions at the intersection of Bronson Avenue and Arlington Avenue, and the geometry may contribute to collisions at the intersection of Lebreton Street at Gladstone Avenue where the City may wish to restrict north-south through movements
- Some high delays and capacity issues are noted at the intersection of Bronson Avenue at Catherine Street/Raymond Street during both peak hours, and on the westbound movement at the intersection of Booth Street at Raymond Street during the PM peak hour

Development Generated Travel Demand

- The proposed development is forecasted produce 90 two-way people trips during the AM peak hour and 97 two-way people trips during the PM peak hour
- Of the forecasted people trips, 32 two-way trips will be vehicle trips during the AM peak hour and 34 two-way trips will be vehicle trips during the PM peak hour based on a 35% auto modal share target
- Of the forecasted trips, 30% are anticipated to travel north, 20% to travel south, 40% to travel east, and 10% to travel west

Background Conditions

- No background developments are within the study area, and an annual background growth rate based upon the TRANS model horizons was applied to the AM peak hour volumes and reversed for the PM peak hour for the mainline arterial and collector volumes
- The study area intersections at both horizons will operate similarly to the existing conditions additional queueing noted along Gladstone Avenue
- Signal timing optimization may be required for the network intersections to reduce all study area movements v/c ratios to 1.00 or below, should City Operations deem it to be required

Development Design

- Vehicle parking is proposed as being underground across two levels, bike parking as being located in secure storage on the first floor, in storage rooms on the parking levels and via surface racks

- Pedestrian connections will be made from all building entrances to the surrounding sidewalk facilities
- A full-movement access is proposed each onto Arlington Avenue to the underground parking and onto Louisa Street to a loading area, each in existing access locations
- Garbage collection is assumed to be on Louisa Street and emergency service access to the building is facilitated by its three public road frontages

Parking

- Vehicle parking of 80 underground spaces for vehicles is proposed along with the retention of seven surface vehicle parking spaces, and 74 bicycle spaces are proposed within a secure bike room, in the underground parking facilities, and on surface racks, meeting the minimum parking rates from the zoning by-law

Boundary Street Design

- The boundary streets will not meet pedestrian LOS targets due partly to their sidewalk and boulevard widths and partly due to the high targets set by the policy area
- Given the street context, the existing facilities, and the presence of on-street parking, no improvements are recommended as part of this study

Access Intersections Design

- An existing 6.0-metre full-movement access to underground parking is proposed to be conserved onto Arlington Avenue and a narrowing of an existing access to a 4.5-metre full-movement access to a loading area is proposed onto Louisa Street
- Stop-control on the accesses is assumed with the intersecting roadways operating under free flow
- No access intersection operational analysis has been performed due to unavailability of pre-pandemic data
- No specific recommendations or design elements are required outside of typical site design

TDM

- Supportive TDM measures to be included within the proposed development should include:
  - Display local area information with walking/cycling maps and relevant transit schedules and route maps
  - Provide a multimodal travel option information package to new residents
  - Inclusion of a 1-year 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 purchase or rental costs

NTM

- Volumes along Arlington Avenue will be lower than the TIA local road thresholds for local roads, and comprise less than 10% of the local road threshold volumes for Bell Street and Louisa Street
- Gladstone Avenue, Booth Street (major collector roads), and Raymond Street (local road) are above major collector road threshold volumes
- Site-generated volumes are less than 1% of volumes on Gladstone Avenue, Booth Street, and Raymond Street, and are considered negligible with respect to roadway classification

Transit

- Site-generated transit trips are forecasted to be 18 new AM and 19 new PM two-way transit trips based upon a 20% transit mode share target
- Ridership increases are anticipated to be one-to-two riders per bus per route/direction
- No specific transit priority measures were considered as part of this development

Network Intersection Design

- Network intersections at the future total horizons will perform similarly to the existing and future background horizons with additional queuing possible along Gladstone Avenue
- The MMLOS targets will not be met for the pedestrian and bicycle LOS at all study area intersections, transit LOS at the Bronson Avenue/Catherine Street/Raymond Street, the Bronson Avenue at Gladstone Avenue, and Booth Street at Gladstone Avenue intersections, truck LOS at the Bronson Avenue at Gladstone Avenue intersection, and auto LOS at the intersection of Bronson Avenue at Catherine Street/Raymond Street and Booth Street at Gladstone Avenue
- Improved cycling facilities, including left-turn configurations out of mixed flow could meet the LOS targets but due to the crossing distances, the pedestrian LOS cannot be met

17 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

John Kingsley, EIT
Transportation Engineering-Intern

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

CGH TRANSPORTATION

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 03-Mar-21
Project Number: 2021-015
Project Reference: Jennings 18 Louisa

1.1 Description of Proposed Development	
Municipal Address	18 Lousia Street
Description of Location	Existing Gladstone Sports & Health Centre
Land Use Classification	Institutional (I1A)
Development Size	137 apartment units, in addition to existing Gladstone Sports & Health Centre
Accesses	Existing accesses on Louisa St and Arlington Ave will remain. New access proposed to underground garage on Bell St, south of Louisa St intersection.
Phase of Development	Single Phase
Buildout Year	2025
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	138	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?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	No
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)?	No	
Is the proposed driveway within auxiliary lanes of an intersection?	No	
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?	No	Bronson, Gladstone, Booth and Hwy 417 have collisions, considered a result of the road classification rather than indicative of a "safety concern"
Does the development include a drive-thru facility?	No	
Safety Trigger	No	

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
Tel. : 613-580-2424
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

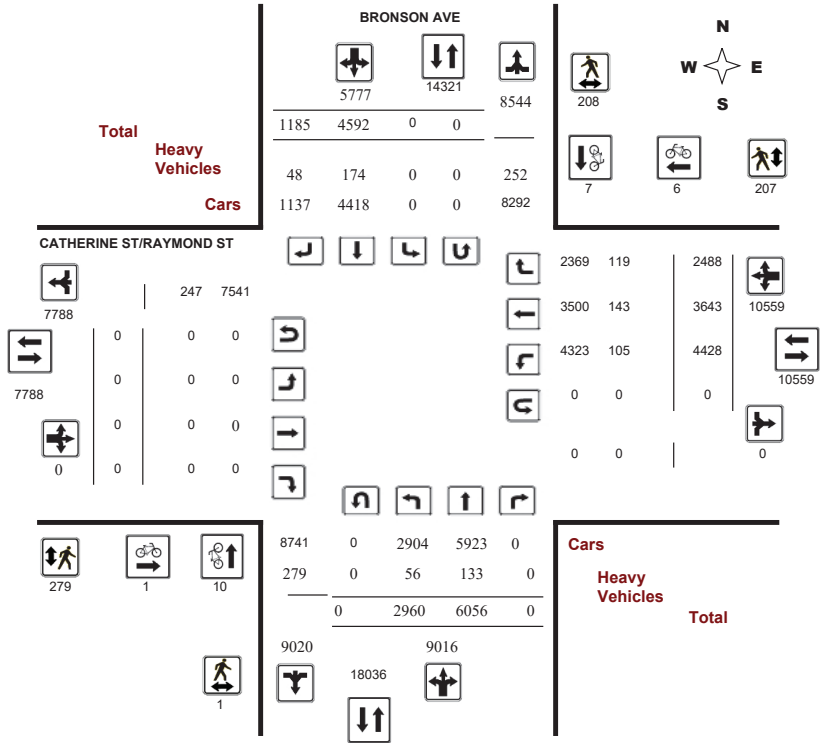
Turning Movement Count - Study Results

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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

Full Study Diagram



W.O. 5365004 - THURS APR 19TH - CONSULTANT - 48 HRS (REIMPORT - 8HR STANDARD)

Transportation Services - Traffic Services

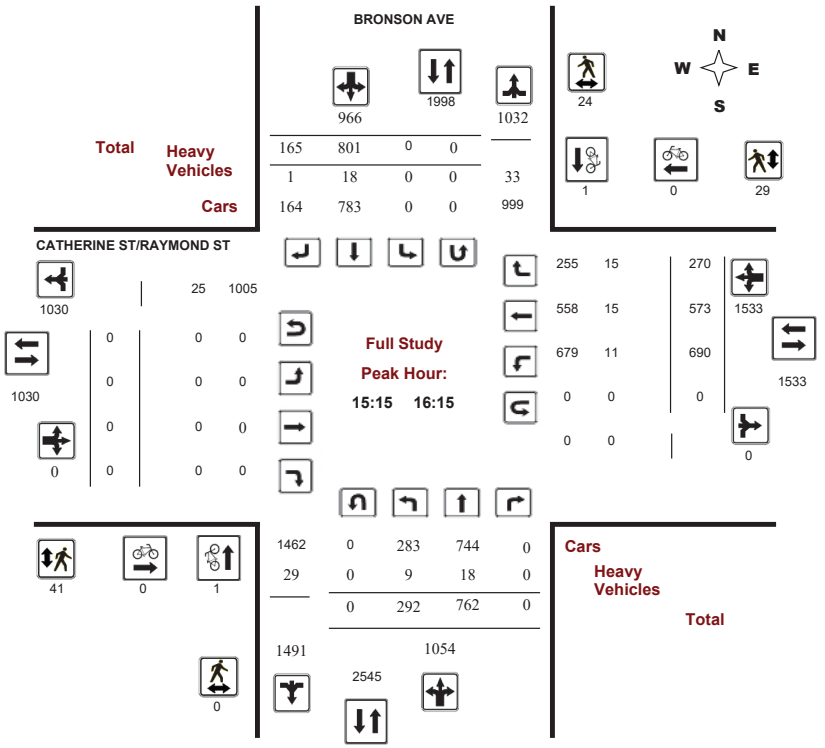
Turning Movement Count - Study Results

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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

Full Study Peak Hour Diagram



W.O. 5365004 - THURS APR 19TH - CONSULTANT - 48 HRS (REIMPORT - 8HR STANDARD)

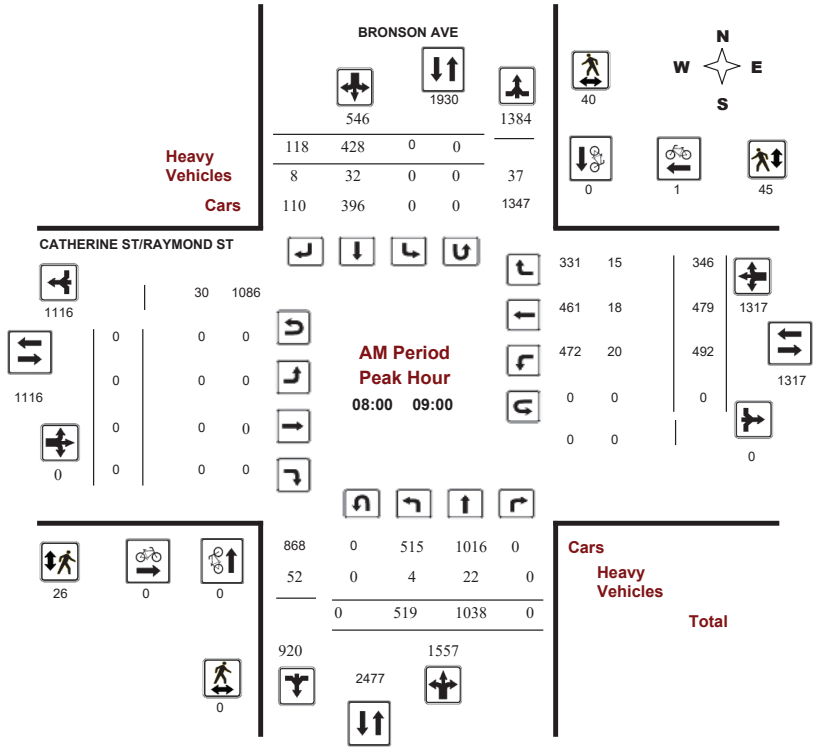
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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



Comments W.O. 5365004 - THURS APR 19TH - CONSULTANT - 48 HRS (REIMPORT - 8HR STANDAR

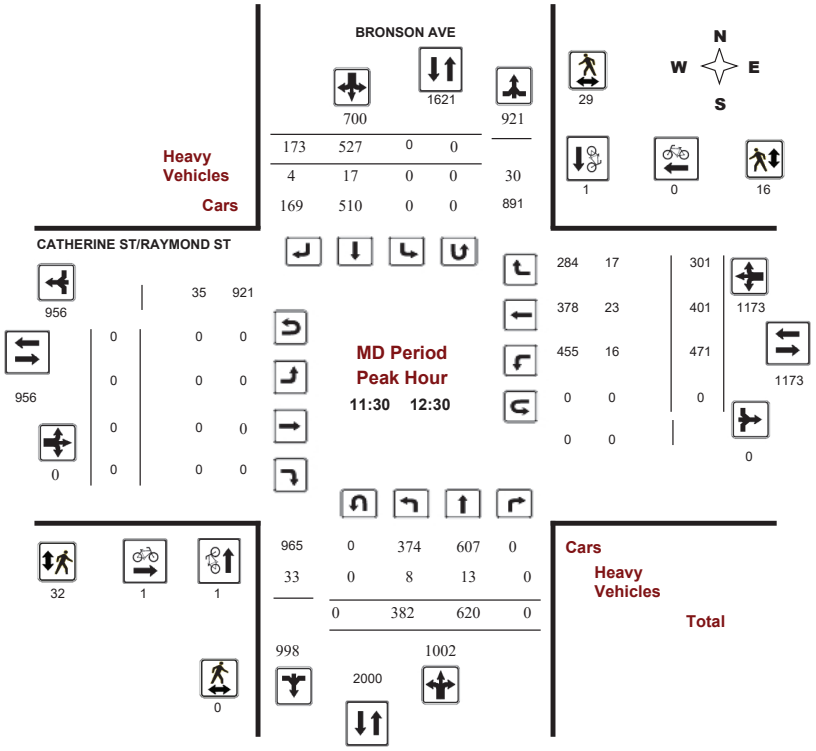
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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



Comments W.O. 5365004 - THURS APR 19TH - CONSULTANT - 48 HRS (REIMPORT - 8HR STANDAR

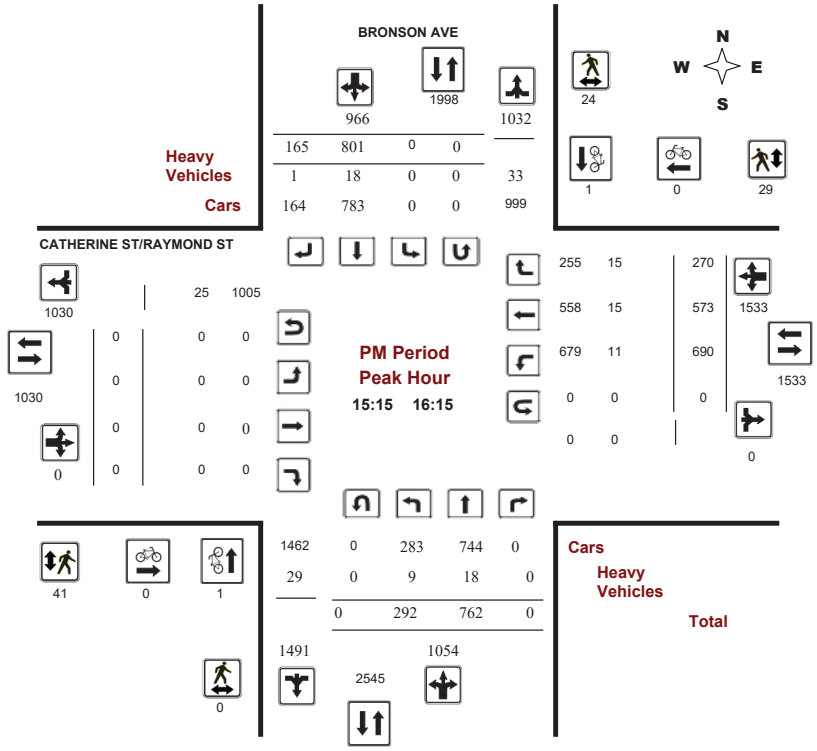
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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



Comments W.O. 5365004 - THURS APR 19TH - CONSULTANT - 48 HRS (REIMPORT - 8HR STANDAR

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, April 19, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

	BRONSON AVE								CATHERINE ST/RAYMOND ST								
	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	478	846	0	**1324**	0	428	140	**568**	**1892**	0	0	0	**0**	465	446	345	**1256**	**1256**	**3148**
08:00 09:00	519	1038	0	**1557**	0	428	118	**546**	**2103**	0	0	0	**0**	492	479	346	**1317**	**1317**	**3420**
09:00 10:00	387	699	0	**1086**	0	406	133	**539**	**1625**	0	0	0	**0**	480	403	329	**1212**	**1212**	**2837**
11:30 12:30	382	620	0	**1002**	0	527	173	**700**	**1702**	0	0	0	**0**	471	401	301	**1173**	**1173**	**2875**
12:30 13:30	349	568	0	**917**	0	560	167	**727**	**1644**	0	0	0	**0**	484	321	310	**1115**	**1115**	**2759**
15:00 16:00	299	747	0	**1046**	0	783	177	**960**	**2006**	0	0	0	**0**	697	517	299	**1513**	**1513**	**3519**
16:00 17:00	265	813	0	**1078**	0	733	130	**863**	**1941**	0	0	0	**0**	677	638	248	**1563**	**1563**	**3504**
17:00 18:00	281	725	0	**1006**	0	727	147	**874**	**1880**	0	0	0	**0**	662	438	310	**1410**	**1410**	**3290**
Sub Total	2960	6056	0	**9016**	0	4592	1185	**5777**	**14793**	0	0	0	**0**	4428	3643	2488	**10559**	**10559**	**25352**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	2960	6056	0	**9016**	0	4592	1185	**5777**	**14793**	0	0	0	**0**	4428	3643	2488	**10559**	**10559**	**25352**
EQ 12Hr	4114	8418	0	**12532**	0	6383	1647	**8030**	**20562**	0	0	0	**0**	6155	5064	3458	**14677**	**14677**	**35239**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	3490	7140	0	**10630**	0	5414	1397	**6811**	**18506**	0	0	0	**0**	5221	4295	2933	**12449**	**13209**	**31715**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**0.9**					
AVG 24Hr	4572	9353	0	**13925**	0	7092	1830	**8923**	**22848**	0	0	0	**0**	6839	5627	3843	**16308**	**16308**	**39156**

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 @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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

Full Study 15 Minute Increments

		BRONSON AVE									CATHERINE ST/RAYMOND ST									
		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	92	184	0	276	0	99	31	130	883	0	0	0	0	103	112	91	306	883	712
07:15	07:30	120	223	0	343	0	115	38	153	1036	0	0	0	0	113	99	89	301	1036	797
07:30	07:45	143	228	0	371	0	107	41	148	1061	0	0	0	0	118	115	89	322	1061	841
07:45	08:00	123	211	0	334	0	107	30	137	996	0	0	0	0	131	120	76	327	996	798
08:00	08:15	129	244	0	373	0	106	31	137	1064	0	0	0	0	131	122	73	326	1064	836
08:15	08:30	124	267	0	391	0	104	31	135	1119	0	0	0	0	132	125	90	347	1119	873
08:30	08:45	125	262	0	387	0	109	23	132	1118	0	0	0	0	136	128	92	356	1118	875
08:45	09:00	141	265	0	406	0	109	33	142	1106	0	0	0	0	93	104	91	288	1106	836
09:00	09:15	129	207	0	336	0	87	25	112	967	0	0	0	0	120	128	105	353	967	801
09:15	09:30	88	179	0	267	0	124	37	161	942	0	0	0	0	132	107	79	318	942	746
09:30	09:45	81	164	0	245	0	107	39	146	838	0	0	0	0	106	90	70	266	838	657
09:45	10:00	89	149	0	238	0	88	32	120	792	0	0	0	0	122	78	75	275	792	633
11:30	11:45	97	165	0	262	0	104	40	144	874	0	0	0	0	117	107	82	306	874	712
11:45	12:00	93	134	0	227	0	109	48	157	829	0	0	0	0	117	108	85	310	829	694
12:00	12:15	99	143	0	242	0	167	42	209	934	0	0	0	0	104	98	69	271	934	722
12:15	12:30	93	178	0	271	0	147	43	190	984	0	0	0	0	133	88	65	286	984	747
12:30	12:45	90	140	0	230	0	139	33	172	895	0	0	0	0	124	87	90	301	895	703
12:45	13:00	84	139	0	223	0	103	45	148	806	0	0	0	0	126	78	67	271	806	642
13:00	13:15	84	148	0	232	0	168	46	214	957	0	0	0	0	118	71	77	266	957	712
13:15	13:30	91	141	0	232	0	150	43	193	908	0	0	0	0	116	85	76	277	908	702
15:00	15:15	73	192	0	265	0	174	47	221	1117	0	0	0	0	184	104	81	369	1117	855
15:15	15:30	77	183	0	260	0	195	41	236	1124	0	0	0	0	169	136	81	386	1124	882
15:30	15:45	69	175	0	244	0	214	48	262	1156	0	0	0	0	191	139	70	400	1156	906
15:45	16:00	80	197	0	277	0	200	41	241	1135	0	0	0	0	153	138	67	358	1135	876
16:00	16:15	66	207	0	273	0	192	35	227	1128	0	0	0	0	177	160	52	389	1128	889
16:15	16:30	78	190	0	268	0	184	28	212	1084	0	0	0	0	183	170	47	400	1084	880
16:30	16:45	63	203	0	266	0	191	40	231	1122	0	0	0	0	157	162	74	393	1122	890
16:45	17:00	58	213	0	271	0	166	27	193	1078	0	0	0	0	160	146	75	381	1078	845
17:00	17:15	51	179	0	230	0	185	30	215	1066	0	0	0	0	174	138	83	395	1066	840
17:15	17:30	73	199	0	272	0	178	36	214	1121	0	0	0	0	173	119	85	377	1121	863
17:30	17:45	76	174	0	250	0	208	39	247	1103	0	0	0	0	150	89	74	313	1103	810
17:45	18:00	81	173	0	254	0	156	42	198	1014	0	0	0	0	165	92	68	325	1014	777
Total:		2960	6056	0	9016	0	4592	1185	5777	32357	0	0	0	0	4428	3643	2488	10559	32357	25,352

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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

Full Study Cyclist Volume

		BRONSON AVE			CATHERINE ST/RAYMOND ST			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	1	0	1	0	0	0	1
07:15	07:30	1	0	1	0	0	0	1
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	1	1	1
08:00	08:15	0	0	0	0	1	1	1
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	0	0	0	0
09:00	09:15	1	0	1	0	0	0	1
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	1	0	1	1
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	1	1	2	0	0	0	2
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	2	1	3	0	0	0	3
12:45	13:00	0	0	0	0	2	2	2
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	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	1	1	2	0	0	0	2
16:15	16:30	1	1	2	0	0	0	2
16:30	16:45	1	0	1	0	0	0	1
16:45	17:00	0	2	2	0	0	0	2
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	1	1	2	0	1	1	3
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	1	1	1
Total		10	7	17	1	6	7	24

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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

Full Study Pedestrian Volume

		BRONSON AVE			CATHERINE ST/RAYMOND ST			
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	2	**2**	3	6	**9**	**11**
07:15	07:30	0	6	**6**	5	6	**11**	**17**
07:30	07:45	0	6	**6**	4	5	**9**	**15**
07:45	08:00	0	2	**2**	4	9	**13**	**15**
08:00	08:15	0	6	**6**	7	7	**14**	**20**
08:15	08:30	0	11	**11**	8	15	**23**	**34**
08:30	08:45	0	12	**12**	4	8	**12**	**24**
08:45	09:00	0	11	**11**	7	15	**22**	**33**
09:00	09:15	0	8	**8**	9	11	**20**	**28**
09:15	09:30	0	4	**4**	4	1	**5**	**9**
09:30	09:45	0	6	**6**	8	1	**9**	**15**
09:45	10:00	0	4	**4**	10	2	**12**	**16**
11:30	11:45	0	5	**5**	9	6	**15**	**20**
11:45	12:00	0	11	**11**	7	3	**10**	**21**
12:00	12:15	0	12	**12**	6	5	**11**	**23**
12:15	12:30	0	1	**1**	10	2	**12**	**13**
12:30	12:45	0	9	**9**	13	8	**21**	**30**
12:45	13:00	0	5	**5**	10	2	**12**	**17**
13:00	13:15	0	7	**7**	8	8	**16**	**23**
13:15	13:30	0	2	**2**	5	4	**9**	**11**
15:00	15:15	0	8	**8**	20	12	**32**	**40**
15:15	15:30	0	14	**14**	11	18	**29**	**43**
15:30	15:45	0	4	**4**	12	3	**15**	**19**
15:45	16:00	0	1	**1**	8	3	**11**	**12**
16:00	16:15	0	5	**5**	10	5	**15**	**20**
16:15	16:30	0	7	**7**	7	10	**17**	**24**
16:30	16:45	0	7	**7**	6	4	**10**	**17**
16:45	17:00	0	4	**4**	8	8	**16**	**20**
17:00	17:15	0	12	**12**	14	8	**22**	**34**
17:15	17:30	0	5	**5**	11	3	**14**	**19**
17:30	17:45	1	5	**6**	18	5	**23**	**29**
17:45	18:00	0	6	**6**	13	4	**17**	**23**
Total	.....	1	208	**209**	279	207	**486**	**695**

W.O. 5365004 - THURS APR 19TH - CONSULTANT - 48 HRS (REIMPORT - 8HR STANDARD)

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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

Full Study Heavy Vehicles

		BRONSON AVE									CATHERINE ST/RAYMOND ST									
		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	1	1	0	**10**	0	6	8	**18**	**28**	0	0	0	**17**	2	8	3	**13**	**30**	**29**
07:15	07:30	2	3	0	**14**	0	7	4	**18**	**32**	0	0	0	**11**	2	5	4	**11**	**22**	**27**
07:30	07:45	2	5	0	**13**	0	4	5	**16**	**29**	0	0	0	**11**	2	4	2	**8**	**19**	**24**
07:45	08:00	4	2	0	**15**	0	6	6	**18**	**33**	0	0	0	**15**	3	5	4	**12**	**27**	**30**
08:00	08:15	2	2	0	**13**	0	5	2	**13**	**26**	0	0	0	**12**	4	8	4	**16**	**28**	**27**
08:15	08:30	1	9	0	**21**	0	7	1	**18**	**39**	0	0	0	**4**	4	2	1	**7**	**11**	**25**
08:30	08:45	1	8	0	**23**	0	9	2	**23**	**46**	0	0	0	**7**	5	4	4	**13**	**20**	**33**
08:45	09:00	0	3	0	**21**	0	11	3	**23**	**44**	0	0	0	**7**	7	4	6	**17**	**24**	**34**
09:00	09:15	8	6	0	**25**	0	7	2	**26**	**51**	0	0	0	**17**	4	7	11	**22**	**39**	**45**
09:15	09:30	1	7	0	**23**	0	10	1	**26**	**49**	0	0	0	**11**	5	9	8	**22**	**33**	**41**
09:30	09:45	2	5	0	**15**	0	4	2	**14**	**29**	0	0	0	**9**	4	5	3	**12**	**21**	**25**
09:45	10:00	3	5	0	**22**	0	5	0	**21**	**43**	0	0	0	**9**	9	6	11	**26**	**35**	**39**
11:30	11:45	2	3	0	**13**	0	2	0	**10**	**23**	0	0	0	**8**	6	6	5	**17**	**25**	**24**
11:45	12:00	3	4	0	**17**	0	6	4	**20**	**37**	0	0	0	**14**	4	7	6	**17**	**31**	**34**
12:00	12:15	2	3	0	**12**	0	6	0	**13**	**25**	0	0	0	**7**	1	5	4	**10**	**17**	**21**
12:15	12:30	1	3	0	**12**	0	3	0	**8**	**20**	0	0	0	**6**	5	5	2	**12**	**18**	**19**
12:30	12:45	2	6	0	**15**	0	6	1	**18**	**33**	0	0	0	**9**	1	6	5	**12**	**21**	**27**
12:45	13:00	0	3	0	**10**	0	3	1	**10**	**20**	0	0	0	**3**	4	2	3	**9**	**12**	**16**
13:00	13:15	1	5	0	**15**	0	6	0	**15**	**30**	0	0	0	**8**	3	7	4	**14**	**22**	**26**
13:15	13:30	4	4	0	**15**	0	4	0	**11**	**26**	0	0	0	**10**	3	6	3	**12**	**22**	**24**
15:00	15:15	0	6	0	**18**	0	9	2	**21**	**39**	0	0	0	**4**	3	2	4	**9**	**13**	**26**
15:15	15:30	2	8	0	**15**	0	2	0	**13**	**28**	0	0	0	**5**	3	3	3	**9**	**14**	**21**
15:30	15:45	2	4	0	**13**	0	5	1	**16**	**29**	0	0	0	**6**	2	3	6	**11**	**17**	**23**
15:45	16:00	4	3	0	**14**	0	5	0	**10**	**24**	0	0	0	**7**	2	3	2	**7**	**14**	**19**
16:00	16:15	1	3	0	**14**	0	6	0	**13**	**27**	0	0	0	**7**	4	6	4	**14**	**21**	**24**
16:15	16:30	1	4	0	**14**	0	7	1	**13**	**27**	0	0	0	**3**	2	1	1	**4**	**7**	**17**
16:30	16:45	1	1	0	**9**	0	6	0	**11**	**20**	0	0	0	**4**	1	3	4	**8**	**12**	**16**
16:45	17:00	0	4	0	**11**	0	4	0	**9**	**20**	0	0	0	**4**	3	4	1	**8**	**12**	**16**
17:00	17:15	0	3	0	**11**	0	5	0	**9**	**20**	0	0	0	**2**	3	2	1	**6**	**8**	**14**
17:15	17:30	0	2	0	**6**	0	2	0	**4**	**10**	0	0	0	**1**	2	1	0	**3**	**4**	**7**
17:30	17:45	2	5	0	**10**	0	2	2	**9**	**19**	0	0	0	**6**	1	2	0	**3**	**9**	**14**
17:45	18:00	1	3	0	**9**	0	4	0	**7**	**16**	0	0	0	**3**	1	2	0	**3**	**6**	**11**
Total:	None	56	133	0	**468**	0	174	48	**474**	**942**	0	0	0	**247**	105	143	119	**367**	**614**	**778**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ CATHERINE ST/RAYMOND ST

Survey Date: Thursday, April 19, 2018 **WO No:** 39598

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	CATHERINE ST/RAYMOND ST Eastbound U-Turn Total	CATHERINE ST/RAYMOND ST 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

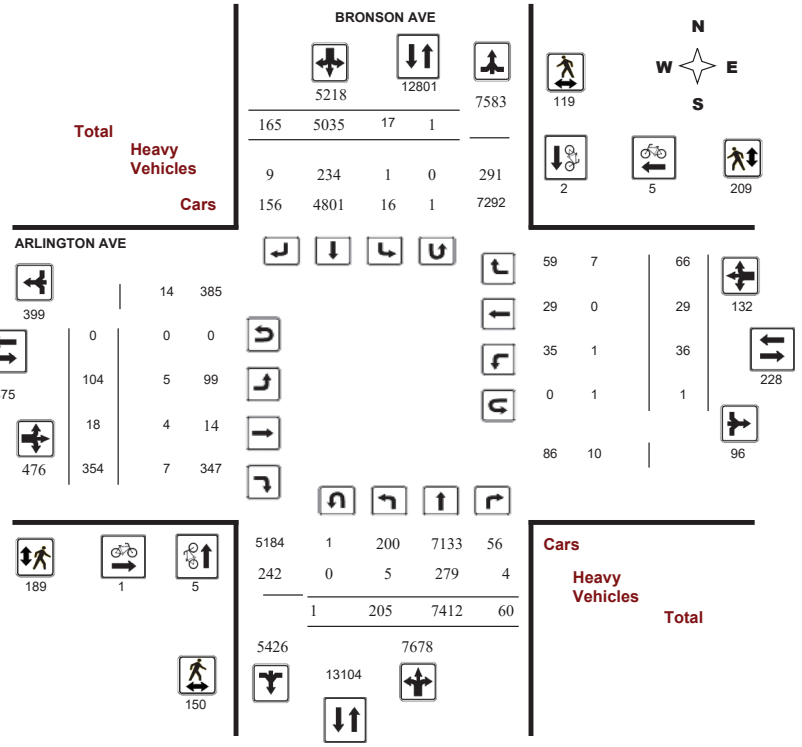
Turning Movement Count - Study Results

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study Diagram



Transportation Services - Traffic Services

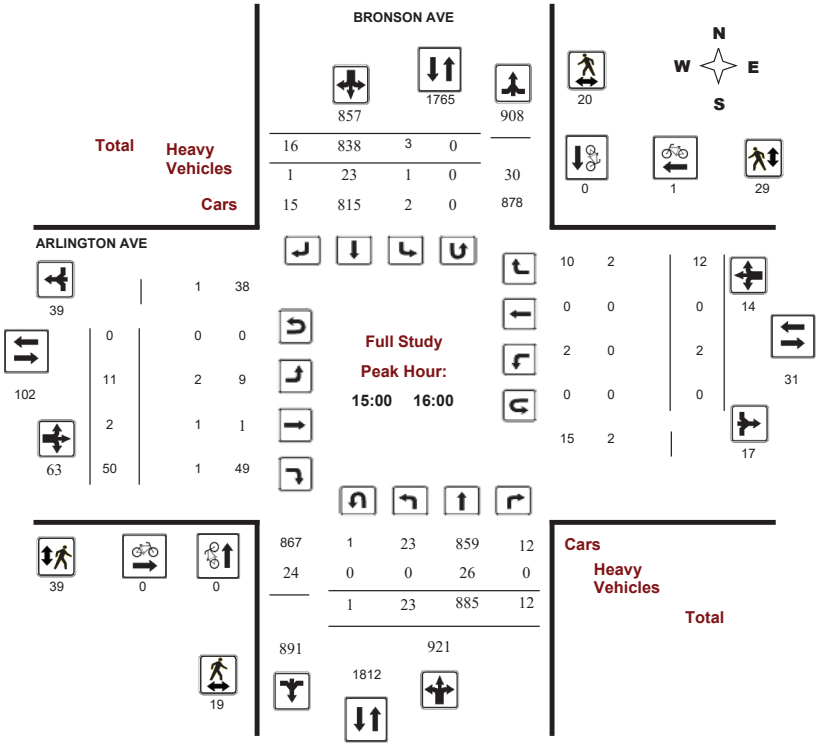
Turning Movement Count - Study Results

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study Peak Hour Diagram



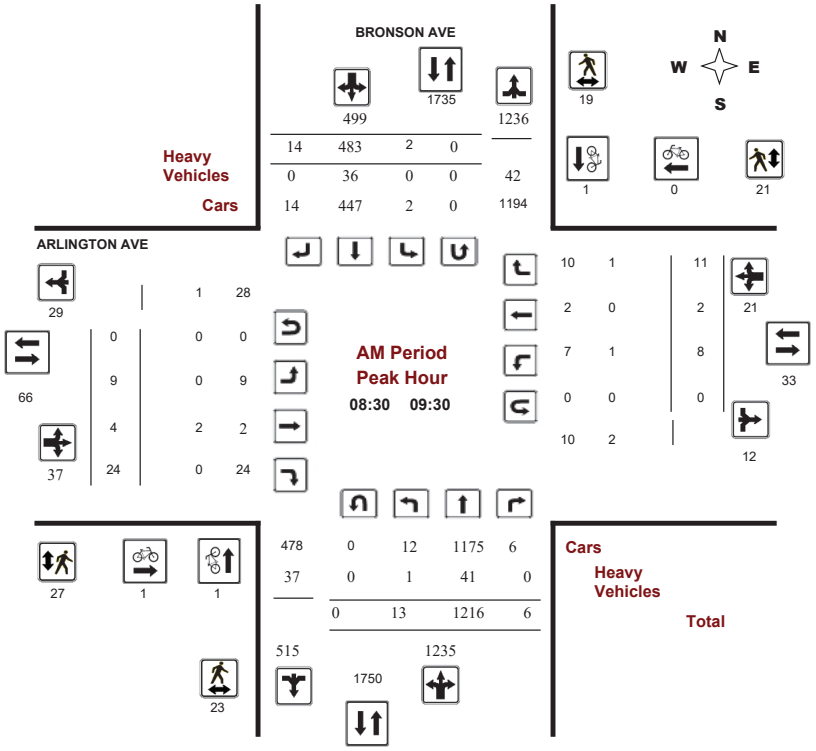
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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



Comments

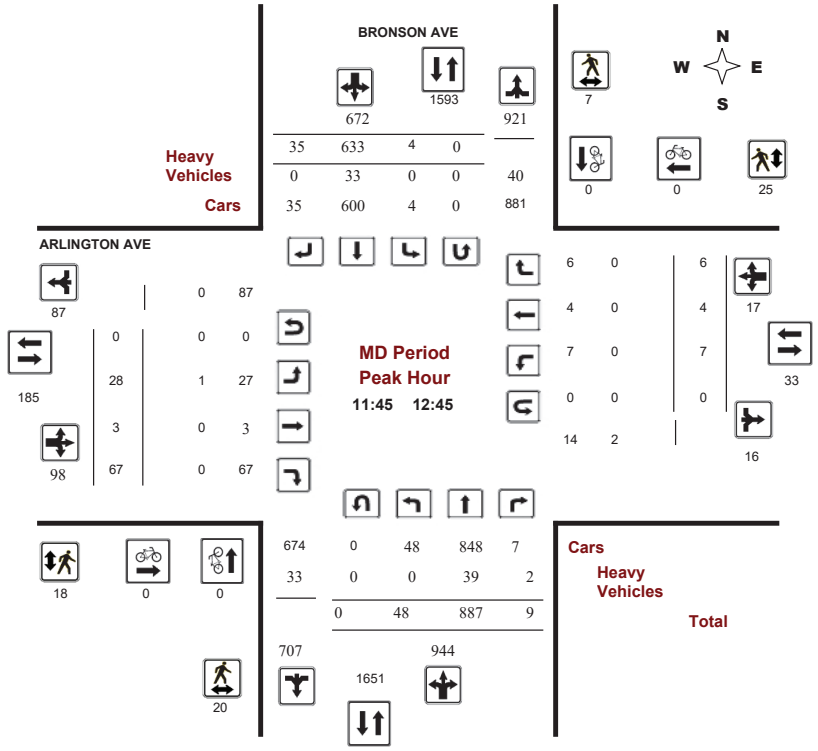
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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



Comments

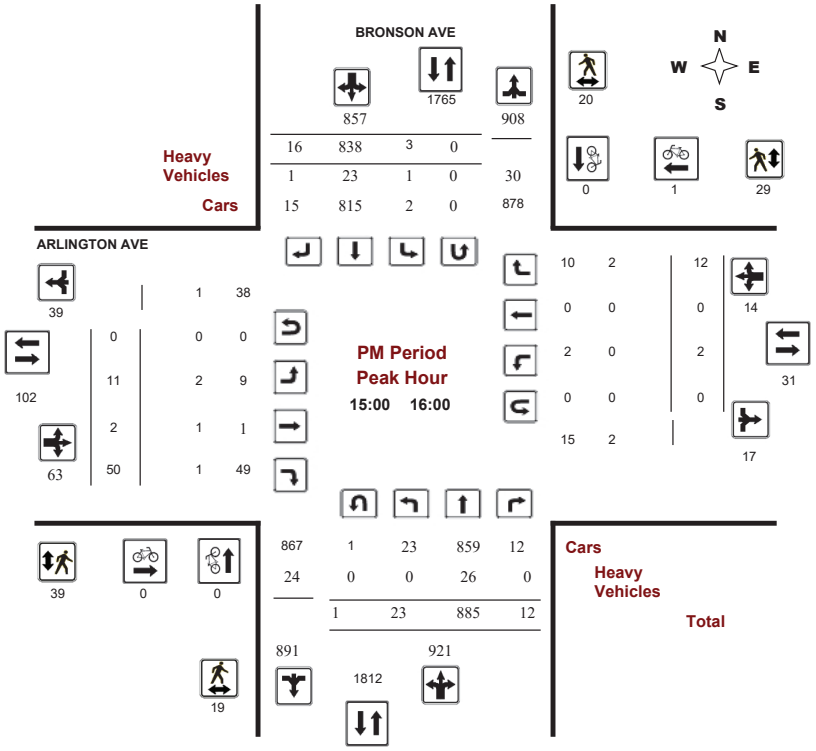
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, December 13, 2017

Total Observed U-Turns

Northbound: 1 Southbound: 1

Eastbound: 0 Westbound: 1

AADT Factor

1.00

	BRONSON AVE									ARLINGTON 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	7	962	6	**975**	1	507	6	**514**	**1489**	0	1	29	**30**	2	1	6	**9**	**39**	**1528**
08:00 09:00	7	1159	4	**1170**	0	484	17	**501**	**1671**	7	3	30	**40**	6	3	6	**15**	**55**	**1726**
09:00 10:00	24	1144	9	**1177**	3	481	10	**494**	**1671**	11	3	25	**39**	4	0	11	**15**	**54**	**1725**
11:30 12:30	46	858	9	**913**	5	607	37	**649**	**1562**	23	3	64	**90**	6	4	9	**19**	**109**	**1671**
12:30 13:30	37	840	7	**884**	3	596	33	**632**	**1516**	24	2	66	**92**	4	3	5	**12**	**104**	**1620**
15:00 16:00	23	885	12	**920**	3	838	16	**857**	**1777**	11	2	50	**63**	2	0	12	**14**	**77**	**1854**
16:00 17:00	23	791	9	**823**	1	772	19	**792**	**1615**	10	3	40	**53**	6	7	8	**21**	**74**	**1689**
17:00 18:00	38	773	4	**815**	1	750	27	**778**	**1593**	18	1	50	**69**	6	11	9	**26**	**95**	**1688**
Sub Total	205	7412	60	**7677**	17	5035	165	**5217**	**12894**	104	18	354	**476**	36	29	66	**131**	**607**	**13501**
U Turns	1			**1**	1			**1**	**2**	**0**			**0**	1			**1**	**1**	**3**
Total	206	7412	60	**7678**	18	5035	165	**5218**	**12896**	104	18	354	**476**	37	29	66	**132**	**608**	**13504**
EQ 12Hr	286	10303	83	**10672**	25	6999	229	**7253**	**17925**	145	25	492	**662**	51	40	92	**183**	**845**	**18770**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	286	10303	83	**10672**	25	6999	229	**7253**	**17925**	145	25	492	**662**	51	40	92	**183**	**845**	**18770**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1.00**					
AVG 24Hr	375	13497	109	**13981**	33	9169	300	**9502**	**23483**	190	33	645	**868**	67	52	121	**240**	**1108**	**24591**
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

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study 15 Minute Increments

		BRONSON AVE									ARLINGTON 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	222	3	227	0	117	0	117	**344**	0	0	5	5	0	0	2	2	**7**	**351**
07:15	07:30	3	206	0	209	0	139	4	143	**352**	0	0	6	6	0	0	2	2	**8**	**360**
07:30	07:45	2	262	2	266	1	117	0	118	**384**	0	0	9	9	0	0	2	2	**11**	**395**
07:45	08:00	0	272	1	273	0	134	2	136	**409**	0	1	9	10	2	1	0	3	**13**	**422**
08:00	08:15	2	273	0	275	0	120	3	123	**398**	1	0	3	4	1	0	0	1	**5**	**403**
08:15	08:30	3	269	2	274	0	117	5	122	**396**	3	0	13	16	1	1	1	3	**19**	**415**
08:30	08:45	2	292	1	295	0	125	1	126	**421**	2	3	10	15	3	0	2	5	**20**	**441**
08:45	09:00	0	325	1	326	0	122	8	130	**456**	1	0	4	5	1	2	3	6	**11**	**467**
09:00	09:15	5	303	2	310	1	119	5	125	**435**	1	1	9	11	3	0	4	7	**18**	**453**
09:15	09:30	6	296	2	304	1	117	0	118	**422**	5	0	1	6	1	0	2	3	**9**	**431**
09:30	09:45	4	288	2	294	1	130	2	133	**427**	1	0	7	8	0	0	3	3	**11**	**438**
09:45	10:00	9	257	3	269	0	115	3	118	**387**	4	2	8	14	0	0	2	2	**16**	**403**
11:30	11:45	7	200	2	209	2	128	8	138	**347**	2	1	12	15	0	1	5	6	**21**	**368**
11:45	12:00	12	227	3	242	2	156	7	165	**407**	5	0	13	18	3	2	3	8	**26**	**433**
12:00	12:15	15	226	2	243	1	163	12	176	**419**	8	2	26	36	2	0	1	3	**39**	**458**
12:15	12:30	12	205	2	219	0	160	10	170	**389**	8	0	13	21	1	1	0	2	**23**	**412**
12:30	12:45	9	229	2	240	1	154	6	161	**401**	7	1	15	23	1	1	2	4	**27**	**428**
12:45	13:00	10	202	2	214	0	140	7	147	**361**	6	1	21	28	1	0	1	2	**30**	**391**
13:00	13:15	11	197	1	209	1	150	11	162	**371**	8	0	13	21	1	2	2	5	**26**	**397**
13:15	13:30	7	212	2	221	1	152	9	162	**383**	3	0	17	20	1	0	0	1	**21**	**404**
15:00	15:15	10	198	4	212	1	225	3	229	**441**	1	1	11	13	1	0	4	5	**18**	**459**
15:15	15:30	5	225	1	231	1	213	5	219	**450**	3	1	13	17	1	0	1	2	**19**	**469**
15:30	15:45	3	231	3	237	1	206	2	209	**446**	3	0	10	13	0	0	4	4	**17**	**463**
15:45	16:00	6	231	4	241	0	194	6	200	**441**	4	0	16	20	0	0	3	3	**23**	**464**
16:00	16:15	3	192	3	198	0	209	2	211	**409**	3	1	8	12	3	1	2	6	**18**	**427**
16:15	16:30	6	216	2	224	0	199	10	209	**433**	2	0	9	11	2	1	1	4	**15**	**448**
16:30	16:45	4	179	2	185	0	170	3	173	**358**	1	2	13	16	1	3	1	5	**21**	**379**
16:45	17:00	10	204	2	216	1	194	4	199	**415**	4	0	10	14	1	2	4	7	**21**	**436**
17:00	17:15	3	189	0	192	0	214	6	220	**412**	4	0	11	15	1	3	2	6	**21**	**433**
17:15	17:30	9	193	0	202	1	207	3	211	**413**	4	1	10	15	0	3	4	7	**22**	**435**
17:30	17:45	6	187	1	194	1	169	6	176	**370**	6	0	10	16	1	3	1	5	**21**	**391**
17:45	18:00	20	204	3	227	0	160	12	172	**399**	4	0	19	23	4	2	2	8	**31**	**430**
Total:		206	7412	60	7678	18	5035	165	5218	**12896**	104	18	354	476	37	29	66	132	**12896**	**13,504**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study Cyclist Volume

Time Period		BRONSON AVE Northbound	BRONSON AVE Southbound	BRONSON AVE Street Total	ARLINGTON AVE Eastbound	ARLINGTON AVE Westbound	ARLINGTON AVE Street Total	Grand Total
07:00	07:15	2	0	**2**	0	0	**0**	**2**
07:15	07:30	0	0	**0**	0	1	**1**	**1**
07:30	07:45	1	0	**1**	0	0	**0**	**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	1	**1**	0	0	**0**	**1**
09:00	09:15	0	0	**0**	1	0	**1**	**1**
09:15	09:30	1	0	**1**	0	0	**0**	**1**
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	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	1	**1**	**1**
16:00	16:15	1	0	**1**	0	0	**0**	**1**
16:15	16:30	0	0	**0**	0	1	**1**	**1**
16:30	16:45	0	1	**1**	0	2	**2**	**3**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
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		5	2	**7**	1	5	**6**	**13**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study Pedestrian Volume

Time Period		BRONSON AVE NB Approach (E or W Crossing)	BRONSON AVE SB Approach (E or W Crossing)	BRONSON AVE Total	ARLINGTON AVE EB Approach (N or S Crossing)	ARLINGTON AVE WB Approach (N or S Crossing)	ARLINGTON AVE Total	Grand Total
07:00	07:15	2	0	**2**	4	3	**7**	**9**
07:15	07:30	0	0	**0**	4	2	**6**	**6**
07:30	07:45	3	3	**6**	5	7	**12**	**18**
07:45	08:00	3	1	**4**	5	6	**11**	**15**
08:00	08:15	4	1	**5**	5	4	**9**	**14**
08:15	08:30	4	3	**7**	10	8	**18**	**25**
08:30	08:45	8	5	**13**	8	12	**20**	**33**
08:45	09:00	5	5	**10**	10	5	**15**	**25**
09:00	09:15	7	4	**11**	2	2	**4**	**15**
09:15	09:30	3	5	**8**	7	2	**9**	**17**
09:30	09:45	5	5	**10**	5	5	**10**	**20**
09:45	10:00	2	1	**3**	3	3	**6**	**9**
11:30	11:45	7	3	**10**	4	10	**14**	**24**
11:45	12:00	11	2	**13**	6	6	**12**	**25**
12:00	12:15	3	1	**4**	7	7	**14**	**18**
12:15	12:30	3	2	**5**	2	7	**9**	**14**
12:30	12:45	3	2	**5**	3	5	**8**	**13**
12:45	13:00	6	8	**14**	3	3	**6**	**20**
13:00	13:15	0	3	**3**	1	3	**4**	**7**
13:15	13:30	2	3	**5**	5	1	**6**	**11**
15:00	15:15	5	2	**7**	10	5	**15**	**22**
15:15	15:30	5	4	**9**	20	14	**34**	**43**
15:30	15:45	7	7	**14**	5	4	**9**	**23**
15:45	16:00	2	7	**9**	4	6	**10**	**19**
16:00	16:15	5	7	**12**	3	7	**10**	**22**
16:15	16:30	7	7	**14**	7	9	**16**	**30**
16:30	16:45	0	2	**2**	1	5	**6**	**8**
16:45	17:00	5	7	**12**	6	9	**15**	**27**
17:00	17:15	6	1	**7**	6	26	**32**	**39**
17:15	17:30	1	6	**7**	7	5	**12**	**19**
17:30	17:45	13	7	**20**	14	7	**21**	**41**
17:45	18:00	13	5	**18**	7	11	**18**	**36**
Total	.....	150	119	**269**	189	209	**398**	**667**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study Heavy Vehicles

		BRONSON AVE									ARLINGTON 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	4	0	**4**	0	12	0	**12**	**16**	0	0	0	**0**	0	0	0	**0**	**0**	**16**
07:15	07:30	0	10	0	**10**	0	8	2	**10**	**20**	0	0	0	**0**	0	0	0	**0**	**0**	**20**
07:30	07:45	0	17	0	**17**	0	11	0	**11**	**28**	0	0	0	**0**	0	0	0	**0**	**0**	**28**
07:45	08:00	0	9	0	**9**	0	12	0	**12**	**21**	0	0	1	**1**	0	0	0	**0**	**1**	**22**
08:00	08:15	0	10	0	**10**	0	12	0	**12**	**22**	0	0	0	**0**	0	0	0	**0**	**0**	**22**
08:15	08:30	0	4	0	**4**	0	10	0	**10**	**14**	0	0	1	**1**	0	0	0	**0**	**1**	**15**
08:30	08:45	0	11	0	**11**	0	9	0	**9**	**20**	0	2	0	**2**	1	0	0	**1**	**3**	**23**
08:45	09:00	0	16	0	**16**	0	12	0	**12**	**28**	0	0	0	**0**	0	0	0	**0**	**0**	**28**
09:00	09:15	0	7	0	**7**	0	5	0	**5**	**12**	0	0	0	**0**	0	0	1	**1**	**1**	**13**
09:15	09:30	1	7	0	**8**	0	10	0	**10**	**18**	0	0	0	**0**	0	0	0	**0**	**0**	**18**
09:30	09:45	0	17	0	**17**	0	10	1	**11**	**28**	0	0	0	**0**	0	0	0	**0**	**0**	**28**
09:45	10:00	1	18	0	**19**	0	8	1	**9**	**28**	2	0	0	**2**	0	0	1	**1**	**3**	**31**
11:30	11:45	0	14	0	**14**	0	11	0	**11**	**25**	0	1	1	**2**	0	0	1	**1**	**3**	**28**
11:45	12:00	0	7	1	**8**	0	14	0	**14**	**22**	0	0	0	**0**	0	0	0	**0**	**0**	**22**
12:00	12:15	0	8	0	**8**	0	6	0	**6**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**14**
12:15	12:30	0	12	1	**13**	0	7	0	**7**	**20**	1	0	0	**1**	0	0	0	**0**	**1**	**21**
12:30	12:45	0	12	0	**12**	0	6	0	**6**	**18**	0	0	0	**0**	0	0	0	**0**	**0**	**18**
12:45	13:00	1	10	1	**12**	0	8	0	**8**	**20**	0	0	0	**0**	0	0	0	**0**	**0**	**20**
13:00	13:15	2	12	0	**14**	0	5	1	**6**	**20**	0	0	0	**0**	0	0	0	**0**	**0**	**20**
13:15	13:30	0	11	0	**11**	0	8	0	**8**	**19**	0	0	0	**0**	0	0	0	**0**	**0**	**19**
15:00	15:15	0	4	0	**4**	1	8	0	**9**	**13**	1	0	0	**1**	0	0	0	**0**	**1**	**14**
15:15	15:30	0	7	0	**7**	0	6	1	**7**	**14**	0	1	0	**1**	0	0	0	**0**	**1**	**15**
15:30	15:45	0	7	0	**7**	0	4	0	**4**	**11**	1	0	1	**2**	0	0	2	**2**	**4**	**15**
15:45	16:00	0	8	0	**8**	0	5	0	**5**	**13**	0	0	0	**0**	0	0	0	**0**	**0**	**13**
16:00	16:15	0	4	0	**4**	0	3	0	**3**	**7**	0	0	0	**0**	0	0	1	**1**	**1**	**8**
16:15	16:30	0	7	0	**7**	0	3	1	**4**	**11**	0	0	0	**0**	0	0	0	**0**	**0**	**12**
16:30	16:45	0	2	0	**2**	0	1	2	**3**	**5**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
16:45	17:00	0	7	0	**7**	0	2	0	**2**	**9**	0	0	2	**2**	0	0	0	**0**	**2**	**11**
17:00	17:15	0	3	0	**3**	0	8	0	**8**	**11**	0	0	0	**0**	0	0	1	**1**	**1**	**12**
17:15	17:30	0	6	0	**6**	0	5	0	**5**	**11**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
17:30	17:45	0	6	0	**6**	0	2	0	**2**	**8**	0	0	0	**0**	0	0	0	**0**	**0**	**8**
17:45	18:00	0	2	1	**3**	0	3	0	**3**	**6**	0	0	1	**1**	0	0	0	**0**	**1**	**7**
Total:	None	5	279	4	**288**	1	234	9	**244**	**532**	5	4	7	**16**	1	0	7	**8**	**24**	**557**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ARLINGTON AVE @ BRONSON AVE

Survey Date: Wednesday, December 13, 2017 **WO No:** 37368

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

Full Study 15 Minute U-Turn Total

		BRONSON AVE		ARLINGTON 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	1	0	0	0	**1**
16:00	16:15	0	0	0	0	**0**
16:15	16:30	0	0	0	1	**1**
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	1	0	0	**1**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	0	0	0	**0**
Total		1	1	0	1	**3**

Transportation Services - Traffic Services

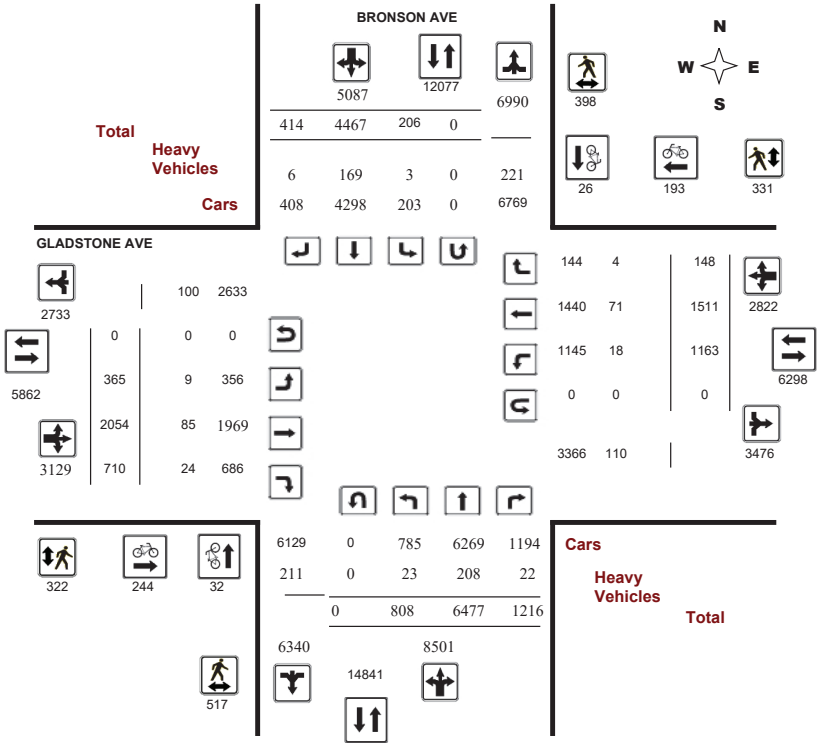
Turning Movement Count - Study Results

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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

Full Study Diagram



Transportation Services - Traffic Services

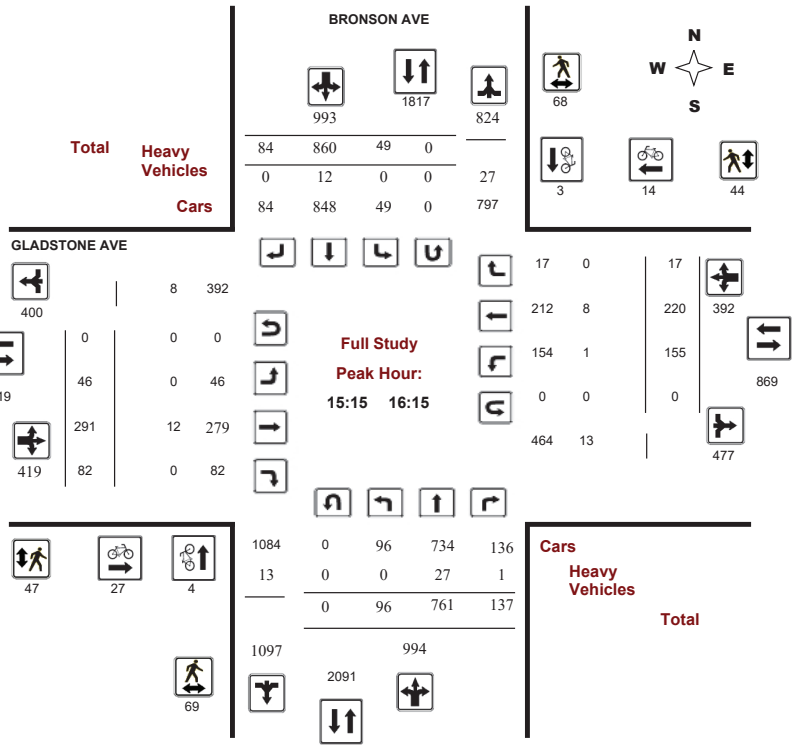
Turning Movement Count - Study Results

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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

Full Study Peak Hour Diagram



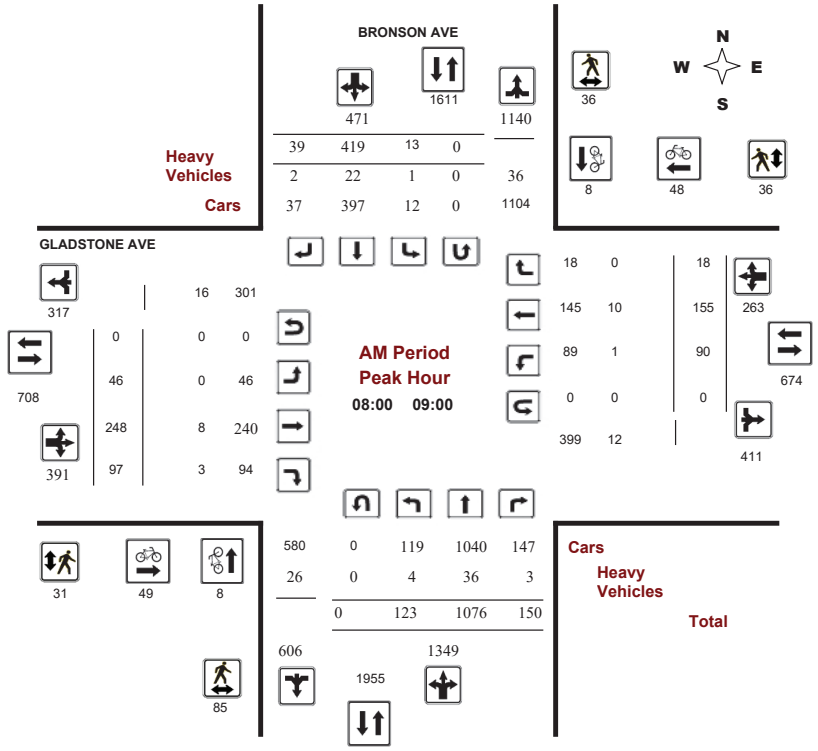
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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



Comments

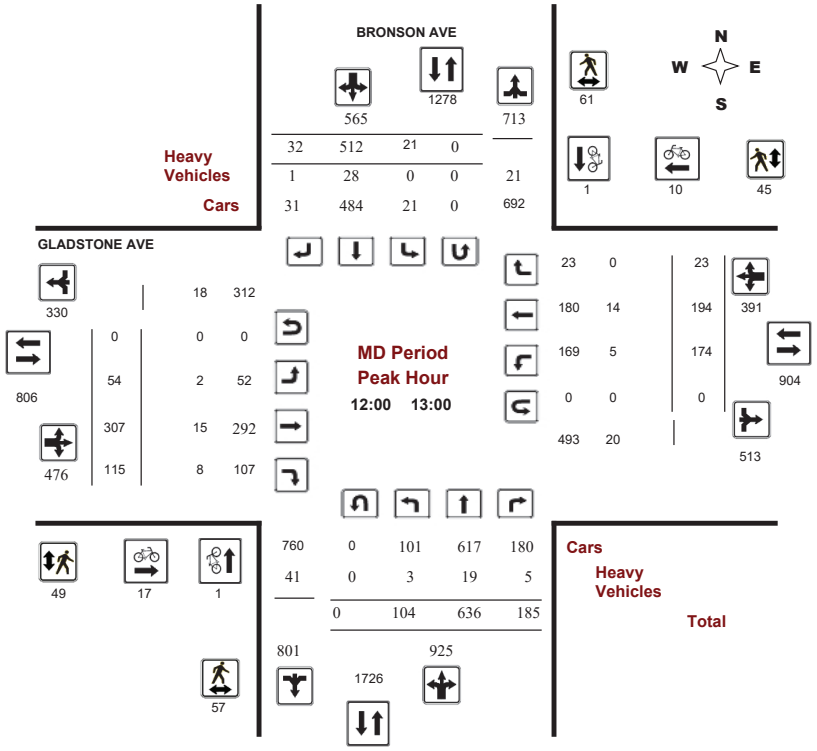
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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



Comments

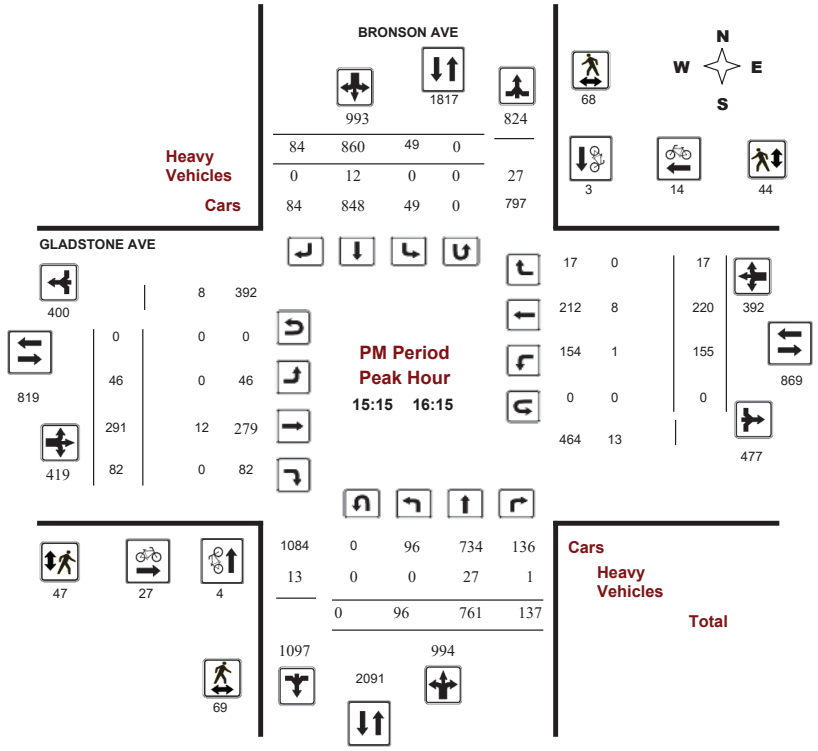
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, July 27, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

	BRONSON AVE								GLADSTONE 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	76	1075	109	**1260**	13	441	21	**475**	**1735**	37	190	58	**285**	112	103	8	**223**	**508**	**2243**
08:00 09:00	123	1076	150	**1349**	13	419	39	**471**	**1820**	46	248	97	**391**	90	155	18	**263**	**654**	**2474**
09:00 10:00	103	794	144	**1041**	10	419	32	**461**	**1502**	38	215	81	**334**	122	132	18	**272**	**606**	**2108**
11:30 12:30	103	625	186	**914**	28	485	30	**543**	**1457**	39	262	122	**423**	177	189	17	**383**	**806**	**2263**
12:30 13:30	108	621	181	**910**	25	494	28	**547**	**1457**	67	300	110	**477**	175	198	28	**401**	**878**	**2335**
15:00 16:00	86	757	145	**988**	50	862	70	**982**	**1970**	52	283	85	**420**	172	193	17	**382**	**802**	**2772**
16:00 17:00	108	757	150	**1015**	38	676	109	**823**	**1838**	39	273	80	**392**	144	311	25	**480**	**872**	**2710**
17:00 18:00	101	772	151	**1024**	29	671	85	**785**	**1809**	47	283	77	**407**	171	230	17	**418**	**825**	**2634**
Sub Total	808	6477	1216	**8501**	206	4467	414	**5087**	**13588**	365	2054	710	**3129**	1163	1511	148	**2822**	**5951**	**19539**
U Turns	0			**0**	0			**0**	**0**	**0**			**0**	0			**0**	**0**	**0**
Total	808	6477	1216	**8501**	206	4467	414	**5087**	**13588**	365	2054	710	**3129**	1163	1511	148	**2822**	**5951**	**19539**
EQ 12Hr	1123	9003	1690	**11816**	286	6209	575	**7070**	**18886**	507	2855	987	**4349**	1617	2100	206	**3923**	**8272**	**27158**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1011	8103	1521	**10635**	257	5588	518	**6363**	**16998**	456	2570	888	**3914**	1455	1890	185	**3530**	**7444**	**24442**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	1324	10615	1993	**13932**	337	7320	679	**8336**	**22268**	597	3367	1163	**5127**	1906	2476	242	**4624**	**9751**	**32019**
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 @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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

Full Study 15 Minute Increments

		BRONSON AVE									GLADSTONE 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	17	265	21	303	2	94	6	102	**405**	8	36	12	56	32	20	2	54	**110**	**515**
07:15	07:30	14	262	29	305	4	106	5	115	**420**	13	52	15	80	28	28	2	58	**138**	**558**
07:30	07:45	22	267	33	322	2	126	5	133	**455**	6	52	13	71	23	27	0	50	**121**	**576**
07:45	08:00	23	281	26	330	5	115	5	125	**455**	10	50	18	78	29	28	4	61	**139**	**594**
08:00	08:15	34	271	25	330	2	118	8	128	**458**	8	53	28	89	22	36	3	61	**150**	**608**
08:15	08:30	28	268	50	346	4	73	7	84	**430**	10	63	28	101	25	26	5	56	**157**	**587**
08:30	08:45	23	270	37	330	3	115	11	129	**459**	14	65	22	101	16	30	2	48	**149**	**608**
08:45	09:00	38	267	38	343	4	113	13	130	**473**	14	67	19	100	27	63	8	98	**198**	**671**
09:00	09:15	29	223	31	283	3	104	12	119	**402**	14	45	25	84	32	41	3	76	**160**	**562**
09:15	09:30	24	218	40	282	2	105	7	114	**396**	9	57	20	86	21	30	6	57	**143**	**539**
09:30	09:45	26	169	39	234	3	96	7	106	**340**	8	55	19	82	28	33	5	66	**148**	**488**
09:45	10:00	24	184	34	242	2	114	6	122	**364**	7	58	17	82	41	28	4	73	**155**	**519**
11:30	11:45	31	160	42	233	7	128	10	145	**378**	9	62	34	105	34	41	2	77	**182**	**560**
11:45	12:00	30	160	50	240	11	112	4	127	**367**	10	51	27	88	57	50	5	112	**200**	**567**
12:00	12:15	24	136	43	203	5	143	10	158	**361**	8	74	26	108	44	43	3	90	**198**	**559**
12:15	12:30	18	169	51	238	5	102	6	113	**351**	12	75	35	122	42	55	7	104	**226**	**577**
12:30	12:45	32	150	47	229	5	139	11	155	**384**	16	68	27	111	47	42	7	96	**207**	**591**
12:45	13:00	30	181	44	255	6	128	5	139	**394**	18	90	27	135	41	54	6	101	**236**	**630**
13:00	13:15	22	137	51	210	9	114	8	131	**341**	24	77	26	127	40	39	6	85	**212**	**553**
13:15	13:30	24	153	39	216	5	113	4	122	**338**	9	65	30	104	47	63	9	119	**223**	**561**
15:00	15:15	12	193	34	239	8	202	17	227	**466**	13	59	26	98	52	41	2	95	**193**	**659**
15:15	15:30	23	177	35	235	9	224	11	244	**479**	16	82	23	121	35	48	7	90	**211**	**690**
15:30	15:45	25	197	40	262	12	237	25	274	**536**	16	62	17	95	47	55	5	107	**202**	**738**
15:45	16:00	26	190	36	252	21	199	17	237	**489**	7	80	19	106	38	49	3	90	**196**	**685**
16:00	16:15	22	197	26	245	7	200	31	238	**483**	7	67	23	97	35	68	2	105	**202**	**685**
16:15	16:30	27	172	32	231	6	188	25	219	**450**	8	56	15	79	43	96	10	149	**228**	**678**
16:30	16:45	30	204	42	276	9	162	26	197	**473**	14	77	21	112	35	71	7	113	**225**	**698**
16:45	17:00	29	184	50	263	16	126	27	169	**432**	10	73	21	104	31	76	6	113	**217**	**649**
17:00	17:15	25	209	44	278	10	201	23	234	**512**	13	88	16	117	32	56	1	89	**206**	**718**
17:15	17:30	26	203	39	268	11	176	29	216	**484**	10	83	18	111	34	59	4	97	**208**	**692**
17:30	17:45	25	179	40	244	6	154	23	183	**427**	13	62	20	95	50	63	4	117	**212**	**639**
17:45	18:00	25	181	28	234	2	140	10	152	**386**	11	50	23	84	55	52	8	115	**199**	**585**
Total:		808	6477	1216	8501	206	4467	414	5087	**13588**	365	2054	710	3129	1163	1511	148	2822	**13588**	**19,539**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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

Full Study Cyclist Volume

		BRONSON AVE			GLADSTONE AVE			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	2	**2**	4	2	**6**	**8**
07:15	07:30	0	1	**1**	5	5	**10**	**11**
07:30	07:45	0	0	**0**	11	6	**17**	**17**
07:45	08:00	0	1	**1**	6	7	**13**	**14**
08:00	08:15	0	2	**2**	12	7	**19**	**21**
08:15	08:30	2	5	**7**	12	18	**30**	**37**
08:30	08:45	3	1	**4**	11	7	**18**	**22**
08:45	09:00	3	0	**3**	14	16	**30**	**33**
09:00	09:15	0	0	**0**	5	10	**15**	**15**
09:15	09:30	0	0	**0**	7	6	**13**	**13**
09:30	09:45	1	0	**1**	4	6	**10**	**11**
09:45	10:00	1	1	**2**	8	3	**11**	**13**
11:30	11:45	1	0	**1**	4	3	**7**	**8**
11:45	12:00	0	0	**0**	5	4	**9**	**9**
12:00	12:15	0	0	**0**	2	0	**2**	**2**
12:15	12:30	0	1	**1**	6	7	**13**	**14**
12:30	12:45	0	0	**0**	5	1	**6**	**6**
12:45	13:00	1	0	**1**	4	2	**6**	**7**
13:00	13:15	1	0	**1**	2	5	**7**	**8**
13:15	13:30	4	0	**4**	5	3	**8**	**12**
15:00	15:15	2	0	**2**	6	3	**9**	**11**
15:15	15:30	0	2	**2**	4	1	**5**	**7**
15:30	15:45	1	1	**2**	3	5	**8**	**10**
15:45	16:00	1	0	**1**	7	6	**13**	**14**
16:00	16:15	2	0	**2**	13	2	**15**	**17**
16:15	16:30	1	1	**2**	8	2	**10**	**12**
16:30	16:45	0	5	**5**	11	11	**22**	**27**
16:45	17:00	2	1	**3**	11	11	**22**	**25**
17:00	17:15	2	1	**3**	14	5	**19**	**22**
17:15	17:30	2	0	**2**	18	10	**28**	**30**
17:30	17:45	2	1	**3**	6	9	**15**	**18**
17:45	18:00	0	0	**0**	11	10	**21**	**21**
Total		32	26	**58**	244	193	**437**	**495**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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

Full Study Pedestrian Volume

		BRONSON AVE			GLADSTONE 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	2	3	**5**	4	9	**13**	**18**
07:15	07:30	9	4	**13**	5	7	**12**	**25**
07:30	07:45	14	6	**20**	9	9	**18**	**38**
07:45	08:00	20	7	**27**	9	7	**16**	**43**
08:00	08:15	16	10	**26**	3	8	**11**	**37**
08:15	08:30	22	10	**32**	7	9	**16**	**48**
08:30	08:45	21	5	**26**	7	10	**17**	**43**
08:45	09:00	26	11	**37**	14	9	**23**	**60**
09:00	09:15	11	7	**18**	6	9	**15**	**33**
09:15	09:30	8	4	**12**	4	6	**10**	**22**
09:30	09:45	7	8	**15**	8	2	**10**	**25**
09:45	10:00	11	6	**17**	1	10	**11**	**28**
11:30	11:45	8	26	**34**	16	4	**20**	**54**
11:45	12:00	16	16	**32**	5	14	**19**	**51**
12:00	12:15	13	9	**22**	16	11	**27**	**49**
12:15	12:30	9	28	**37**	14	7	**21**	**58**
12:30	12:45	20	9	**29**	10	14	**24**	**53**
12:45	13:00	15	15	**30**	9	13	**22**	**52**
13:00	13:15	15	4	**19**	8	5	**13**	**32**
13:15	13:30	16	18	**34**	9	14	**23**	**57**
15:00	15:15	6	12	**18**	9	11	**20**	**38**
15:15	15:30	15	21	**36**	16	9	**25**	**61**
15:30	15:45	16	14	**30**	10	11	**21**	**51**
15:45	16:00	19	10	**29**	10	8	**18**	**47**
16:00	16:15	19	23	**42**	11	16	**27**	**69**
16:15	16:30	21	19	**40**	13	12	**25**	**65**
16:30	16:45	21	7	**28**	13	20	**33**	**61**
16:45	17:00	17	15	**32**	13	13	**26**	**58**
17:00	17:15	34	15	**49**	7	10	**17**	**66**
17:15	17:30	25	27	**52**	25	13	**38**	**90**
17:30	17:45	22	21	**43**	20	13	**33**	**76**
17:45	18:00	23	8	**31**	11	18	**29**	**60**
Total	.....	517	398	**915**	322	331	**653**	**1568**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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

Full Study Heavy Vehicles

		BRONSON AVE									GLADSTONE 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	1	8	1	**10**	0	9	0	**9**	**19**	0	4	0	**4**	0	3	0	**3**	**7**	**26**
07:15	07:30	0	15	1	**16**	0	9	0	**9**	**25**	0	3	0	**3**	1	2	0	**3**	**6**	**31**
07:30	07:45	0	10	1	**11**	0	7	1	**8**	**19**	1	4	1	**6**	2	1	0	**3**	**9**	**28**
07:45	08:00	2	3	0	**5**	1	14	0	**15**	**20**	1	5	0	**6**	0	1	0	**1**	**7**	**27**
08:00	08:15	1	8	0	**9**	0	7	1	**8**	**17**	0	1	1	**2**	0	2	0	**2**	**4**	**21**
08:15	08:30	2	11	1	**14**	1	5	0	**6**	**20**	0	3	2	**5**	0	2	0	**2**	**7**	**27**
08:30	08:45	1	8	1	**10**	0	8	0	**8**	**18**	0	2	0	**2**	1	3	0	**4**	**6**	**24**
08:45	09:00	0	9	1	**10**	0	2	1	**3**	**13**	0	2	0	**2**	0	3	0	**3**	**5**	**18**
09:00	09:15	1	11	2	**14**	0	12	0	**12**	**26**	1	1	1	**3**	1	2	0	**3**	**6**	**32**
09:15	09:30	1	8	0	**9**	0	6	1	**7**	**16**	1	3	2	**6**	2	2	1	**5**	**11**	**27**
09:30	09:45	1	5	2	**8**	0	6	0	**6**	**14**	0	1	0	**1**	1	3	1	**5**	**6**	**20**
09:45	10:00	2	5	3	**10**	0	9	0	**9**	**19**	1	5	0	**6**	2	0	1	**3**	**9**	**28**
11:30	11:45	1	7	2	**10**	1	4	1	**6**	**16**	0	1	2	**3**	0	4	0	**4**	**7**	**23**
11:45	12:00	2	7	0	**9**	0	7	0	**7**	**16**	0	1	1	**2**	2	2	0	**4**	**6**	**22**
12:00	12:15	0	5	1	**6**	0	10	1	**11**	**17**	1	2	1	**4**	3	4	0	**7**	**11**	**28**
12:15	12:30	0	8	2	**10**	0	7	0	**7**	**17**	1	6	2	**9**	0	5	0	**5**	**14**	**31**
12:30	12:45	2	3	1	**6**	0	7	0	**7**	**13**	0	3	4	**7**	2	1	0	**3**	**10**	**23**
12:45	13:00	1	3	1	**5**	0	4	0	**4**	**9**	0	4	1	**5**	0	4	0	**4**	**9**	**18**
13:00	13:15	1	1	0	**2**	0	3	0	**3**	**5**	1	4	1	**6**	0	1	0	**1**	**7**	**12**
13:15	13:30	1	3	0	**4**	0	3	0	**3**	**7**	0	3	2	**5**	0	2	1	**3**	**8**	**15**
15:00	15:15	0	16	0	**16**	0	3	0	**3**	**19**	0	4	1	**5**	0	4	0	**4**	**9**	**28**
15:15	15:30	0	7	1	**8**	0	4	0	**4**	**12**	0	5	0	**5**	0	1	0	**1**	**6**	**18**
15:30	15:45	0	7	0	**7**	0	4	0	**4**	**11**	0	2	0	**2**	0	1	0	**1**	**3**	**14**
15:45	16:00	0	8	0	**8**	0	3	0	**3**	**11**	0	3	0	**3**	0	5	0	**5**	**8**	**19**
16:00	16:15	0	5	0	**5**	0	1	0	**1**	**6**	0	2	0	**2**	1	1	0	**2**	**4**	**10**
16:15	16:30	1	4	0	**5**	0	1	0	**1**	**6**	0	2	0	**2**	0	2	0	**2**	**4**	**10**
16:30	16:45	0	5	0	**5**	0	3	0	**3**	**8**	0	3	0	**3**	0	1	0	**1**	**4**	**12**
16:45	17:00	1	4	0	**5**	0	3	0	**3**	**8**	0	1	0	**1**	0	1	0	**1**	**2**	**10**
17:00	17:15	0	4	0	**4**	0	3	0	**3**	**7**	1	1	0	**2**	0	0	0	**0**	**2**	**9**
17:15	17:30	0	6	0	**6**	0	1	0	**1**	**7**	0	2	0	**2**	0	1	0	**1**	**3**	**10**
17:30	17:45	1	2	1	**4**	0	3	0	**3**	**7**	0	1	1	**2**	0	4	0	**4**	**6**	**13**
17:45	18:00	0	2	0	**2**	0	1	0	**1**	**3**	0	1	1	**2**	0	3	0	**3**	**5**	**8**
Total:	None	23	208	22	**253**	3	169	6	**178**	**431**	9	85	24	**118**	18	71	4	**93**	**211**	**642**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BRONSON AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36090

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	GLADSTONE AVE Eastbound U-Turn Total	GLADSTONE AVE 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

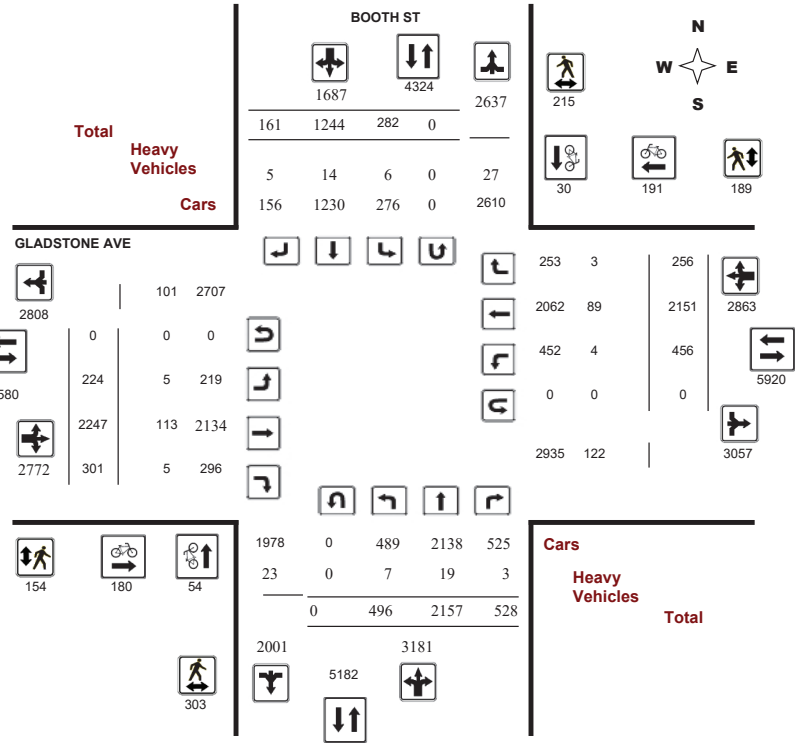
Turning Movement Count - Study Results

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study Diagram



Transportation Services - Traffic Services

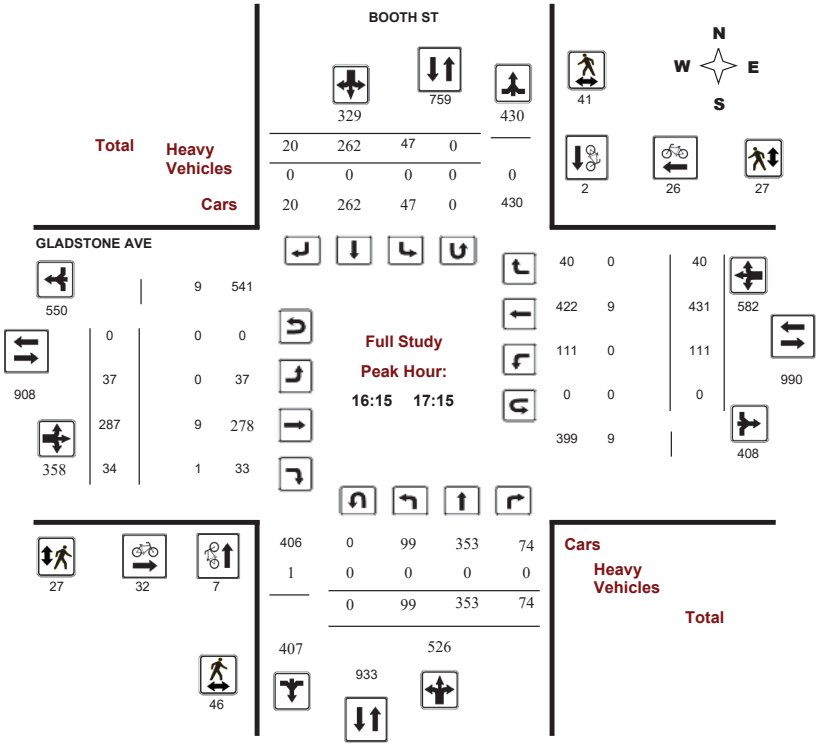
Turning Movement Count - Study Results

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study Peak Hour Diagram



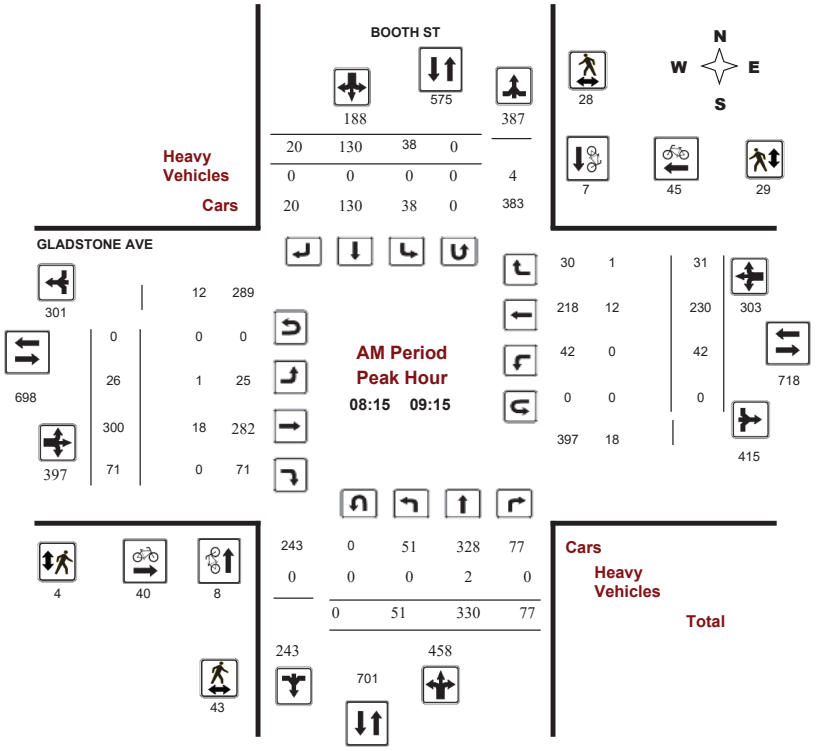
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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



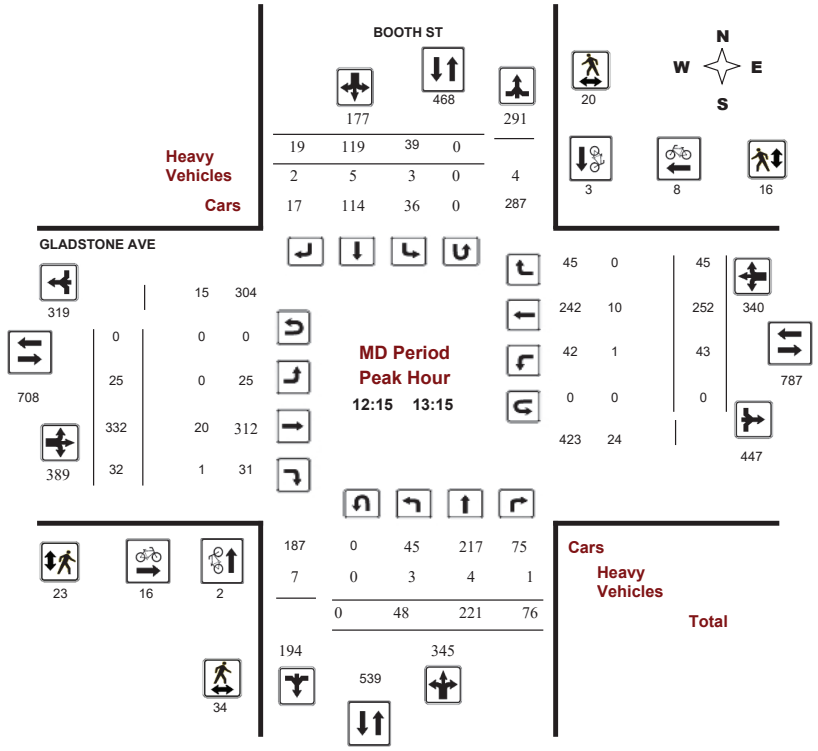
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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



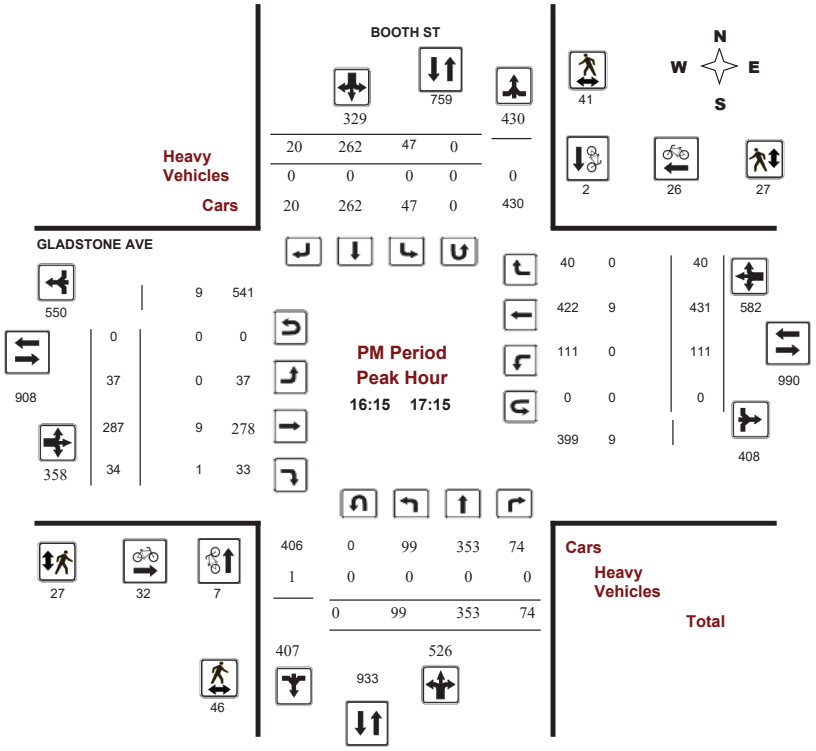
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, July 27, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

	BOOTH ST									GLADSTONE 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	26	220	37	**283**	23	136	12	**171**	**454**	15	196	28	**239**	26	136	24	**186**	**425**	**879**
08:00 09:00	57	312	80	**449**	37	141	15	**193**	**642**	27	318	73	**418**	34	228	24	**286**	**704**	**1346**
09:00 10:00	33	236	84	**353**	38	91	20	**149**	**502**	21	253	33	**307**	35	199	30	**264**	**571**	**1073**
11:30 12:30	60	192	61	**313**	38	90	22	**150**	**463**	42	300	37	**379**	41	253	45	**339**	**718**	**1181**
12:30 13:30	44	207	71	**322**	37	120	17	**174**	**496**	19	335	33	**387**	40	267	37	**344**	**731**	**1227**
15:00 16:00	109	325	51	**485**	38	193	28	**259**	**744**	30	291	37	**358**	67	278	29	**374**	**732**	**1476**
16:00 17:00	105	352	59	**516**	40	253	24	**317**	**833**	33	267	27	**327**	109	443	35	**587**	**914**	**1747**
17:00 18:00	62	313	85	**460**	31	220	23	**274**	**734**	37	287	33	**357**	104	347	32	**483**	**840**	**1574**
Sub Total	496	2157	528	**3181**	282	1244	161	**1687**	**4868**	224	2247	301	**2772**	456	2151	256	**2863**	**5635**	**10503**
U Turns	0			**0**	0			**0**	**0**	**0**			**0**	0			**0**	**0**	**0**
Total	496	2157	528	**3181**	282	1244	161	**1687**	**4868**	224	2247	301	**2772**	456	2151	256	**2863**	**5635**	**10503**
EQ 12Hr	689	2998	734	**4421**	392	1729	224	**2345**	**6766**	311	3123	418	**3852**	634	2990	356	**3980**	**7832**	**14598**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	620	2698	661	**3979**	353	1556	202	**2111**	**6090**	280	2811	376	**3467**	571	2691	320	**3582**	**7049**	**13139**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	812	3534	866	**5212**	462	2038	265	**2765**	**7977**	367	3682	493	**4542**	748	3525	419	**4692**	**9234**	**17211**
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 @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study 15 Minute Increments

		BOOTH ST									GLADSTONE 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	6	38	7	51	6	23	1	30	**81**	1	34	9	44	3	31	5	39	**83**	**164**
07:15	07:30	1	47	13	61	8	31	3	42	**103**	3	58	7	68	10	29	5	44	**112**	**215**
07:30	07:45	10	64	8	82	4	41	4	49	**131**	5	50	6	61	6	36	7	49	**110**	**241**
07:45	08:00	9	71	9	89	5	41	4	50	**139**	6	54	6	66	7	40	7	54	**120**	**259**
08:00	08:15	14	53	21	88	11	34	3	48	**136**	6	74	12	92	10	58	4	72	**164**	**300**
08:15	08:30	15	83	18	116	2	29	4	35	**151**	12	78	29	119	4	54	3	61	**180**	**331**
08:30	08:45	16	85	23	124	9	35	1	45	**169**	4	87	19	110	7	47	8	62	**172**	**341**
08:45	09:00	12	91	18	121	15	43	7	65	**186**	5	79	13	97	13	69	9	91	**188**	**374**
09:00	09:15	8	71	18	97	12	23	8	43	**140**	5	56	10	71	18	60	11	89	**160**	**300**
09:15	09:30	10	61	20	91	8	28	1	37	**128**	3	56	6	65	7	51	4	62	**127**	**255**
09:30	09:45	5	53	22	80	13	21	4	38	**118**	6	75	7	88	4	45	8	57	**145**	**263**
09:45	10:00	10	51	24	85	5	19	7	31	**116**	7	66	10	83	6	43	7	56	**139**	**255**
11:30	11:45	14	46	22	82	12	22	7	41	**123**	10	63	10	83	7	60	10	77	**160**	**283**
11:45	12:00	18	51	9	78	8	19	4	31	**109**	10	69	9	88	11	73	13	97	**185**	**294**
12:00	12:15	15	36	14	65	10	23	6	39	**104**	14	85	10	109	9	57	7	73	**182**	**286**
12:15	12:30	13	59	16	88	8	26	5	39	**127**	8	83	8	99	14	63	15	92	**191**	**318**
12:30	12:45	14	49	15	78	13	29	5	47	**125**	5	76	4	85	10	65	8	83	**168**	**293**
12:45	13:00	8	65	23	96	10	30	4	44	**140**	7	93	13	113	11	58	13	82	**195**	**335**
13:00	13:15	13	48	22	83	8	34	5	47	**130**	5	80	7	92	8	66	9	83	**175**	**305**
13:15	13:30	9	45	11	65	6	27	3	36	**101**	2	86	9	97	11	78	7	96	**193**	**294**
15:00	15:15	27	73	7	107	12	41	9	62	**169**	9	62	11	82	11	64	6	81	**163**	**332**
15:15	15:30	21	86	12	119	14	43	6	63	**182**	7	91	9	107	13	62	5	80	**187**	**369**
15:30	15:45	40	82	12	134	8	57	7	72	**206**	3	74	9	86	19	79	10	108	**194**	**400**
15:45	16:00	21	84	20	125	4	52	6	62	**187**	11	64	8	83	24	73	8	105	**188**	**375**
16:00	16:15	22	85	16	123	7	62	9	78	**201**	8	63	6	77	25	102	7	134	**211**	**412**
16:15	16:30	29	92	9	130	10	63	4	77	**207**	13	60	10	83	21	122	9	152	**235**	**442**
16:30	16:45	33	91	16	140	14	61	7	82	**222**	5	74	2	81	32	109	6	147	**228**	**450**
16:45	17:00	21	84	18	123	9	67	4	80	**203**	7	70	9	86	31	110	13	154	**240**	**443**
17:00	17:15	16	86	31	133	14	71	5	90	**223**	12	83	13	108	27	90	12	129	**237**	**460**
17:15	17:30	20	87	18	125	3	58	8	69	**194**	12	73	6	91	30	103	6	139	**230**	**424**
17:30	17:45	12	80	21	113	6	55	3	64	**177**	7	64	9	80	27	90	7	124	**204**	**381**
17:45	18:00	14	60	15	89	8	36	7	51	**140**	6	67	5	78	20	64	7	91	**169**	**309**
Total:		496	2157	528	3181	282	1244	161	1687	**4868**	224	2247	301	2772	456	2151	256	2863	**4868**	**10,503**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study Cyclist Volume

Time Period		BOOTH ST			GLADSTONE AVE			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	3	2	**5**	4	0	**4**	**9**
07:15	07:30	1	2	**3**	5	5	**10**	**13**
07:30	07:45	5	3	**8**	13	8	**21**	**29**
07:45	08:00	4	2	**6**	8	8	**16**	**22**
08:00	08:15	0	1	**1**	13	6	**19**	**20**
08:15	08:30	0	2	**2**	8	17	**25**	**27**
08:30	08:45	3	0	**3**	12	10	**22**	**25**
08:45	09:00	2	0	**2**	16	10	**26**	**28**
09:00	09:15	3	5	**8**	4	8	**12**	**20**
09:15	09:30	3	0	**3**	2	11	**13**	**16**
09:30	09:45	0	0	**0**	1	6	**7**	**7**
09:45	10:00	1	0	**1**	3	4	**7**	**8**
11:30	11:45	2	0	**2**	0	4	**4**	**6**
11:45	12:00	1	0	**1**	4	2	**6**	**7**
12:00	12:15	2	0	**2**	3	2	**5**	**7**
12:15	12:30	1	1	**2**	3	4	**7**	**9**
12:30	12:45	1	0	**1**	7	0	**7**	**8**
12:45	13:00	0	2	**2**	3	1	**4**	**6**
13:00	13:15	0	0	**0**	3	3	**6**	**6**
13:15	13:30	0	0	**0**	2	2	**4**	**4**
15:00	15:15	0	0	**0**	2	6	**8**	**8**
15:15	15:30	1	1	**2**	0	3	**3**	**5**
15:30	15:45	1	0	**1**	4	5	**9**	**10**
15:45	16:00	2	2	**4**	0	9	**9**	**13**
16:00	16:15	1	0	**1**	8	2	**10**	**11**
16:15	16:30	1	0	**1**	4	3	**7**	**8**
16:30	16:45	1	0	**1**	8	8	**16**	**17**
16:45	17:00	4	0	**4**	9	10	**19**	**23**
17:00	17:15	1	2	**3**	11	5	**16**	**19**
17:15	17:30	5	1	**6**	6	15	**21**	**27**
17:30	17:45	4	2	**6**	9	6	**15**	**21**
17:45	18:00	1	2	**3**	5	8	**13**	**16**
Total		54	30	**84**	180	191	**371**	**455**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study Pedestrian Volume

Time Period		BOOTH ST			GLADSTONE 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	2	2	**4**	5	3	**8**	**12**
07:15	07:30	2	3	**5**	4	5	**9**	**14**
07:30	07:45	8	9	**17**	7	4	**11**	**28**
07:45	08:00	6	8	**14**	4	12	**16**	**30**
08:00	08:15	9	7	**16**	2	10	**12**	**28**
08:15	08:30	17	6	**23**	0	6	**6**	**29**
08:30	08:45	9	8	**17**	0	15	**15**	**32**
08:45	09:00	9	10	**19**	0	6	**6**	**25**
09:00	09:15	8	4	**12**	4	2	**6**	**18**
09:15	09:30	7	5	**12**	7	6	**13**	**25**
09:30	09:45	22	16	**38**	17	18	**35**	**73**
09:45	10:00	12	9	**21**	6	9	**15**	**36**
11:30	11:45	7	4	**11**	4	1	**5**	**16**
11:45	12:00	10	5	**15**	5	4	**9**	**24**
12:00	12:15	18	0	**18**	9	1	**10**	**28**
12:15	12:30	7	3	**10**	11	1	**12**	**22**
12:30	12:45	18	8	**26**	3	12	**15**	**41**
12:45	13:00	5	7	**12**	4	1	**5**	**17**
13:00	13:15	4	2	**6**	5	2	**7**	**13**
13:15	13:30	11	4	**15**	1	1	**2**	**17**
15:00	15:15	3	5	**8**	3	3	**6**	**14**
15:15	15:30	4	6	**10**	4	2	**6**	**16**
15:30	15:45	9	2	**11**	1	9	**10**	**21**
15:45	16:00	11	7	**18**	3	9	**12**	**30**
16:00	16:15	11	10	**21**	6	5	**11**	**32**
16:15	16:30	9	7	**16**	11	3	**14**	**30**
16:30	16:45	9	10	**19**	4	4	**8**	**27**
16:45	17:00	18	9	**27**	9	9	**18**	**45**
17:00	17:15	10	15	**25**	3	11	**14**	**39**
17:15	17:30	11	11	**22**	5	8	**13**	**35**
17:30	17:45	12	6	**18**	5	4	**9**	**27**
17:45	18:00	5	7	**12**	2	3	**5**	**17**
Total	.....	303	215	**518**	154	189	**343**	**861**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study Heavy Vehicles

BOOTH ST **GLADSTONE AVE**

Time Period		Northbound				Southbound					Eastbound				Westbound						
		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	2	1	**3**	0	4	0	**4**	**7**	**7**
07:15	07:30	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	4	0	**4**	**8**	**8**
07:30	07:45	0	1	0	**1**	1	1	0	**2**	**3**	0	3	0	**3**	0	2	0	**2**	**5**	**8**
07:45	08:00	0	1	0	**1**	0	0	0	**0**	**1**	0	3	0	**3**	0	0	0	**0**	**3**	**4**
08:00	08:15	1	0	1	**2**	0	0	0	**0**	**2**	1	4	0	**5**	0	5	1	**6**	**11**	**13**
08:15	08:30	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	0	3	0	**3**	**12**	**12**
08:30	08:45	0	1	0	**1**	0	0	0	**0**	**1**	1	4	0	**5**	0	3	1	**4**	**9**	**10**
08:45	09:00	0	1	0	**1**	0	0	0	**0**	**1**	0	2	0	**2**	0	4	0	**4**	**6**	**7**
09:00	09:15	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	2	0	**2**	**5**	**5**
09:15	09:30	0	2	0	**2**	0	1	0	**1**	**3**	0	6	0	**6**	0	3	0	**3**	**9**	**12**
09:30	09:45	1	3	0	**4**	0	0	0	**0**	**4**	0	2	0	**2**	0	1	0	**1**	**3**	**7**
09:45	10:00	0	0	0	**0**	0	1	0	**1**	**1**	0	4	0	**4**	0	3	0	**3**	**7**	**8**
11:30	11:45	0	1	0	**1**	1	0	0	**1**	**2**	0	1	1	**2**	0	5	0	**5**	**7**	**9**
11:45	12:00	0	0	0	**0**	0	1	0	**1**	**1**	0	1	0	**1**	0	4	0	**4**	**5**	**6**
12:00	12:15	0	0	0	**0**	0	1	0	**1**	**1**	1	4	0	**5**	1	4	0	**5**	**10**	**11**
12:15	12:30	0	1	0	**1**	0	1	0	**1**	**2**	0	8	0	**8**	0	5	0	**5**	**13**	**15**
12:30	12:45	1	0	0	**1**	2	0	1	**3**	**4**	0	3	1	**4**	0	2	0	**2**	**6**	**10**
12:45	13:00	0	3	0	**3**	1	0	1	**2**	**5**	0	4	0	**4**	0	2	0	**2**	**6**	**11**
13:00	13:15	2	0	1	**3**	0	4	0	**4**	**7**	0	5	0	**5**	1	1	0	**2**	**7**	**14**
13:15	13:30	0	0	0	**0**	0	0	0	**0**	**0**	1	5	0	**6**	1	5	0	**6**	**12**	**12**
15:00	15:15	0	1	0	**1**	1	0	0	**1**	**2**	0	3	1	**4**	0	1	0	**1**	**5**	**7**
15:15	15:30	0	0	0	**0**	0	0	1	**1**	**1**	0	4	0	**4**	0	4	0	**4**	**8**	**9**
15:30	15:45	2	0	0	**2**	0	1	0	**1**	**3**	0	5	0	**5**	1	0	0	**1**	**6**	**9**
15:45	16:00	0	0	1	**1**	0	0	1	**1**	**2**	1	3	0	**4**	0	1	1	**2**	**6**	**8**
16:00	16:15	0	1	0	**1**	0	3	1	**4**	**5**	0	3	0	**3**	0	1	0	**1**	**4**	**9**
16:15	16:30	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	2	0	**2**	**4**	**4**
16:30	16:45	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	1	0	**1**	**5**	**5**
16:45	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	1	**2**	0	5	0	**5**	**7**	**7**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	1	0	**1**	**3**	**3**
17:15	17:30	0	2	0	**2**	0	0	0	**0**	**2**	0	5	0	**5**	0	2	0	**2**	**7**	**9**
17:30	17:45	0	1	0	**1**	0	0	0	**0**	**1**	0	3	0	**3**	0	5	0	**5**	**8**	**9**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**1**	0	4	0	**4**	**5**	**5**
Total:	None	7	19	3	**29**	6	14	5	**25**	**54**	5	113	5	**123**	4	89	3	**96**	**219**	**273**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36092

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

Full Study 15 Minute U-Turn Total

BOOTH ST **GLADSTONE 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

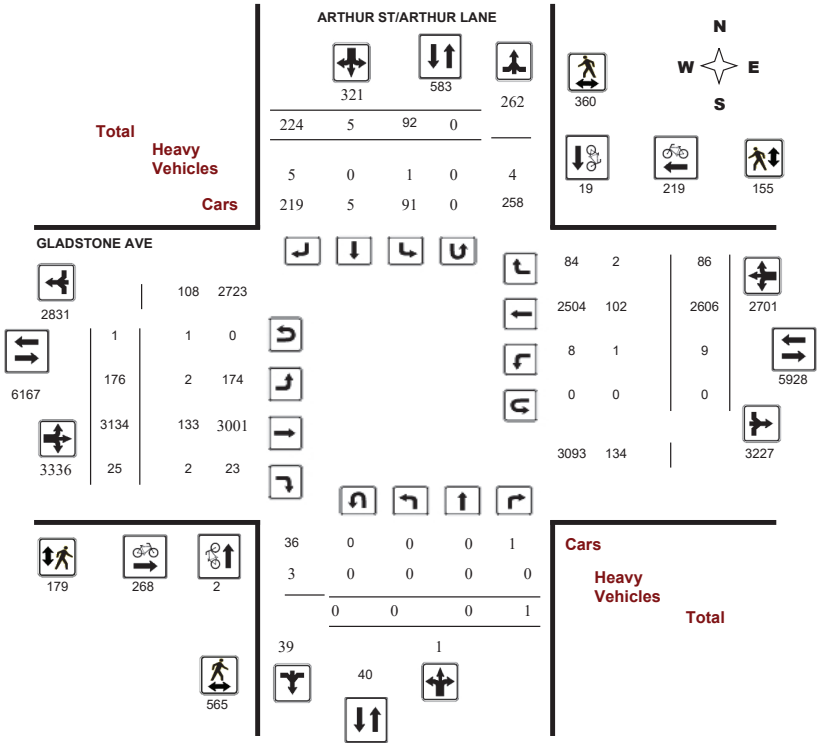
Turning Movement Count - Study Results

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study Diagram



Transportation Services - Traffic Services

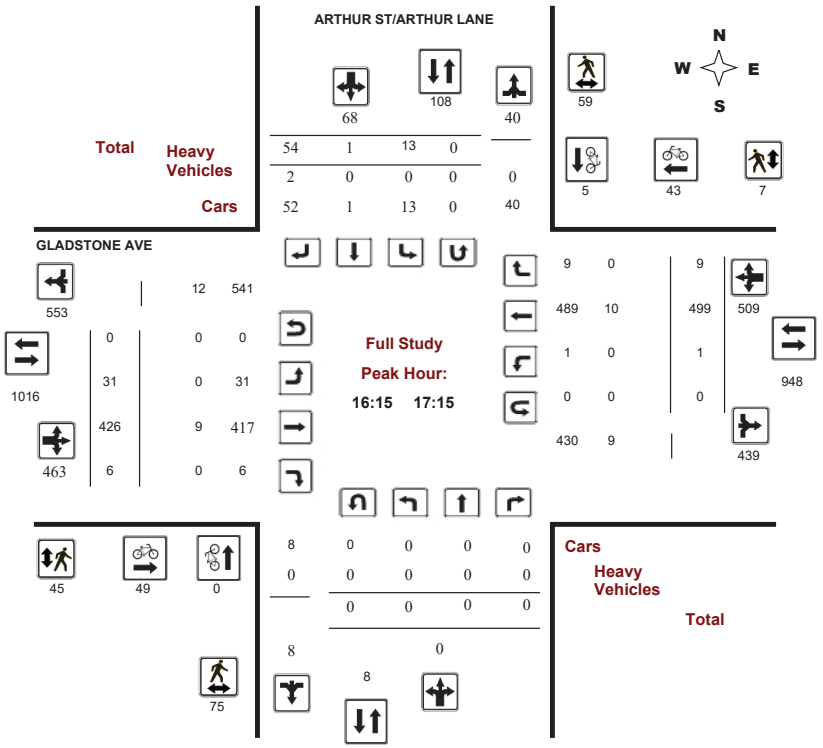
Turning Movement Count - Study Results

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study Peak Hour Diagram



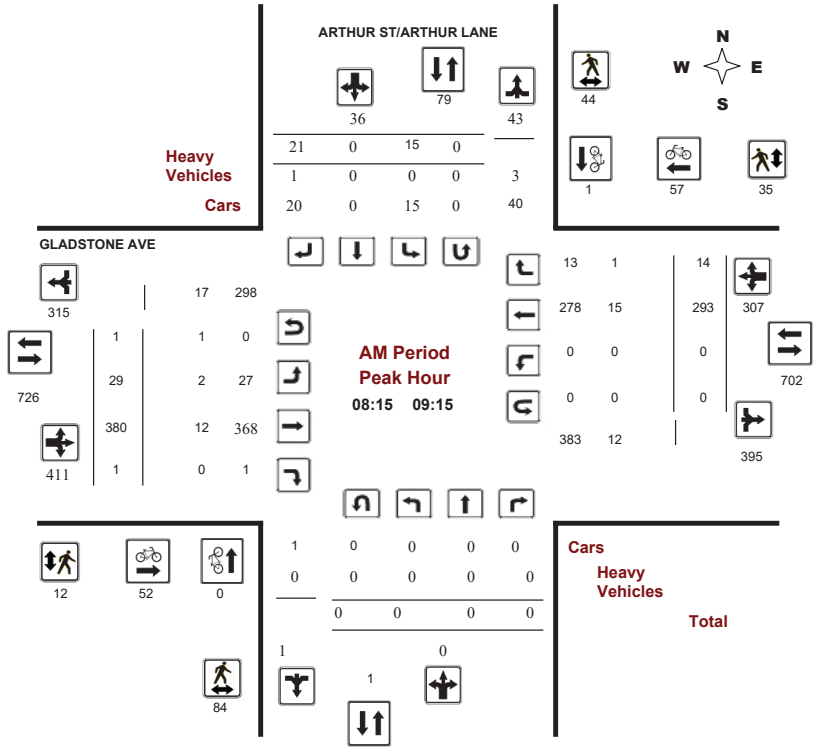
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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



Comments

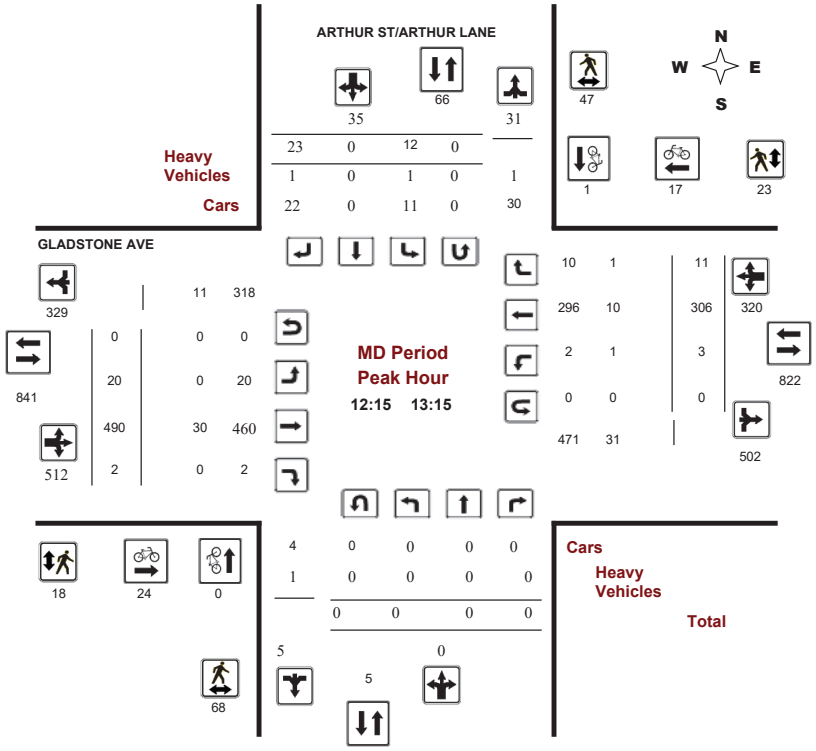
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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



Comments

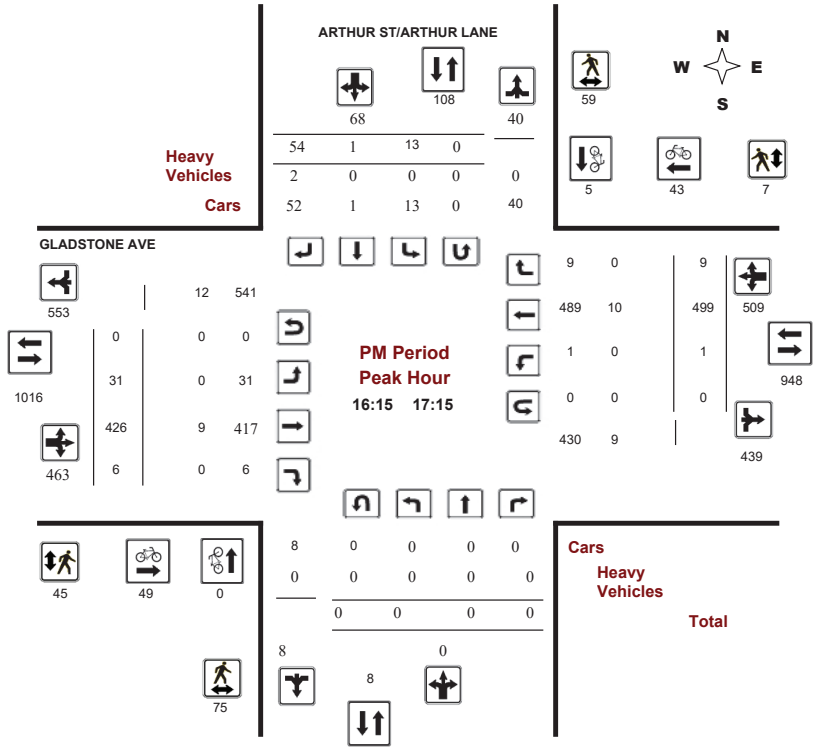
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, July 27, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 1 Westbound: 0

AADT Factor .90

	ARTHUR ST/ARTHUR LANE								GLADSTONE 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**	1	0	8	**9**	**9**	9	291	1	**301**	0	195	4	**199**	**500**	**509**
08:00 09:00	0	0	0	**0**	11	0	13	**24**	**24**	24	405	2	**431**	1	287	9	**297**	**728**	**752**
09:00 10:00	0	0	0	**0**	9	0	24	**33**	**33**	27	339	6	**372**	1	246	15	**262**	**634**	**667**
11:30 12:30	0	0	0	**0**	16	0	38	**54**	**54**	25	422	4	**451**	3	301	10	**314**	**765**	**819**
12:30 13:30	0	0	1	**1**	9	0	26	**35**	**36**	20	475	2	**497**	2	315	14	**331**	**828**	**864**
15:00 16:00	0	0	0	**0**	16	1	28	**45**	**45**	18	403	4	**425**	0	340	12	**352**	**777**	**822**
16:00 17:00	0	0	0	**0**	11	2	50	**63**	**63**	26	393	6	**425**	1	516	11	**528**	**953**	**1016**
17:00 18:00	0	0	0	**0**	19	2	37	**58**	**58**	27	406	0	**433**	1	406	11	**418**	**851**	**909**
Sub Total	0	0	1	**1**	92	5	224	**321**	**322**	176	3134	25	**3335**	9	2606	86	**2701**	**6036**	**6358**
U Turns	0			**0**	0			**0**	**0**	**1**			**1**	0			**0**	**1**	**1**
Total	0	0	1	**1**	92	5	224	**321**	**322**	177	3134	25	**3336**	9	2606	86	**2701**	**6037**	**6359**
EQ 12Hr	0	0	1	**1**	128	7	311	**446**	**447**	246	4356	35	**4637**	13	3622	120	**3755**	**8392**	**8839**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	0	0	1	**1**	115	6	280	**401**	**402**	221	3920	32	**4173**	12	3260	108	**3380**	**7553**	**7955**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**.90**					
AVG 24Hr	0	0	1	**1**	151	8	367	**526**	**527**	290	5135	42	**5467**	16	4271	141	**4428**	**9895**	**10422**
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

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study 15 Minute Increments

		ARTHUR ST/ARTHUR LANE									GLADSTONE 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	2	**2**	2	57	0	59	0	44	0	44	**103**	**105**
07:15	07:30	0	0	0	0	0	0	1	1	**1**	0	79	0	79	0	46	1	47	**126**	**127**
07:30	07:45	0	0	0	0	0	0	0	0	**0**	3	69	1	73	0	53	1	54	**127**	**127**
07:45	08:00	0	0	0	0	1	0	5	6	**6**	4	86	0	90	0	52	2	54	**144**	**150**
08:00	08:15	0	0	0	0	2	0	1	3	**3**	4	103	1	108	1	63	1	65	**173**	**176**
08:15	08:30	0	0	0	0	2	0	1	3	**3**	5	91	0	96	0	64	2	66	**162**	**165**
08:30	08:45	0	0	0	0	3	0	4	7	**7**	9	112	0	121	0	57	3	60	**181**	**188**
08:45	09:00	0	0	0	0	4	0	7	11	**11**	7	99	1	107	0	103	3	106	**213**	**224**
09:00	09:15	0	0	0	0	6	0	9	15	**15**	9	78	0	87	0	69	6	75	**162**	**177**
09:15	09:30	0	0	0	0	0	0	7	7	**7**	4	87	1	92	1	57	1	59	**151**	**158**
09:30	09:45	0	0	0	0	1	0	4	5	**5**	5	88	4	97	0	63	4	67	**164**	**169**
09:45	10:00	0	0	0	0	2	0	4	6	**6**	9	86	1	96	0	57	4	61	**157**	**163**
11:30	11:45	0	0	0	0	3	0	16	19	**19**	7	109	1	117	0	71	1	72	**189**	**208**
11:45	12:00	0	0	0	0	1	0	9	10	**10**	9	92	1	102	1	83	3	87	**189**	**199**
12:00	12:15	0	0	0	0	6	0	6	12	**12**	6	105	1	112	0	72	5	77	**189**	**201**
12:15	12:30	0	0	0	0	6	0	7	13	**13**	3	116	1	120	2	75	1	78	**198**	**211**
12:30	12:45	0	0	0	0	0	0	4	4	**4**	5	120	1	126	0	67	6	73	**199**	**203**
12:45	13:00	0	0	0	0	4	0	7	11	**11**	5	134	0	139	1	86	3	90	**229**	**240**
13:00	13:15	0	0	0	0	2	0	5	7	**7**	7	120	0	127	0	78	1	79	**206**	**213**
13:15	13:30	0	0	1	1	3	0	10	13	**14**	3	101	1	105	1	84	4	89	**194**	**208**
15:00	15:15	0	0	0	0	6	0	9	15	**15**	7	94	0	101	0	67	4	71	**172**	**187**
15:15	15:30	0	0	0	0	5	1	4	10	**10**	6	114	3	123	0	73	3	76	**199**	**209**
15:30	15:45	0	0	0	0	2	0	11	13	**13**	2	83	1	86	0	111	3	114	**200**	**213**
15:45	16:00	0	0	0	0	3	0	4	7	**7**	3	112	0	115	0	89	2	91	**206**	**213**
16:00	16:15	0	0	0	0	3	1	14	18	**18**	4	94	0	98	0	122	2	124	**222**	**240**
16:15	16:30	0	0	0	0	3	0	14	17	**17**	6	81	4	91	0	141	2	143	**234**	**251**
16:30	16:45	0	0	0	0	3	1	11	15	**15**	6	113	1	120	0	133	2	135	**255**	**270**
16:45	17:00	0	0	0	0	2	0	11	13	**13**	10	105	1	116	1	120	5	126	**242**	**255**
17:00	17:15	0	0	0	0	5	0	18	23	**23**	9	127	0	136	0	105	0	105	**241**	**264**
17:15	17:30	0	0	0	0	5	1	8	14	**14**	7	96	0	103	0	118	3	121	**224**	**238**
17:30	17:45	0	0	0	0	6	1	7	14	**14**	7	90	0	97	1	99	3	103	**200**	**214**
17:45	18:00	0	0	0	0	3	0	4	7	**7**	4	93	0	97	0	84	5	89	**186**	**193**
Total:		0	0	1	1	92	5	224	321	**322**	177	3134	25	3336	9	2606	86	2701	**322**	**6,359**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study Cyclist Volume

		ARTHUR ST/ARTHUR LANE			GLADSTONE AVE			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	**0**	7	3	**10**	**10**
07:15	07:30	0	1	**1**	6	5	**11**	**12**
07:30	07:45	0	0	**0**	16	9	**25**	**25**
07:45	08:00	0	1	**1**	7	8	**15**	**16**
08:00	08:15	1	1	**2**	12	2	**14**	**16**
08:15	08:30	0	0	**0**	11	20	**31**	**31**
08:30	08:45	0	0	**0**	13	8	**21**	**21**
08:45	09:00	0	1	**1**	18	14	**32**	**33**
09:00	09:15	0	0	**0**	10	15	**25**	**25**
09:15	09:30	0	0	**0**	4	7	**11**	**11**
09:30	09:45	0	0	**0**	8	5	**13**	**13**
09:45	10:00	0	0	**0**	7	3	**10**	**10**
11:30	11:45	0	0	**0**	2	3	**5**	**5**
11:45	12:00	0	0	**0**	5	2	**7**	**7**
12:00	12:15	0	1	**1**	4	2	**6**	**7**
12:15	12:30	0	1	**1**	8	4	**12**	**13**
12:30	12:45	0	0	**0**	6	1	**7**	**7**
12:45	13:00	0	0	**0**	9	5	**14**	**14**
13:00	13:15	0	0	**0**	1	7	**8**	**8**
13:15	13:30	0	0	**0**	5	5	**10**	**10**
15:00	15:15	0	0	**0**	6	5	**11**	**11**
15:15	15:30	0	0	**0**	4	2	**6**	**6**
15:30	15:45	0	3	**3**	3	4	**7**	**10**
15:45	16:00	0	1	**1**	8	6	**14**	**15**
16:00	16:15	1	3	**4**	13	6	**19**	**23**
16:15	16:30	0	2	**2**	9	8	**17**	**19**
16:30	16:45	0	3	**3**	17	13	**30**	**33**
16:45	17:00	0	0	**0**	8	16	**24**	**24**
17:00	17:15	0	0	**0**	15	6	**21**	**21**
17:15	17:30	0	1	**1**	11	9	**20**	**21**
17:30	17:45	0	0	**0**	7	8	**15**	**15**
17:45	18:00	0	0	**0**	8	8	**16**	**16**
Total		2	19	**21**	268	219	**487**	**508**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study Pedestrian Volume

	ARTHUR ST/ARTHUR LANE			GLADSTONE 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	8	7	**15**	1	2	**3**	**18**
07:15 07:30	13	2	**15**	1	1	**2**	**17**
07:30 07:45	19	7	**26**	2	1	**3**	**29**
07:45 08:00	13	7	**20**	3	0	**3**	**23**
08:00 08:15	18	10	**28**	3	4	**7**	**35**
08:15 08:30	24	6	**30**	6	3	**9**	**39**
08:30 08:45	24	10	**34**	1	11	**12**	**46**
08:45 09:00	23	18	**41**	2	13	**15**	**56**
09:00 09:15	13	10	**23**	3	8	**11**	**34**
09:15 09:30	17	10	**27**	5	6	**11**	**38**
09:30 09:45	10	9	**19**	3	5	**8**	**27**
09:45 10:00	8	15	**23**	4	7	**11**	**34**
11:30 11:45	27	7	**34**	13	7	**20**	**54**
11:45 12:00	21	19	**40**	6	4	**10**	**50**
12:00 12:15	23	10	**33**	9	10	**19**	**52**
12:15 12:30	26	13	**39**	4	11	**15**	**54**
12:30 12:45	15	13	**28**	3	2	**5**	**33**
12:45 13:00	11	13	**24**	3	4	**7**	**31**
13:00 13:15	16	8	**24**	8	6	**14**	**38**
13:15 13:30	22	18	**40**	11	8	**19**	**59**
15:00 15:15	9	1	**10**	0	1	**1**	**11**
15:15 15:30	10	7	**17**	5	1	**6**	**23**
15:30 15:45	16	6	**22**	2	6	**8**	**30**
15:45 16:00	10	13	**23**	2	6	**8**	**31**
16:00 16:15	19	20	**39**	14	7	**21**	**60**
16:15 16:30	20	13	**33**	9	3	**12**	**45**
16:30 16:45	19	13	**32**	7	2	**9**	**41**
16:45 17:00	14	13	**27**	13	0	**13**	**40**
17:00 17:15	22	20	**42**	16	2	**18**	**60**
17:15 17:30	22	12	**34**	4	6	**10**	**44**
17:30 17:45	29	14	**43**	9	5	**14**	**57**
17:45 18:00	24	16	**40**	7	3	**10**	**50**
Total	565	360	**925**	179	155	**334**	**1259**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study Heavy Vehicles

		ARTHUR ST/ARTHUR LANE									GLADSTONE 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	3	0	**3**	0	4	0	**4**	**7**	**7**
07:15	07:30	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	5	0	**5**	**8**	**8**
07:30	07:45	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	1	0	**1**	**5**	**5**
07:45	08:00	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	3	0	**3**	**7**	**7**
08:00	08:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	1	0	**1**	**6**	**6**
08:15	08:30	0	0	0	**0**	0	0	0	**0**	**0**	1	6	0	**7**	0	5	1	**6**	**13**	**14**
08:30	08:45	0	0	0	**0**	0	0	1	**1**	**1**	1	3	0	**4**	0	2	0	**2**	**6**	**7**
08:45	09:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**1**	0	8	0	**8**	**9**	**9**
09:00	09:15	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	0	0	**0**	**2**	**2**
09:15	09:30	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	4	0	**4**	**11**	**11**
09:30	09:45	0	0	0	**0**	0	0	0	**0**	**0**	0	3	2	**5**	0	5	0	**5**	**10**	**10**
09:45	10:00	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	3	0	**3**	**10**	**10**
11:30	11:45	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	4	0	**4**	**7**	**7**
11:45	12:00	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	2	0	**2**	**4**	**4**
12:00	12:15	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	8	0	**8**	**13**	**13**
12:15	12:30	0	0	0	**0**	0	0	0	**0**	**0**	0	11	0	**11**	1	4	0	**5**	**16**	**16**
12:30	12:45	0	0	0	**0**	0	0	0	**0**	**0**	0	8	0	**8**	0	2	1	**3**	**11**	**11**
12:45	13:00	0	0	0	**0**	1	0	0	**1**	**1**	0	5	0	**5**	0	3	0	**3**	**8**	**9**
13:00	13:15	0	0	0	**0**	0	0	1	**1**	**1**	0	6	0	**6**	0	1	0	**1**	**7**	**8**
13:15	13:30	0	0	0	**0**	0	0	0	**0**	**0**	0	5	0	**5**	0	5	0	**5**	**10**	**10**
15:00	15:15	0	0	0	**0**	0	0	0	**0**	**0**	0	6	0	**6**	0	3	0	**3**	**9**	**9**
15:15	15:30	0	0	0	**0**	0	0	1	**1**	**1**	0	5	0	**5**	0	3	0	**3**	**8**	**9**
15:30	15:45	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	4	0	**4**	**7**	**7**
15:45	16:00	0	0	0	**0**	0	0	0	**0**	**0**	0	7	0	**7**	0	3	0	**3**	**10**	**10**
16:00	16:15	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	2	0	**2**	**4**	**4**
16:15	16:30	0	0	0	**0**	0	0	2	**2**	**2**	0	2	0	**2**	0	3	0	**3**	**5**	**7**
16:30	16:45	0	0	0	**0**	0	0	0	**0**	**0**	0	4	0	**4**	0	2	0	**2**	**6**	**6**
16:45	17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**1**	0	4	0	**4**	**5**	**5**
17:00	17:15	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	1	0	**1**	**3**	**3**
17:15	17:30	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	1	0	**1**	**4**	**4**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	2	0	**2**	0	3	0	**3**	**5**	**5**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	3	0	**3**	0	3	0	**3**	**6**	**6**
Total:	None	0	0	0	**0**	1	0	5	**6**	**6**	2	133	2	**137**	1	102	2	**105**	**242**	**249**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

GLADSTONE AVE @ ARTHUR ST/ARTHUR LANE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36094

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

Full Study 15 Minute U-Turn Total

Time Period		ARTHUR ST/ARTHUR LANE Northbound U-Turn Total	ARTHUR ST/ARTHUR LANE Southbound U-Turn Total	GLADSTONE AVE Eastbound U-Turn Total	GLADSTONE AVE 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	1	0	**1**
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**

Transportation Services - Traffic Services

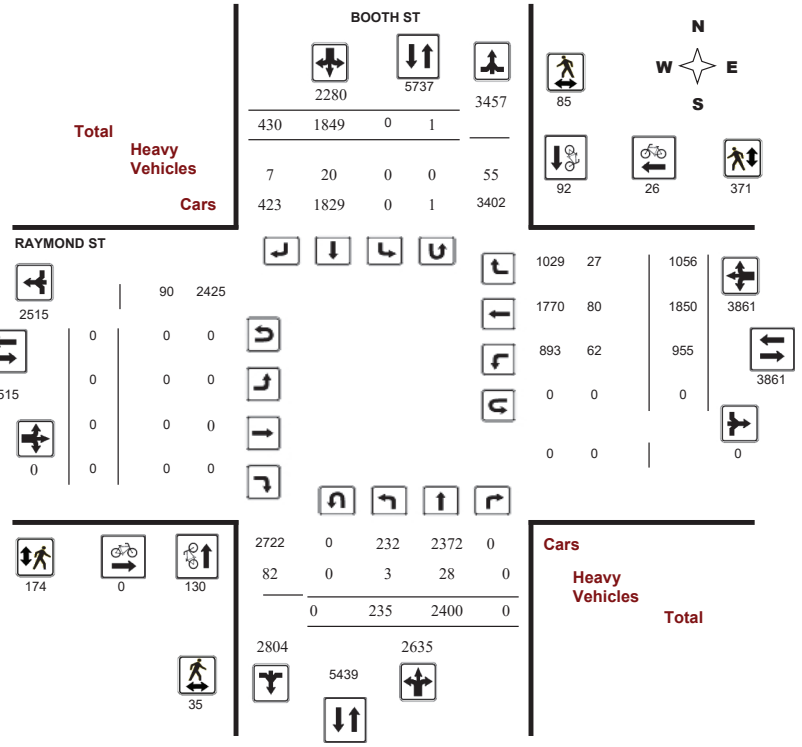
Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study Diagram



Transportation Services - Traffic Services

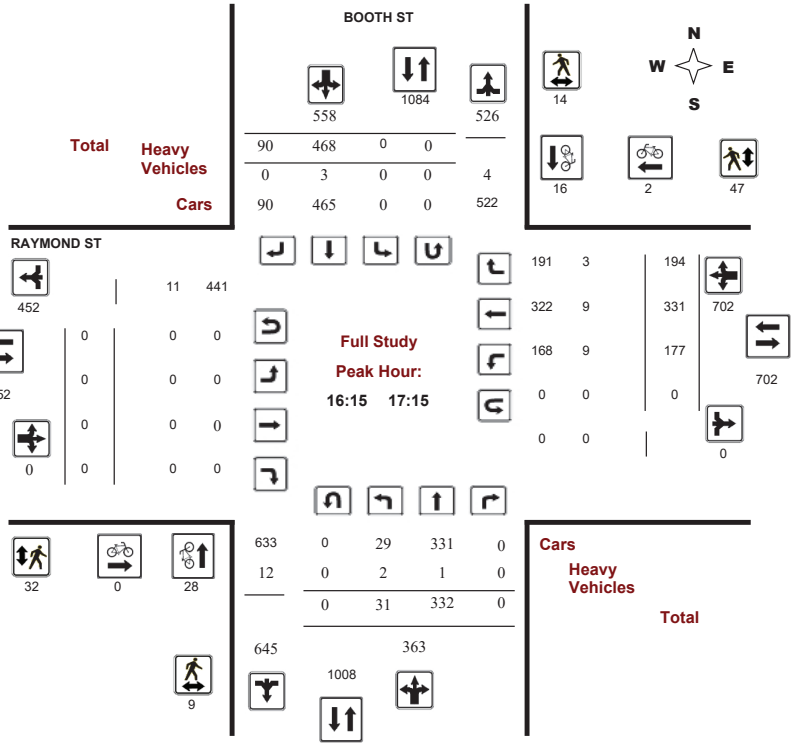
Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study Summary (8 HR Standard)

Survey Date: Thursday, September 01, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 1

Eastbound: 0 Westbound: 0

AADT Factor 1.00

	BOOTH ST								RAYMOND ST									
	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	19	251	0	**270**	0	149	25	**174**	**444**	0	0	0	**0**	94	190	99	**383**	**383**	**827**
08:00 09:00	37	373	0	**410**	0	186	32	**218**	**628**	0	0	0	**0**	124	218	108	**450**	**450**	**1078**
09:00 10:00	29	250	0	**279**	0	144	31	**175**	**454**	0	0	0	**0**	106	201	102	**409**	**409**	**863**
11:30 12:30	33	264	0	**297**	0	128	45	**173**	**470**	0	0	0	**0**	69	172	105	**346**	**346**	**816**
12:30 13:30	28	268	0	**296**	0	145	55	**200**	**496**	0	0	0	**0**	69	156	101	**326**	**326**	**822**
15:00 16:00	35	323	0	**358**	0	284	84	**368**	**726**	0	0	0	**0**	160	273	163	**596**	**596**	**1322**
16:00 17:00	38	343	0	**381**	0	427	89	**516**	**897**	0	0	0	**0**	160	341	170	**671**	**671**	**1568**
17:00 18:00	16	328	0	**344**	0	386	69	**455**	**799**	0	0	0	**0**	173	299	208	**680**	**680**	**1479**
Sub Total	235	2400	0	**2635**	0	1849	430	**2279**	**4914**	0	0	0	**0**	955	1850	1056	**3861**	**3861**	**8775**
U Turns				**0**				**1**	**1**				**0**				**0**	**0**	**1**
Total	235	2400	0	**2635**	0	1849	430	**2280**	**4915**	0	0	0	**0**	955	1850	1056	**3861**	**3861**	**8776**
EQ 12Hr	327	3336	0	**3663**	0	2570	598	**3169**	**6832**	0	0	0	**0**	1327	2572	1468	**5367**	**5367**	**12199**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	308	3144	0	**3452**	0	2422	563	**2987**	**6832**	0	0	0	**0**	1251	2424	1383	**5058**	**5367**	**12199**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	403	4119	0	**4522**	0	3173	738	**3913**	**8435**	0	0	0	**0**	1639	3175	1812	**6626**	**6626**	**15061**
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.

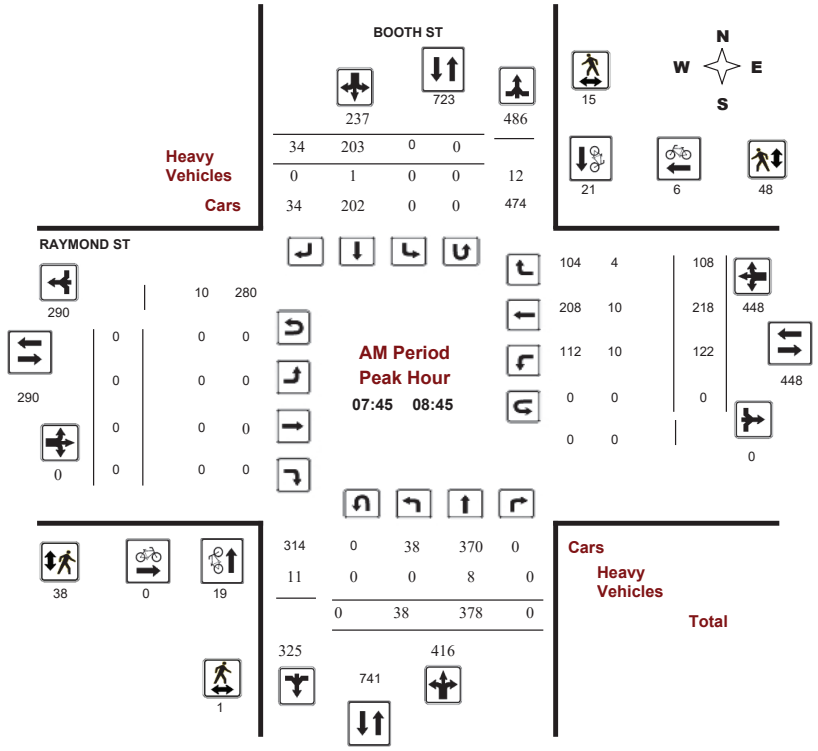
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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



Comments

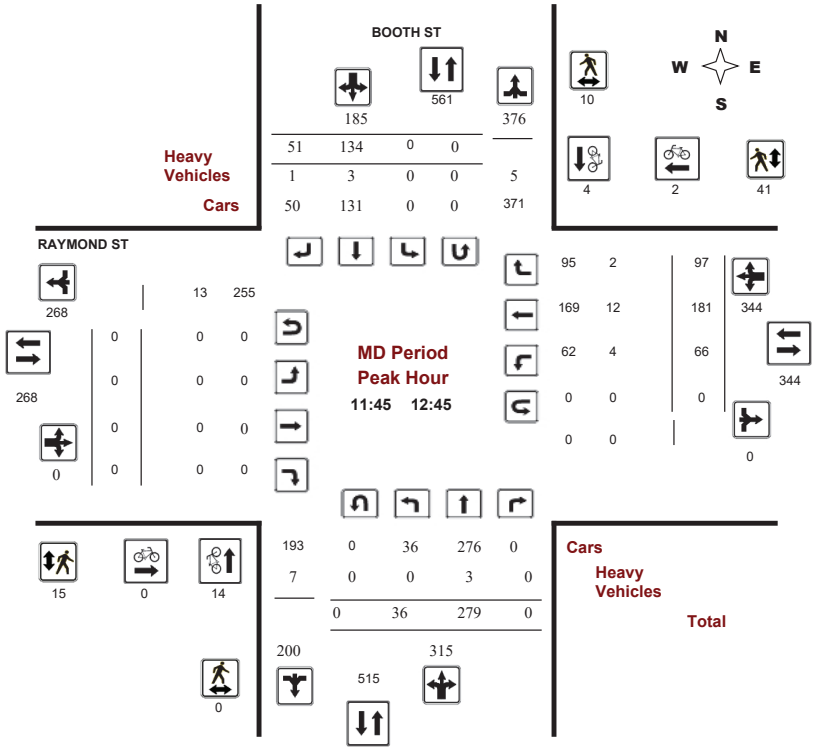
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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



Comments

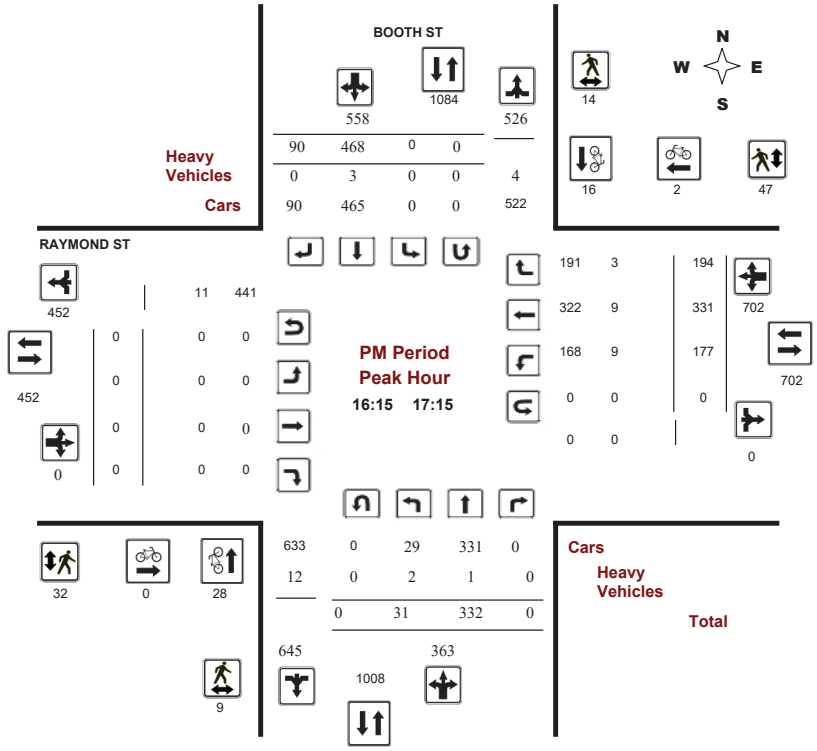
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study 15 Minute Increments

		BOOTH ST									RAYMOND ST									
		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	4	54	0	58	0	24	4	28	0	0	0	0	0	16	37	23	76	0	162
07:15	07:30	3	58	0	61	0	27	9	37	6	0	0	0	0	24	40	22	86	6	184
07:30	07:45	4	52	0	56	0	44	4	48	0	0	0	0	0	26	53	26	105	0	209
07:45	08:00	8	87	0	95	0	54	8	62	6	0	0	0	0	28	60	28	116	6	273
08:00	08:15	7	83	0	90	0	49	12	61	0	0	0	0	0	39	36	34	109	0	260
08:15	08:30	9	111	0	120	0	51	7	58	0	0	0	0	0	31	64	25	120	0	298
08:30	08:45	14	97	0	111	0	49	7	56	3	0	0	0	0	24	58	21	103	3	270
08:45	09:00	7	82	0	89	0	37	6	43	0	0	0	0	0	30	60	28	118	0	250
09:00	09:15	12	65	0	77	0	37	12	49	1	0	0	0	0	28	59	26	113	1	239
09:15	09:30	6	75	0	81	0	42	5	47	5	0	0	0	0	26	53	28	107	5	235
09:30	09:45	7	52	0	59	0	31	6	37	0	0	0	0	0	31	43	24	98	0	194
09:45	10:00	4	58	0	62	0	34	8	42	5	0	0	0	0	21	46	24	91	5	195
11:30	11:45	10	58	0	68	0	27	5	32	1	0	0	0	0	17	37	24	78	1	178
11:45	12:00	7	70	0	77	0	27	14	41	3	0	0	0	0	19	44	27	90	3	208
12:00	12:15	8	74	0	82	0	41	14	55	1	0	0	0	0	17	52	27	96	1	233
12:15	12:30	8	62	0	70	0	33	12	45	0	0	0	0	0	16	39	27	82	0	197
12:30	12:45	13	73	0	86	0	33	11	44	3	0	0	0	0	14	46	16	76	3	206
12:45	13:00	4	65	0	69	0	36	10	46	3	0	0	0	0	15	37	21	73	3	188
13:00	13:15	6	66	0	72	0	38	17	55	3	0	0	0	0	20	35	37	92	3	219
13:15	13:30	5	64	0	69	0	38	17	55	4	0	0	0	0	20	38	27	85	4	209
15:00	15:15	18	86	0	104	0	53	18	71	2	0	0	0	0	45	75	49	169	2	344
15:15	15:30	5	65	0	70	0	87	25	112	0	0	0	0	0	45	72	39	156	0	338
15:30	15:45	8	84	0	92	0	61	22	83	0	0	0	0	0	24	64	36	124	0	299
15:45	16:00	4	88	0	92	0	83	19	102	2	0	0	0	0	46	62	39	147	2	341
16:00	16:15	10	95	0	105	0	75	18	93	1	0	0	0	0	30	86	36	152	1	350
16:15	16:30	10	98	0	108	0	112	19	131	2	0	0	0	0	44	84	50	178	2	417
16:30	16:45	8	67	0	75	0	120	27	147	1	0	0	0	0	40	79	38	157	1	379
16:45	17:00	10	83	0	93	0	120	25	145	2	0	0	0	0	46	92	46	184	2	422
17:00	17:15	3	84	0	87	0	116	19	135	1	0	0	0	0	47	76	60	183	1	405
17:15	17:30	3	78	0	81	0	104	12	116	0	0	0	0	0	53	76	47	176	0	373
17:30	17:45	5	70	0	75	0	83	12	95	0	0	0	0	0	43	74	48	165	0	335
17:45	18:00	5	96	0	101	0	83	26	109	3	0	0	0	0	30	73	53	156	3	366
Total:		235	2400	0	2635	0	1849	430	2280	58	0	0	0	0	955	1850	1056	3861	58	8,776

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study Cyclist Volume

Time Period		BOOTH ST			RAYMOND ST			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	6	1	7	0	1	1	8
07:15	07:30	1	5	6	0	0	0	6
07:30	07:45	2	3	5	0	0	0	5
07:45	08:00	5	8	13	0	0	0	13
08:00	08:15	6	6	12	0	3	3	15
08:15	08:30	5	6	11	0	2	2	13
08:30	08:45	3	1	4	0	1	1	5
08:45	09:00	3	5	8	0	2	2	10
09:00	09:15	4	7	11	0	3	3	14
09:15	09:30	0	2	2	0	0	0	2
09:30	09:45	1	2	3	0	1	1	4
09:45	10:00	1	1	2	0	0	0	2
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	2	1	3	0	0	0	3
12:00	12:15	6	2	8	0	1	1	9
12:15	12:30	3	0	3	0	0	0	3
12:30	12:45	3	1	4	0	1	1	5
12:45	13:00	5	4	9	0	2	2	11
13:00	13:15	2	2	4	0	1	1	5
13:15	13:30	3	0	3	0	0	0	3
15:00	15:15	5	0	5	0	0	0	5
15:15	15:30	5	1	6	0	0	0	6
15:30	15:45	5	2	7	0	0	0	7
15:45	16:00	3	4	7	0	0	0	7
16:00	16:15	5	5	10	0	1	1	11
16:15	16:30	5	3	8	0	1	1	9
16:30	16:45	9	7	16	0	1	1	17
16:45	17:00	8	3	11	0	0	0	11
17:00	17:15	6	3	9	0	0	0	9
17:15	17:30	5	2	7	0	0	0	7
17:30	17:45	7	2	9	0	4	4	13
17:45	18:00	6	3	9	0	1	1	10
Total		130	92	**222**	0	26	26	248

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study Pedestrian Volume

Time Period		BOOTH ST			RAYMOND ST			
		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	0	**0**	3	12	**15**	**15**
07:15	07:30	2	4	**6**	2	13	**15**	**21**
07:30	07:45	0	3	**3**	5	8	**13**	**16**
07:45	08:00	0	4	**4**	13	12	**25**	**29**
08:00	08:15	0	2	**2**	8	9	**17**	**19**
08:15	08:30	0	6	**6**	11	15	**26**	**32**
08:30	08:45	1	3	**4**	6	12	**18**	**22**
08:45	09:00	1	3	**4**	1	23	**24**	**28**
09:00	09:15	2	0	**2**	2	11	**13**	**15**
09:15	09:30	0	9	**9**	6	17	**23**	**32**
09:30	09:45	2	4	**6**	9	7	**16**	**22**
09:45	10:00	1	1	**2**	4	7	**11**	**13**
11:30	11:45	1	0	**1**	4	11	**15**	**16**
11:45	12:00	0	1	**1**	3	13	**16**	**17**
12:00	12:15	0	3	**3**	5	11	**16**	**19**
12:15	12:30	0	4	**4**	5	7	**12**	**16**
12:30	12:45	0	2	**2**	2	10	**12**	**14**
12:45	13:00	1	3	**4**	9	9	**18**	**22**
13:00	13:15	1	2	**3**	5	5	**10**	**13**
13:15	13:30	2	2	**4**	4	11	**15**	**19**
15:00	15:15	3	2	**5**	5	16	**21**	**26**
15:15	15:30	2	1	**3**	2	12	**14**	**17**
15:30	15:45	3	2	**5**	2	17	**19**	**24**
15:45	16:00	1	1	**2**	0	17	**17**	**19**
16:00	16:15	0	1	**1**	8	11	**19**	**20**
16:15	16:30	3	2	**5**	8	9	**17**	**22**
16:30	16:45	2	1	**3**	5	16	**21**	**24**
16:45	17:00	2	4	**6**	13	8	**21**	**27**
17:00	17:15	2	7	**9**	6	14	**20**	**29**
17:15	17:30	2	4	**6**	6	10	**16**	**22**
17:30	17:45	0	4	**4**	7	13	**20**	**24**
17:45	18:00	1	0	**1**	5	5	**10**	**11**
Total	.....	35	85	**120**	174	371	**545**	**665**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study Heavy Vehicles

		BOOTH ST									RAYMOND ST									
		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	0	0	**0**	1	2	1	**4**	**4**	**4**
07:15	07:30	0	1	0	**1**	0	1	4	**5**	**6**	0	0	0	**0**	3	3	1	**7**	**7**	**13**
07:30	07:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	1	3	1	**5**	**5**	**5**
07:45	08:00	0	5	0	**5**	0	1	0	**1**	**6**	0	0	0	**0**	2	3	0	**5**	**5**	**11**
08:00	08:15	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	3	0	2	**5**	**5**	**5**
08:15	08:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	2	2	2	**6**	**6**	**6**
08:30	08:45	0	3	0	**3**	0	0	0	**0**	**3**	0	0	0	**0**	3	5	0	**8**	**8**	**11**
08:45	09:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	1	0	1	**2**	**2**	**2**
09:00	09:15	0	0	0	**0**	0	1	0	**1**	**1**	0	0	0	**0**	2	1	1	**4**	**4**	**5**
09:15	09:30	1	2	0	**3**	0	1	1	**2**	**5**	0	0	0	**0**	4	4	0	**8**	**8**	**13**
09:30	09:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	2	2	2	**6**	**6**	**6**
09:45	10:00	0	2	0	**2**	0	3	0	**3**	**5**	0	0	0	**0**	4	5	1	**10**	**10**	**15**
11:30	11:45	0	0	0	**0**	0	1	0	**1**	**1**	0	0	0	**0**	2	2	0	**4**	**4**	**5**
11:45	12:00	0	2	0	**2**	0	1	0	**1**	**3**	0	0	0	**0**	2	3	1	**6**	**6**	**9**
12:00	12:15	0	0	0	**0**	0	0	1	**1**	**1**	0	0	0	**0**	1	3	1	**5**	**5**	**6**
12:15	12:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	2	0	**2**	**2**	**2**
12:30	12:45	0	1	0	**1**	0	2	0	**2**	**3**	0	0	0	**0**	1	4	0	**5**	**5**	**8**
12:45	13:00	0	1	0	**1**	0	1	1	**2**	**3**	0	0	0	**0**	1	2	0	**3**	**3**	**6**
13:00	13:15	0	3	0	**3**	0	0	0	**0**	**3**	0	0	0	**0**	1	5	1	**7**	**7**	**10**
13:15	13:30	0	2	0	**2**	0	2	0	**2**	**4**	0	0	0	**0**	3	2	1	**6**	**6**	**10**
15:00	15:15	0	1	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	2	2	0	**4**	**4**	**6**
15:15	15:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	3	4	0	**7**	**7**	**7**
15:30	15:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	2	0	**2**	**2**	**2**
15:45	16:00	0	2	0	**2**	0	0	0	**0**	**2**	0	0	0	**0**	2	2	1	**5**	**5**	**7**
16:00	16:15	0	1	0	**1**	0	0	0	**0**	**1**	0	0	0	**0**	3	4	2	**9**	**9**	**10**
16:15	16:30	2	0	0	**2**	0	0	0	**0**	**2**	0	0	0	**0**	2	3	2	**7**	**7**	**9**
16:30	16:45	0	1	0	**1**	0	0	0	**0**	**1**	0	0	0	**0**	3	3	0	**6**	**6**	**7**
16:45	17:00	0	0	0	**0**	0	2	0	**2**	**2**	0	0	0	**0**	3	2	0	**5**	**5**	**7**
17:00	17:15	0	0	0	**0**	0	1	0	**1**	**1**	0	0	0	**0**	1	1	1	**3**	**3**	**4**
17:15	17:30	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	1	1	**2**	**2**	**2**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	2	2	2	**6**	**6**	**6**
17:45	18:00	0	1	0	**1**	0	2	0	**2**	**3**	0	0	0	**0**	2	1	2	**5**	**5**	**8**
Total:	None	3	28	0	**31**	0	20	7	**27**	**58**	0	0	0	**0**	62	80	27	**169**	**169**	**227**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BOOTH ST @ RAYMOND ST

Survey Date: Thursday, September 01, 2016 **WO No:** 36266

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

Full Study 15 Minute U-Turn Total

		BOOTH ST		RAYMOND ST		
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	1	0	0	1
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	1	0	0	1

Appendix C

Synchro Intersection Worksheets – Existing Conditions

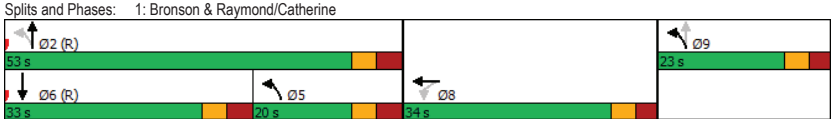
Lane Group	WBL	WBT	NBL	NBT	SBT	Ø5	Ø9
Lane Configurations							
Traffic Volume (vph)	492	479	519	1038	428		
Future Volume (vph)	492	479	519	1038	428		
Lane Group Flow (vph)	372	1091	577	1153	607		
Turn Type	Perm	NA	pm+pt	NA	NA		
Protected Phases		8	5 9	2	6	5	9
Permitted Phases	8		2	9			
Detector Phase	8	8	5 9	2	6		
Switch Phase							
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	5.0
Minimum Split (s)	28.3	28.3		24.8	24.8	11.8	11.8
Total Split (s)	34.0	34.0		53.0	33.0	20.0	23.0
Total Split (%)	30.9%	30.9%		48.2%	30.0%	18%	21%
Maximum Green (s)	27.7	27.7		46.2	26.2	13.2	16.8
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0		3.5	3.5	3.5	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.3	6.3		6.8	6.8		
Lead/Lag					Lead	Lag	
Lead-Lag Optimize?					Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Recall Mode	Max	Max		C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	15.0	15.0		10.0	10.0		
Pedestrian Calls (#/hr)	40	40		45	26		
Act Effct Green (s)	27.7	27.7	62.4	69.2	26.2		
Actuated g/C Ratio	0.25	0.25	0.57	0.63	0.24		
v/c Ratio	1.06	1.01	0.98	0.55	0.82		
Control Delay	104.4	69.0	54.6	12.9	45.3		
Queue Delay	0.0	0.0	0.0	0.0	17.7		
Total Delay	104.4	69.0	54.6	12.9	63.0		
LOS	F	E	D	B	E		
Approach Delay		78.0		26.8	63.0		
Approach LOS		E		C	E		
Queue Length 50th (m)	~102.0	~87.7	65.1	68.4	62.4		
Queue Length 95th (m)	#168.1	#120.8	#142.4	85.5	#85.8		
Internal Link Dist (m)		247.5		81.5	56.5		
Turn Bay Length (m)	110.0		45.0				
Base Capacity (vph)	352	1077	586	2086	741		
Starvation Cap Reductn	0	0	0	0	136		
Spillback Cap Reductn	0	0	0	52	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	1.06	1.01	0.98	0.57	1.00		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 38 (35%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 110

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 52.3 Intersection LOS: D
Intersection Capacity Utilization 86.2% 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.

Splits and Phases: 1: Bronson & Raymond/Catherine



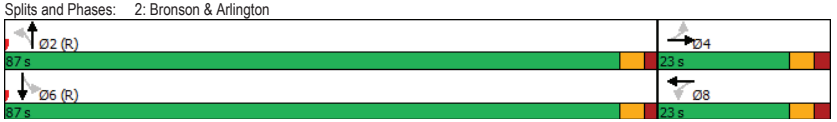
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	9	4	8	2	13	1365	2	514
Future Volume (vph)	9	4	8	2	13	1365	2	514
Lane Group Flow (vph)	0	41	0	23	0	1538	0	589
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	87.0	87.0	87.0	87.0
Total Split (%)	20.9%	20.9%	20.9%	20.9%	79.1%	79.1%	79.1%	79.1%
Maximum Green (s)	17.4	17.4	17.4	17.4	81.8	81.8	81.8	81.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	23	23	19	19	21	21	27	27
Act Effct Green (s)		12.8		12.8		90.6		90.6
Actuated g/C Ratio		0.12		0.12		0.82		0.82
v/c Ratio		0.22		0.15		0.60		0.24
Control Delay		23.9		28.6		5.0		3.3
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		23.9		28.6		5.0		3.4
LOS		C		C		A		A
Approach Delay		23.9		28.6		5.0		3.4
Approach LOS		C		C		A		A
Queue Length 50th (m)		2.8		2.2		32.8		11.9
Queue Length 95th (m)		12.3		9.4		m48.3		23.3
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		243		210		2556		2462
Starvation Cap Reductn		0		0		97		0
Spillback Cap Reductn		3		1		0		456
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.17		0.11		0.63		0.29

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 11 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 5.2 Intersection LOS: A
Intersection Capacity Utilization 70.1% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	46	248	83	155	123	1076	13	384
Future Volume (vph)	46	248	83	155	123	1076	13	384
Lane Group Flow (vph)	51	375	92	192	137	1363	14	470
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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	37.0	37.0	37.0	37.0	58.0	58.0	58.0	58.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	85	85	36	36	36	36	31	31
Act Effct Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.55	0.55	0.55	0.55
v/c Ratio	0.15	0.73	0.49	0.36	0.32	0.78	0.14	0.27
Control Delay	24.5	38.0	36.3	27.0	14.3	21.1	14.7	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	38.0	36.3	27.0	14.3	21.1	14.7	12.0
LOS	C	D	D	C	B	C	B	B
Approach Delay		36.4		30.0		20.5		12.0
Approach LOS		D		C		C		B
Queue Length 50th (m)	6.6	60.3	13.4	26.7	13.0	98.0	1.2	22.7
Queue Length 95th (m)	15.3	93.3	29.5	44.9	25.4	126.3	4.9	31.7
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	331	516	189	533	431	1742	101	1722
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.73	0.49	0.36	0.32	0.78	0.14	0.27

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 42 (44%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 22.5 Intersection LOS: C
Intersection Capacity Utilization 94.8% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: Bronson & Gladstone

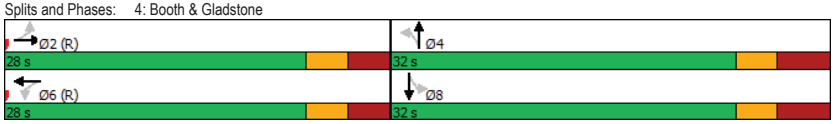
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	300	42	230	51	330	38	130
Future Volume (vph)	26	300	42	230	51	330	38	130
Lane Group Flow (vph)	29	412	47	290	57	453	42	166
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Maximum Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	43	43	28	28	29	29	0	0
Act Effct Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.42	0.42	0.42	0.42
v/c Ratio	0.09	0.69	0.19	0.48	0.12	0.64	0.15	0.23
Control Delay	13.5	22.7	15.6	17.2	9.9	13.3	12.5	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	22.7	15.6	17.2	9.9	13.3	12.5	11.2
LOS	B	C	B	B	A	B	B	B
Approach Delay		22.1		16.9		12.9		11.4
Approach LOS		C		B		B		B
Queue Length 50th (m)	2.0	35.3	3.4	22.6	2.3	17.3	2.7	10.1
Queue Length 95th (m)	6.6	#64.4	10.0	41.3	m6.7	37.1	8.3	20.6
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	332	597	243	609	473	712	288	721
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.69	0.19	0.48	0.12	0.64	0.15	0.23

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 16 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 16.3 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: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	30	380	293	0
Future Volume (vph)	30	380	293	0
Lane Group Flow (vph)	0	456	342	40
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	8
Permitted Phases	2			
Detector Phase	2	2	6	8
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	23.2
Total Split (s)	31.8	31.8	31.8	23.2
Total Split (%)	57.8%	57.8%	57.8%	42.2%
Maximum Green (s)	26.3	26.3	26.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	None
Walk Time (s)	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	84	84	44	35
Act Effct Green (s)		41.3	41.3	13.1
Actuated g/C Ratio		0.74	0.74	0.24
v/c Ratio		0.37	0.27	0.10
Control Delay		7.8	6.8	5.0
Queue Delay		0.0	0.0	0.0
Total Delay		7.8	6.8	5.0
LOS		A	A	A
Approach Delay		7.8	6.8	5.0
Approach LOS		A	A	A
Queue Length 50th (m)		19.5	13.1	0.0
Queue Length 95th (m)		53.5	36.6	4.2
Internal Link Dist (m)		246.0	139.3	183.9
Turn Bay Length (m)				
Base Capacity (vph)		1229	1246	523
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.37	0.27	0.08

Intersection Summary
Cycle Length: 55
Actuated Cycle Length: 55.5
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 67.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	218	108	38	378	203
Future Volume (vph)	218	108	38	378	203
Lane Group Flow (vph)	378	120	42	420	264
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	34.5	34.5	34.5
Total Split (%)	42.5%	42.5%	57.5%	57.5%	57.5%
Maximum Green (s)	20.0	20.0	29.3	29.3	29.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	15	15	48	48	38
Act Effct Green (s)	20.0	20.0	29.3	29.3	29.3
Actuated g/C Ratio	0.33	0.33	0.49	0.49	0.49
v/c Ratio	0.69	0.22	0.09	0.49	0.32
Control Delay	25.4	4.6	8.9	12.9	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	4.6	8.9	12.9	14.2
LOS	C	A	A	B	B
Approach Delay	20.4			12.5	14.2
Approach LOS	C			B	B
Queue Length 50th (m)	35.3	0.0	2.3	28.9	15.7
Queue Length 95th (m)	#63.8	8.9	6.6	49.4	m26.2
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	549	541	486	852	835
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	0.69	0.22	0.09	0.49	0.32

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 16.1 — Intersection LOS: B
Intersection Capacity Utilization 64.2% — ICU Level of Service C
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: 6: Booth & Raymond

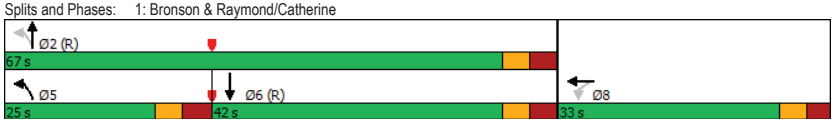
Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	690	573	292	762	801
Future Volume (vph)	690	573	292	762	801
Lane Group Flow (vph)	430	1274	324	847	1073
Turn Type	Perm	NA	pm+pt	NA	NA
Protected Phases		8	5	2	6
Permitted Phases	8		2		
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	28.3	28.3	11.8	24.8	24.8
Total Split (s)	33.0	33.0	25.0	67.0	42.0
Total Split (%)	33.0%	33.0%	25.0%	67.0%	42.0%
Maximum Green (s)	26.7	26.7	18.2	60.2	35.2
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.8	6.8	6.8
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	15.0	15.0		10.0	10.0
Pedestrian Calls (#/hr)	24	24		29	41
Act Effct Green (s)	26.7	26.7	60.2	60.2	36.1
Actuated g/C Ratio	0.27	0.27	0.60	0.60	0.36
v/c Ratio	1.13	1.09	0.92	0.42	0.92
Control Delay	122.4	86.7	57.8	11.5	29.8
Queue Delay	0.0	0.0	0.0	0.0	12.0
Total Delay	122.4	86.7	57.8	11.5	41.8
LOS	F	F	E	B	D
Approach Delay		95.7		24.3	41.8
Approach LOS		F		C	D
Queue Length 50th (m)	~113.0	~103.8	46.8	42.7	90.5
Queue Length 95th (m)	#180.0	#134.1	#95.4	55.4	#140.8
Internal Link Dist (m)		247.5		81.5	56.5
Turn Bay Length (m)	110.0		45.0		
Base Capacity (vph)	380	1173	366	1996	1166
Starvation Cap Reductn	0	0	0	0	100
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.13	1.09	0.89	0.42	1.01

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 60 (60%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 100

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 59.9 Intersection LOS: E
Intersection Capacity Utilization 88.2% 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.

Splits and Phases: 1: Bronson & Raymond/Catherine



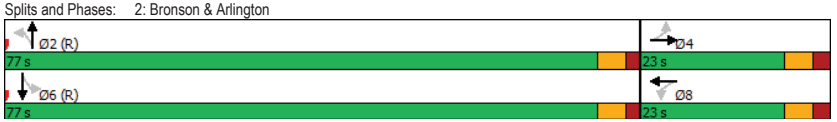
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	11	2	2	0	24	996	3	914
Future Volume (vph)	11	2	2	0	24	996	3	914
Lane Group Flow (vph)	0	70	0	15	0	1147	0	1037
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	77.0	77.0	77.0	77.0
Total Split (%)	23.0%	23.0%	23.0%	23.0%	77.0%	77.0%	77.0%	77.0%
Maximum Green (s)	17.4	17.4	17.4	17.4	71.8	71.8	71.8	71.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	19	19	20	20	29	29	39	39
Act Effct Green (s)		12.8		12.8		80.6		80.6
Actuated g/C Ratio		0.13		0.13		0.81		0.81
v/c Ratio		0.31		0.08		0.48		0.41
Control Delay		17.3		10.1		3.0		2.0
Queue Delay		0.0		0.0		0.0		0.1
Total Delay		17.4		10.1		3.0		2.1
LOS		B		B		A		A
Approach Delay		17.4		10.1		3.0		2.1
Approach LOS		B		B		A		A
Queue Length 50th (m)		2.5		0.0		15.0		14.1
Queue Length 95th (m)		14.2		4.0		m32.5		17.1
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		288		253		2395		2504
Starvation Cap Reductn		0		0		140		0
Spillback Cap Reductn		4		0		0		259
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.25		0.06		0.51		0.46

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 29 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 3.1 Intersection LOS: A
Intersection Capacity Utilization 67.8% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



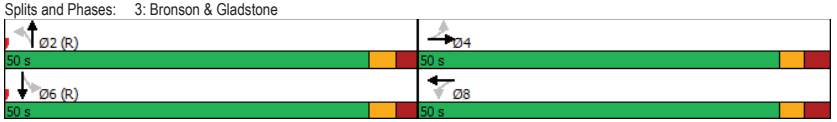
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	46	291	137	220	96	761	49	758
Future Volume (vph)	46	291	137	220	96	761	49	758
Lane Group Flow (vph)	51	403	152	263	107	998	54	935
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	69	69	68	68	44	44	47	47
Act Effct Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.13	0.57	0.51	0.36	0.71	0.73	0.41	0.66
Control Delay	17.9	24.8	28.0	20.5	39.3	16.2	30.9	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	24.8	28.0	20.5	39.3	16.2	30.9	24.9
LOS	B	C	C	C	D	B	C	C
Approach Delay		24.1		23.2		18.4		25.2
Approach LOS		C		C		B		C
Queue Length 50th (m)	5.8	56.7	20.8	33.1	11.1	55.3	6.9	73.3
Queue Length 95th (m)	13.2	86.0	41.2	52.2	#46.2	34.8	19.4	94.5
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	395	713	296	736	151	1372	132	1416
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.57	0.51	0.36	0.71	0.73	0.41	0.66

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 40 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 22.2 Intersection LOS: C
Intersection Capacity Utilization 86.1% 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: 3: Bronson & Gladstone



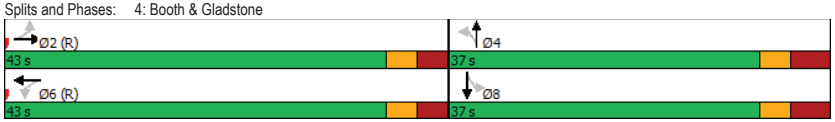
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	37	287	138	431	99	353	47	327
Future Volume (vph)	37	287	138	431	99	353	47	327
Lane Group Flow (vph)	41	366	153	523	110	474	52	385
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	43.0	43.0	43.0	43.0	37.0	37.0	37.0	37.0
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.3%	46.3%	46.3%	46.3%
Maximum Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	46	46	41	41	27	27	27	27
Act Effct Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.38	0.38	0.38	0.38
v/c Ratio	0.16	0.47	0.43	0.66	0.42	0.74	0.26	0.59
Control Delay	14.7	16.9	29.4	31.5	24.5	29.5	21.6	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	16.9	29.4	31.5	24.5	29.5	21.6	24.4
LOS	B	B	C	C	C	C	C	C
Approach Delay		16.7		31.0		28.5		24.1
Approach LOS		B		C		C		C
Queue Length 50th (m)	3.5	35.4	23.6	83.9	12.1	59.0	5.3	45.5
Queue Length 95th (m)	9.7	57.6	42.3	114.6	26.5	#95.4	14.2	72.8
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	251	772	357	789	264	639	200	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.47	0.43	0.66	0.42	0.74	0.26	0.59

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 51 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 26.1 — Intersection LOS: C
Intersection Capacity Utilization 89.9% — 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: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBL	WBT	SBT
Lane Configurations					
Traffic Volume (vph)	31	426	1	499	1
Future Volume (vph)	31	426	1	499	1
Lane Group Flow (vph)	0	514	0	565	75
Turn Type	Perm	NA	Perm	NA	NA
Protected Phases		2		6	8
Permitted Phases	2		6		
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	23.2
Total Split (s)	56.8	56.8	56.8	56.8	23.2
Total Split (%)	71.0%	71.0%	71.0%	71.0%	29.0%
Maximum Green (s)	51.3	51.3	51.3	51.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None
Walk Time (s)	19.0	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	75	75	59	59	45
Act Effct Green (s)		58.6		58.6	14.8
Actuated g/C Ratio		0.73		0.73	0.18
v/c Ratio		0.43		0.44	0.25
Control Delay		6.2		7.6	12.1
Queue Delay		0.0		0.2	0.0
Total Delay		6.2		7.9	12.1
LOS		A		A	B
Approach Delay		6.2		7.9	12.1
Approach LOS		A		A	B
Queue Length 50th (m)		21.6		40.0	1.8
Queue Length 95th (m)		32.6		62.2	11.9
Internal Link Dist (m)		246.0		139.3	183.9
Turn Bay Length (m)					
Base Capacity (vph)		1202		1273	352
Starvation Cap Reductn		0		193	0
Spillback Cap Reductn		0		0	0
Storage Cap Reductn		0		0	0
Reduced v/c Ratio		0.43		0.52	0.21

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 65 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 7.4 Intersection LOS: A
Intersection Capacity Utilization 73.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	331	194	31	332	468
Future Volume (vph)	331	194	31	332	468
Lane Group Flow (vph)	565	216	34	369	620
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	44.5	44.5	44.5
Total Split (%)	36.4%	36.4%	63.6%	63.6%	63.6%
Maximum Green (s)	20.0	20.0	39.3	39.3	39.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	14	14	47	47	32
Act Effct Green (s)	20.0	20.0	39.3	39.3	39.3
Actuated g/C Ratio	0.29	0.29	0.56	0.56	0.56
v/c Ratio	1.18	0.39	0.12	0.38	0.65
Control Delay	127.5	5.5	8.5	9.9	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	127.5	5.5	8.5	9.9	14.2
LOS	F	A	A	A	B
Approach Delay	93.7			9.8	14.2
Approach LOS	F			A	B
Queue Length 50th (m)	~90.7	0.0	1.9	24.4	49.0
Queue Length 95th (m)	#145.4	13.8	5.9	40.5	81.1
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	479	558	287	979	954
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	0.39	0.12	0.38	0.65

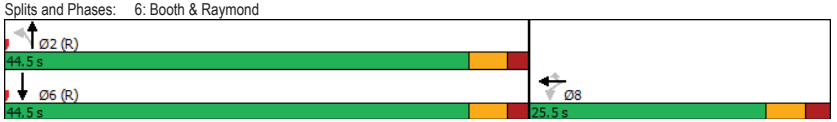
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 39 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 65

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.18
Intersection Signal Delay: 47.6 — Intersection LOS: D
Intersection Capacity Utilization 76.5% — 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: 6: Booth & Raymond



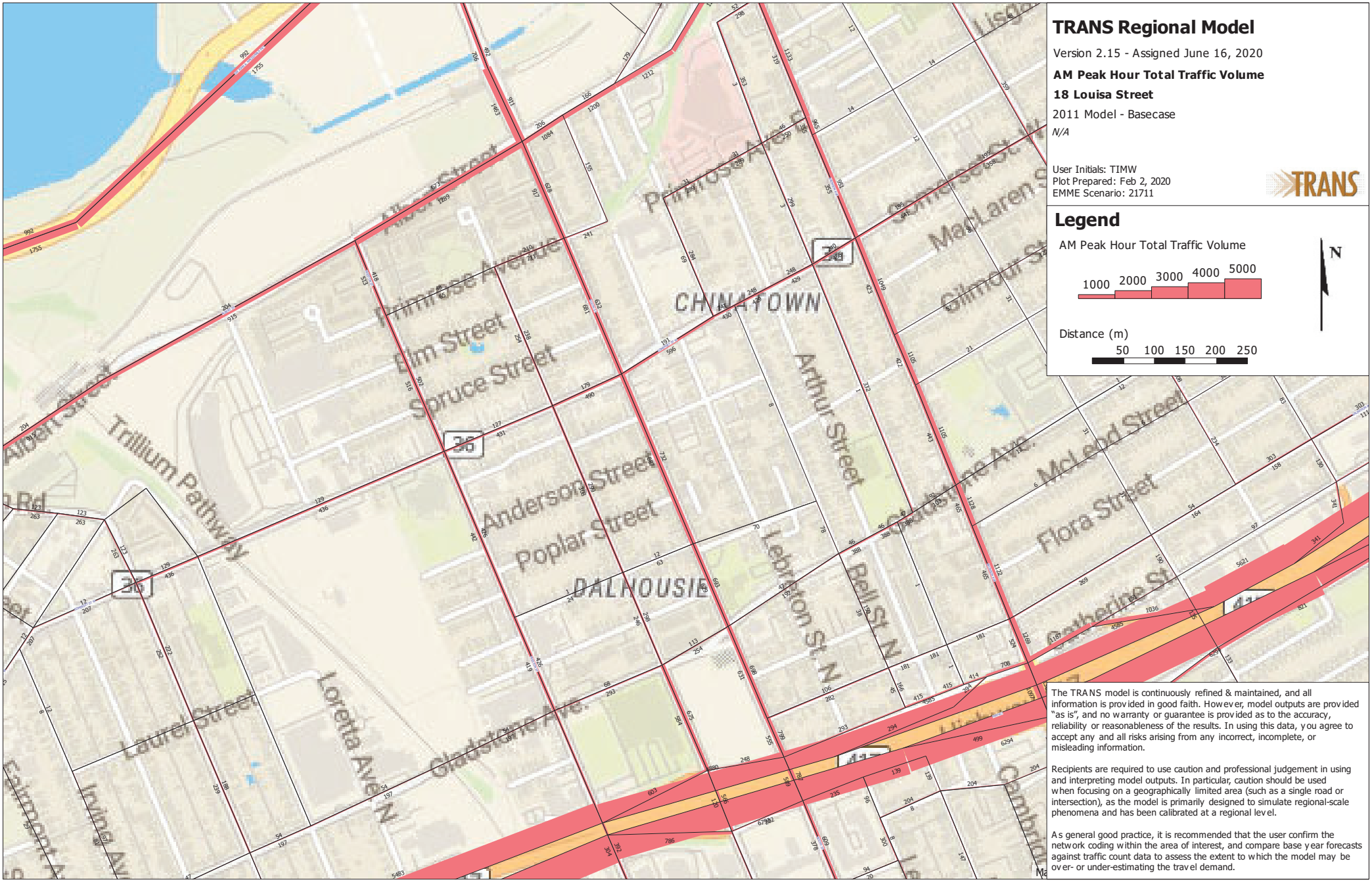
Appendix D

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
2018-01-24	2018	23:29	ARLINGTON AVE @ BELL ST	01 - Clear	07 - Dark	02 - Stop sign		02 - Non-fatal injury	07 - SMV other	03 - Loose snow
2017-04-18	2017	21:00	ARLINGTON AVE @ BOOTH ST	01 - Clear	07 - Dark	02 - Stop sign		03 - P.D. only	03 - Rear end	01 - Dry
2015-01-12	2015	6:35	ARLINGTON AVE @ BRONSON AVE	03 - Snow	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	05 - Turning movement	03 - Loose snow
2015-03-28	2015	16:49	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2015-05-24	2015	16:07	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	02 - Angle	01 - Dry
2015-08-26	2015	11:45	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-11-08	2015	15:00	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2015-12-17	2015	11:46	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2016-02-04	2016	10:18	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2016-06-01	2016	18:20	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-10-16	2016	11:56	ARLINGTON AVE @ BRONSON AVE	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2016-12-02	2016	19:42	ARLINGTON AVE @ BRONSON AVE	02 - Rain	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-01-08	2017	12:33	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2017-03-10	2017	12:42	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2017-05-23	2017	19:42	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	02 - Angle	01 - Dry
2017-06-05	2017	18:01	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-06-30	2017	15:33	ARLINGTON AVE @ BRONSON AVE	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-12-14	2017	13:50	ARLINGTON AVE @ BRONSON AVE	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	04 - Slush
2019-02-19	2019	15:30	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2019-03-14	2019	15:30	ARLINGTON AVE @ BRONSON AVE	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2019-06-26	2019	15:35	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2019-12-22	2019	10:28	ARLINGTON AVE @ BRONSON AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-06-28	2017	19:56	ARLINGTON AVE btwn ARTHUR LANE N & CAMBRIDGE ST N	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2018-04-03	2018	20:00	ARLINGTON AVE btwn ARTHUR LANE N & CAMBRIDGE ST N	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2018-01-07	2018	Unknown	ARLINGTON AVE btwn BELL ST N & ARTHUR LANE N	01 - Clear	00 - Unknown	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	03 - Loose snow
2016-05-10	2016	0:00	ARLINGTON AVE btwn BOOTH ST & LEBRETON ST N	01 - Clear	00 - Unknown	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2017-09-24	2017	0:00	ARLINGTON AVE btwn BOOTH ST & LEBRETON ST N	01 - Clear	00 - Unknown	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2019-01-09	2019	12:00	ARLINGTON AVE btwn BOOTH ST & LEBRETON ST N	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2015-02-27	2015	12:15	ARLINGTON AVE btwn CAMBRIDGE ST N & BRONSON AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-09-08	2015	22:03	ARLINGTON AVE btwn CAMBRIDGE ST N & BRONSON AVE	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2015-03-13	2015	11:51	BELL ST @ GLADSTONE AVE	03 - Snow	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2015-03-30	2015	18:18	BELL ST @ GLADSTONE AVE	03 - Snow	05 - Dusk	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2016-03-07	2016	8:01	BELL ST @ GLADSTONE AVE	03 - Snow	01 - Daylight	02 - Stop sign		03 - P.D. only	06 - SMV unattended vehicle	06 - Ice
2016-08-12	2016	14:07	BELL ST @ GLADSTONE AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	03 - Rear end	01 - Dry
2016-12-14	2016	15:30	BELL ST @ GLADSTONE AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	03 - Rear end	02 - Wet
2017-08-21	2017	20:16	BELL ST @ GLADSTONE AVE	01 - Clear	05 - Dusk	02 - Stop sign		02 - Non-fatal injury	05 - Turning movement	01 - Dry
2017-09-08	2017	16:58	BELL ST @ GLADSTONE AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2017-11-06	2017	17:00	BELL ST @ GLADSTONE AVE	01 - Clear	05 - Dusk	02 - Stop sign		02 - Non-fatal injury	05 - Turning movement	01 - Dry
2019-10-01	2019	17:00	BELL ST @ GLADSTONE AVE	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	03 - Rear end	01 - Dry
2015-05-27	2015	15:58	BELL ST N btwn GLADSTONE AVE & LOUISA ST	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2017-09-06	2017	0:00	BELL ST N btwn GLADSTONE AVE & LOUISA ST	01 - Clear	00 - Unknown	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2018-06-14	2018	19:51	BELL ST N btwn GLADSTONE AVE & LOUISA ST	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2018-08-24	2018	22:29	BELL ST N btwn GLADSTONE AVE & LOUISA ST	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2019-05-29	2019	16:30	BELL ST N btwn GLADSTONE AVE & LOUISA ST	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	99 - Other	01 - Dry
2015-08-18	2015	13:49	BOOTH ST @ LOUISA ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2015-12-27	2015	3:28	BOOTH ST @ LOUISA ST	03 - Snow	07 - Dark	02 - Stop sign		03 - P.D. only	02 - Angle	04 - Slush
2017-02-28	2017	9:32	BOOTH ST @ LOUISA ST	01 - Clear	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-11-01	2017	15:26	BOOTH ST @ LOUISA ST	01 - Clear	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	03 - Rear end	02 - Wet
2017-03-15	2017	11:11	BOOTH ST btwn LOUISA ST & ARLINGTON AVE	03 - Snow	01 - Daylight	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	03 - Loose snow
2017-12-06	2017	11:46	BOOTH ST btwn LOUISA ST & ARLINGTON AVE	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-02-02	2015	7:18	GLADSTONE AVE @ LEBRETON ST	03 - Snow	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	05 - Turning movement	03 - Loose snow
2015-07-08	2015	15:57	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2015-09-21	2015	16:56	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2016-06-11	2016	19:30	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2017-03-17	2017	17:40	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2017-04-07	2017	8:50	GLADSTONE AVE @ LEBRETON ST	02 - Rain	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2017-05-20	2017	14:38	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2017-12-31	2017	9:27	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2018-05-24	2018	23:54	GLADSTONE AVE @ LEBRETON ST	01 - Clear	07 - Dark	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2018-06-09	2018	22:31	GLADSTONE AVE @ LEBRETON ST	01 - Clear	07 - Dark	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2018-07-28	2018	19:34	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	02 - Angle	01 - Dry
2018-08-08	2018	18:36	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	02 - Angle	01 - Dry
2018-10-30	2018	17:43	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2019-02-16	2019	15:30	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2019-05-23	2019	1:34	GLADSTONE AVE @ LEBRETON ST	01 - Clear	07 - Dark	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2019-05-28	2019	9:59	GLADSTONE AVE @ LEBRETON ST	02 - Rain	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2019-06-09	2019	17:20	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		02 - Non-fatal injury	02 - Angle	01 - Dry
2019-06-19	2019	16:16	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2019-06-27	2019	13:45	GLADSTONE AVE @ LEBRETON ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2019-10-31	2019	9:15	GLADSTONE AVE @ LEBRETON ST	02 - Rain	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2019-12-20	2019	16:20	GLADSTONE AVE @ LEBRETON ST	01 - Clear	05 - Dusk	02 - Stop sign		03 - P.D. only	02 - Angle	02 - Wet
2017-05-21	2017	10:12	GLADSTONE AVE btwn LEBRETON ST N & BELL ST N	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2018-03-15	2018	13:45	GLADSTONE AVE btwn LEBRETON ST N & BELL ST N	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	02 - Angle	01 - Dry
2019-08-08	2019	10:06	GLADSTONE AVE btwn LEBRETON ST N & BELL ST N	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	99 - Other	01 - Dry
2019-01-17	2019	12:20	LEBRETON ST @ LOUISA ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	06 - Ice
2016-10-20	2016	12:46	LEBRETON ST @ RAYMOND ST	02 - Rain	01 - Daylight	02 - Stop sign		03 - P.D. only	04 - Sideswipe	02 - Wet
2017-07-25	2017	16:12	LEBRETON ST @ RAYMOND ST	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-09-11	2017	10:00	LEBRETON ST N btwn GLADSTONE AVE & LOUISA ST	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2019-12-13	2019	0:00	LEBRETON ST N btwn GLADSTONE AVE & LOUISA ST	01 - Clear	00 - Unknown	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	02 - Wet
2017-04-16	2017	0:00	LEBRETON ST N btwn LOUISA ST & ARLINGTON AVE	01 - Clear	00 - Unknown	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2019-08-16	2019	0:00	LEBRETON ST N btwn LOUISA ST & ARLINGTON AVE	01 - Clear	00 - Unknown	10 - No control		03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2015-10-23	2015	23:45	LOUISA ST btwn LEBRETON ST N & BELL ST N	01 - Clear	07 - Dark	10 - No control		02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-05-07	2018	22:04	LOUISA ST btwn LEBRETON ST N & BELL ST N	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	07 - SMV other	01 - Dry
2018-10-24	2018	19:26	RAYMOND ST btwn LEBRETON ST N & BELL ST N	01 - Clear	07 - Dark	10 - No control		02 - Non-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

18 Louisa Street

2011 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: Feb 2, 2020
EMME Scenario: 21711

TRANS

Legend

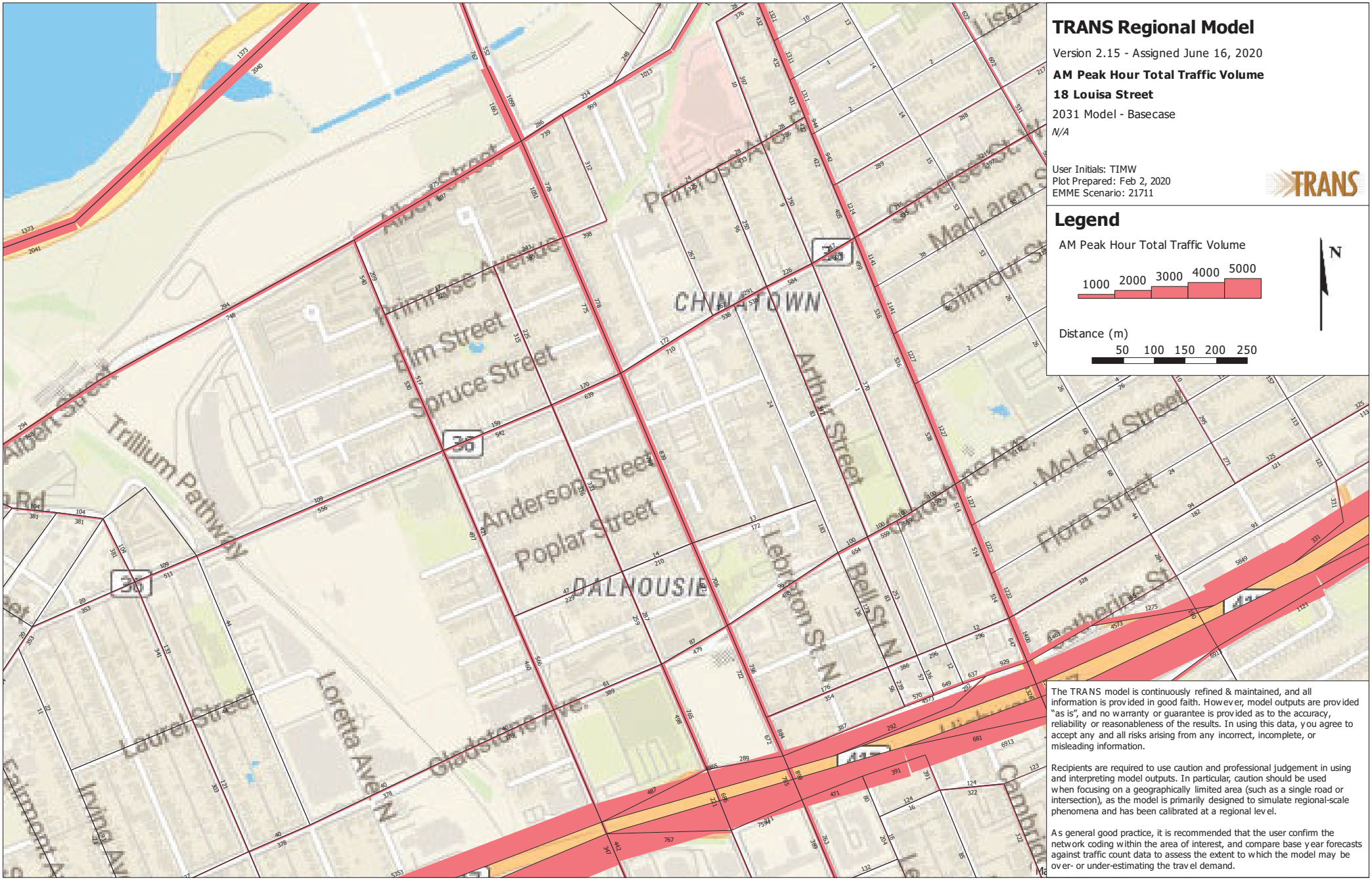
AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

Distance (m)

50 100 150 200 250

N



TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

18 Louisa Street

2031 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: Feb 2, 2020
EMME Scenario: 21711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

Distance (m)

50 100 150 200 250

N

Appendix F

Synchro Intersection Worksheets – 2025 Future Background Conditions

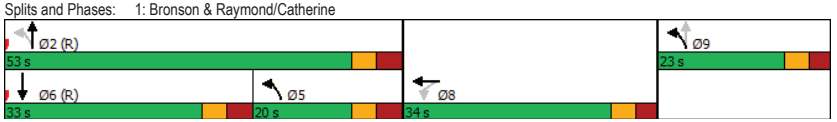
Lane Group	WBL	WBT	NBL	NBT	SBT	Ø5	Ø9
Lane Configurations							
Traffic Volume (vph)	527	514	537	1075	451		
Future Volume (vph)	527	514	537	1075	451		
Lane Group Flow (vph)	353	1034	537	1075	569		
Turn Type	Perm	NA	pm+pt	NA	NA		
Protected Phases		8	5 9	2	6	5	9
Permitted Phases	8		2	9			
Detector Phase	8	8	5 9	2	6		
Switch Phase							
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	5.0
Minimum Split (s)	28.3	28.3		24.8	24.8	11.8	11.8
Total Split (s)	34.0	34.0		53.0	33.0	20.0	23.0
Total Split (%)	30.9%	30.9%		48.2%	30.0%	18%	21%
Maximum Green (s)	27.7	27.7		46.2	26.2	13.2	16.8
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0		3.5	3.5	3.5	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.3	6.3		6.8	6.8		
Lead/Lag					Lead	Lag	
Lead-Lag Optimize?					Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Recall Mode	Max	Max		C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	15.0	15.0		10.0	10.0		
Pedestrian Calls (#/hr)	40	40		45	26		
Act Effct Green (s)	27.7	27.7	62.4	69.2	26.2		
Actuated g/C Ratio	0.25	0.25	0.57	0.63	0.24		
v/c Ratio	1.00	0.95	0.90	0.52	0.77		
Control Delay	90.9	54.4	36.8	12.3	42.4		
Queue Delay	0.0	0.0	0.0	0.0	9.4		
Total Delay	90.9	54.4	36.8	12.3	51.8		
LOS	F	D	D	B	D		
Approach Delay		63.6		20.5	51.8		
Approach LOS		E		C	D		
Queue Length 50th (m)	~88.8	78.2	58.5	61.5	57.7		
Queue Length 95th (m)	#156.7	#108.0	#111.4	77.2	77.9		
Internal Link Dist (m)		247.5		81.5	56.5		
Turn Bay Length (m)	110.0		45.0				
Base Capacity (vph)	352	1092	600	2086	741		
Starvation Cap Reductn	0	0	0	0	144		
Spillback Cap Reductn	0	0	0	39	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	1.00	0.95	0.90	0.53	0.95		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 38 (35%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 42.2 Intersection LOS: D
Intersection Capacity Utilization 88.9% 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.

Splits and Phases: 1: Bronson & Raymond/Catherine



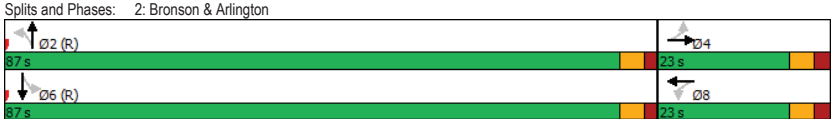
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	9	4	8	2	13	1413	2	542
Future Volume (vph)	9	4	8	2	13	1413	2	542
Lane Group Flow (vph)	0	37	0	21	0	1432	0	558
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	87.0	87.0	87.0	87.0
Total Split (%)	20.9%	20.9%	20.9%	20.9%	79.1%	79.1%	79.1%	79.1%
Maximum Green (s)	17.4	17.4	17.4	17.4	81.8	81.8	81.8	81.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	23	23	19	19	21	21	27	27
Act Effct Green (s)		12.8		12.8		90.6		90.6
Actuated g/C Ratio		0.12		0.12		0.82		0.82
v/c Ratio		0.20		0.13		0.56		0.23
Control Delay		24.3		29.0		4.4		3.3
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		24.3		29.0		4.4		3.3
LOS		C		C		A		A
Approach Delay		24.3		29.0		4.4		3.3
Approach LOS		C		C		A		A
Queue Length 50th (m)		2.6		2.0		29.8		11.2
Queue Length 95th (m)		11.7		9.0		m44.5		22.0
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		242		211		2559		2462
Starvation Cap Reductn		0		0		96		0
Spillback Cap Reductn		2		0		0		345
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.15		0.10		0.58		0.26

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 11 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 4.7 Intersection LOS: A
Intersection Capacity Utilization 71.5% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



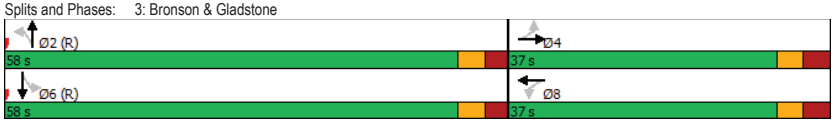
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	46	305	83	175	123	1114	13	405
Future Volume (vph)	46	305	83	175	123	1114	13	405
Lane Group Flow (vph)	46	394	83	193	123	1264	13	444
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	37.0	37.0	37.0	37.0	58.0	58.0	58.0	58.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	85	85	36	36	36	36	31	31
Act Effct Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.55	0.55	0.55	0.55
v/c Ratio	0.14	0.75	0.47	0.36	0.28	0.73	0.10	0.26
Control Delay	24.2	39.4	36.3	27.0	13.6	19.2	12.9	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	39.4	36.3	27.0	13.6	19.2	12.9	11.8
LOS	C	D	D	C	B	B	B	B
Approach Delay		37.8		29.8		18.7		11.9
Approach LOS		D		C		B		B
Queue Length 50th (m)	5.9	64.1	12.0	26.9	11.3	86.1	1.1	21.2
Queue Length 95th (m)	14.2	#105.5	27.4	45.3	22.4	111.2	4.4	29.8
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	330	523	176	534	445	1743	125	1724
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.75	0.47	0.36	0.28	0.73	0.10	0.26

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 42 (44%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 22.0 Intersection LOS: C
Intersection Capacity Utilization 98.8% ICU Level of Service F
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Bronson & Gladstone



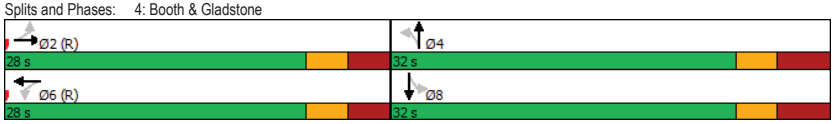
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	369	42	260	51	354	38	137
Future Volume (vph)	26	369	42	260	51	354	38	137
Lane Group Flow (vph)	26	440	42	291	51	431	38	157
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Maximum Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	43	43	28	28	29	29	0	0
Act Effct Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.42	0.42	0.42	0.42
v/c Ratio	0.08	0.73	0.19	0.48	0.11	0.60	0.12	0.22
Control Delay	13.4	25.0	15.7	17.3	9.6	12.6	12.1	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	25.0	15.7	17.3	9.6	12.6	12.1	11.1
LOS	B	C	B	B	A	B	B	B
Approach Delay		24.4		17.1		12.3		11.3
Approach LOS		C		B		B		B
Queue Length 50th (m)	1.8	39.1	3.1	22.9	2.0	16.4	2.5	9.5
Queue Length 95th (m)	6.1	#78.3	9.4	41.6	m6.0	33.8	7.5	19.6
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	330	600	223	609	477	713	304	721
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.73	0.19	0.48	0.11	0.60	0.13	0.22

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 16 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 17.1 Intersection LOS: B
Intersection Capacity Utilization 86.8% 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: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	30	467	331	0
Future Volume (vph)	30	467	331	0
Lane Group Flow (vph)	0	498	345	36
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	8
Permitted Phases	2			
Detector Phase	2	2	6	8
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	23.2
Total Split (s)	31.8	31.8	31.8	23.2
Total Split (%)	57.8%	57.8%	57.8%	42.2%
Maximum Green (s)	26.3	26.3	26.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	None
Walk Time (s)	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	84	84	44	35
Act Effct Green (s)		42.0	42.0	13.2
Actuated g/C Ratio		0.75	0.75	0.23
v/c Ratio		0.40	0.27	0.09
Control Delay		8.0	6.7	4.5
Queue Delay		0.0	0.0	0.0
Total Delay		8.0	6.7	4.5
LOS		A	A	A
Approach Delay		8.0	6.7	4.5
Approach LOS		A	A	A
Queue Length 50th (m)		22.1	13.3	0.0
Queue Length 95th (m)		60.0	36.8	3.7
Internal Link Dist (m)		246.0	139.3	183.9
Turn Bay Length (m)				
Base Capacity (vph)		1246	1256	519
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.40	0.27	0.07

Intersection Summary
Cycle Length: 55
Actuated Cycle Length: 56.2
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 7.4	Intersection LOS: A
Intersection Capacity Utilization 72.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	218	108	38	405	214
Future Volume (vph)	218	108	38	405	214
Lane Group Flow (vph)	340	108	38	405	248
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	34.5	34.5	34.5
Total Split (%)	42.5%	42.5%	57.5%	57.5%	57.5%
Maximum Green (s)	20.0	20.0	29.3	29.3	29.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	15	15	48	48	38
Act Effct Green (s)	20.0	20.0	29.3	29.3	29.3
Actuated g/C Ratio	0.33	0.33	0.49	0.49	0.49
v/c Ratio	0.62	0.20	0.08	0.48	0.30
Control Delay	22.7	4.7	8.7	12.6	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	4.7	8.7	12.6	14.3
LOS	C	A	A	B	B
Approach Delay	18.4			12.2	14.3
Approach LOS	B			B	B
Queue Length 50th (m)	30.8	0.0	2.1	27.5	15.0
Queue Length 95th (m)	54.3	8.4	6.1	47.1	m25.1
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	549	533	500	852	835
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	0.62	0.20	0.08	0.48	0.30

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 15.1 Intersection LOS: B
Intersection Capacity Utilization 64.2% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Booth & Raymond

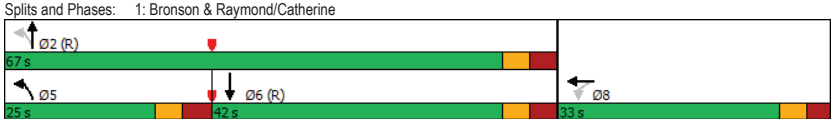
Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	690	573	308	803	829
Future Volume (vph)	690	573	308	803	829
Lane Group Flow (vph)	386	1147	308	803	994
Turn Type	Perm	NA	pm+pt	NA	NA
Protected Phases		8	5	2	6
Permitted Phases	8		2		
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	28.3	28.3	11.8	24.8	24.8
Total Split (s)	33.0	33.0	25.0	67.0	42.0
Total Split (%)	33.0%	33.0%	25.0%	67.0%	42.0%
Maximum Green (s)	26.7	26.7	18.2	60.2	35.2
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.8	6.8	6.8
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	15.0	15.0		10.0	10.0
Pedestrian Calls (#/hr)	24	24		29	41
Act Effct Green (s)	26.7	26.7	60.2	60.2	37.1
Actuated g/C Ratio	0.27	0.27	0.60	0.60	0.37
v/c Ratio	1.02	0.98	0.86	0.40	0.83
Control Delay	88.2	56.2	44.5	11.2	21.9
Queue Delay	0.0	0.0	0.0	0.0	4.0
Total Delay	88.2	56.2	44.5	11.2	26.0
LOS	F	E	D	B	C
Approach Delay		64.2		20.4	26.0
Approach LOS		E		C	C
Queue Length 50th (m)	~89.1	80.8	38.2	39.8	64.4
Queue Length 95th (m)	#156.3	#113.2	#79.6	51.8	#128.7
Internal Link Dist (m)		247.5		81.5	56.5
Turn Bay Length (m)	110.0		45.0		
Base Capacity (vph)	380	1173	385	1996	1200
Starvation Cap Reductn	0	0	0	0	138
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.02	0.98	0.80	0.40	0.94

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 60 (60%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 40.4 Intersection LOS: D
Intersection Capacity Utilization 89.9% 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.

Splits and Phases: 1: Bronson & Raymond/Catherine



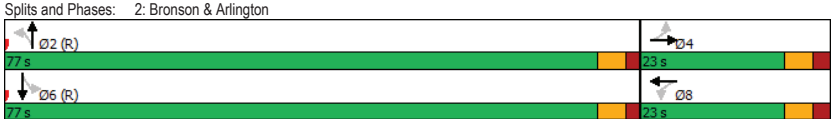
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	11	2	2	0	24	1049	3	946
Future Volume (vph)	11	2	2	0	24	1049	3	946
Lane Group Flow (vph)	0	63	0	14	0	1085	0	965
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	77.0	77.0	77.0	77.0
Total Split (%)	23.0%	23.0%	23.0%	23.0%	77.0%	77.0%	77.0%	77.0%
Maximum Green (s)	17.4	17.4	17.4	17.4	71.8	71.8	71.8	71.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	19	19	20	20	29	29	39	39
Act Effct Green (s)		12.8		12.8		80.6		80.6
Actuated g/C Ratio		0.13		0.13		0.81		0.81
v/c Ratio		0.28		0.07		0.45		0.38
Control Delay		17.7		9.4		2.8		2.0
Queue Delay		0.0		0.0		0.1		0.0
Total Delay		17.7		9.4		2.9		2.0
LOS		B		A		A		A
Approach Delay		17.7		9.4		2.9		2.0
Approach LOS		B		A		A		A
Queue Length 50th (m)		2.3		0.0		13.6		13.6
Queue Length 95th (m)		13.3		3.7		m29.4		16.5
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		284		253		2419		2507
Starvation Cap Reductn		0		0		239		0
Spillback Cap Reductn		3		0		0		223
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.22		0.06		0.50		0.42

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 29 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 3.0 Intersection LOS: A
Intersection Capacity Utilization 69.4% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



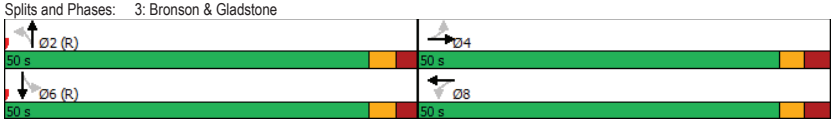
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	46	329	137	271	96	802	49	785
Future Volume (vph)	46	329	137	271	96	802	49	785
Lane Group Flow (vph)	46	401	137	288	96	939	49	869
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	69	69	68	68	44	44	47	47
Act Effct Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.12	0.56	0.46	0.39	0.56	0.68	0.33	0.61
Control Delay	17.9	24.7	26.1	21.0	25.1	15.6	26.0	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	24.7	26.1	21.0	25.1	15.6	26.0	23.8
LOS	B	C	C	C	C	B	C	C
Approach Delay		24.0		22.7		16.5		23.9
Approach LOS		C		C		B		C
Queue Length 50th (m)	5.2	56.4	18.2	36.8	9.2	51.0	6.0	66.1
Queue Length 95th (m)	12.3	85.3	36.3	57.4	#34.0	33.5	16.2	85.7
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	377	716	298	738	171	1375	150	1418
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.56	0.46	0.39	0.56	0.68	0.33	0.61

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 40 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 21.0 Intersection LOS: C
Intersection Capacity Utilization 89.3% 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: 3: Bronson & Gladstone



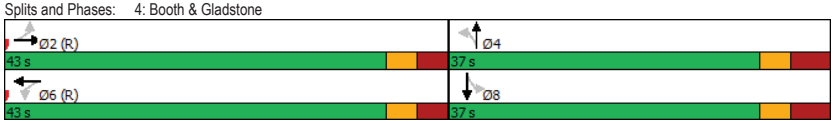
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	37	324	138	530	99	372	47	351
Future Volume (vph)	37	324	138	530	99	372	47	351
Lane Group Flow (vph)	37	366	138	570	99	446	47	371
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	43.0	43.0	43.0	43.0	37.0	37.0	37.0	37.0
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.3%	46.3%	46.3%	46.3%
Maximum Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	46	46	41	41	27	27	27	27
Act Effct Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.38	0.38	0.38	0.38
v/c Ratio	0.17	0.47	0.39	0.72	0.36	0.70	0.21	0.57
Control Delay	15.1	16.9	28.9	34.0	22.7	27.4	20.1	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	16.9	28.9	34.0	22.7	27.4	20.1	23.8
LOS	B	B	C	C	C	C	C	C
Approach Delay		16.7		33.0		26.5		23.4
Approach LOS		B		C		C		C
Queue Length 50th (m)	3.2	35.4	21.4	93.2	10.6	54.4	4.7	43.3
Queue Length 95th (m)	9.2	57.6	39.0	124.6	23.4	86.8	12.7	69.6
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	220	775	357	791	277	639	220	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.47	0.39	0.72	0.36	0.70	0.21	0.57

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 51 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 26.2 Intersection LOS: C
Intersection Capacity Utilization 96.4% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBL	WBT	SBT
Lane Configurations					
Traffic Volume (vph)	31	481	1	614	1
Future Volume (vph)	31	481	1	614	1
Lane Group Flow (vph)	0	518	0	624	68
Turn Type	Perm	NA	Perm	NA	NA
Protected Phases		2		6	8
Permitted Phases	2		6		
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	23.2
Total Split (s)	56.8	56.8	56.8	56.8	23.2
Total Split (%)	71.0%	71.0%	71.0%	71.0%	29.0%
Maximum Green (s)	51.3	51.3	51.3	51.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None
Walk Time (s)	19.0	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	75	75	59	59	45
Act Effct Green (s)		58.6		58.6	14.8
Actuated g/C Ratio		0.73		0.73	0.18
v/c Ratio		0.43		0.49	0.23
Control Delay		5.8		8.3	12.3
Queue Delay		0.0		0.3	0.0
Total Delay		5.8		8.5	12.3
LOS		A		A	B
Approach Delay		5.8		8.5	12.3
Approach LOS		A		A	B
Queue Length 50th (m)		19.9		46.6	1.7
Queue Length 95th (m)		30.5		72.5	11.3
Internal Link Dist (m)		246.0		139.3	183.9
Turn Bay Length (m)					
Base Capacity (vph)		1205		1274	348
Starvation Cap Reductn		0		182	0
Spillback Cap Reductn		0		0	0
Storage Cap Reductn		0		0	0
Reduced v/c Ratio		0.43		0.57	0.20

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 65 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 7.5 Intersection LOS: A
Intersection Capacity Utilization 76.5% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	331	194	31	350	502
Future Volume (vph)	331	194	31	350	502
Lane Group Flow (vph)	508	194	31	350	592
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	44.5	44.5	44.5
Total Split (%)	36.4%	36.4%	63.6%	63.6%	63.6%
Maximum Green (s)	20.0	20.0	39.3	39.3	39.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	14	14	47	47	32
Act Effct Green (s)	20.0	20.0	39.3	39.3	39.3
Actuated g/C Ratio	0.29	0.29	0.56	0.56	0.56
v/c Ratio	1.06	0.36	0.10	0.36	0.62
Control Delay	86.0	5.5	8.2	9.7	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	86.0	5.5	8.2	9.7	13.5
LOS	F	A	A	A	B
Approach Delay	63.8			9.6	13.5
Approach LOS	E			A	B
Queue Length 50th (m)	~74.8	0.0	1.7	22.9	45.6
Queue Length 95th (m)	#127.5	13.1	5.4	38.0	75.4
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	479	542	308	979	955
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	1.06	0.36	0.10	0.36	0.62

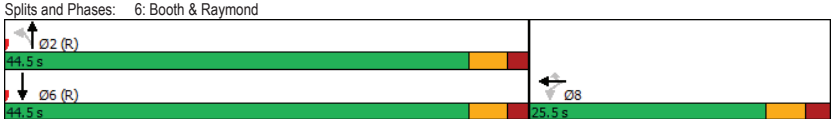
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 39 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 33.7 — Intersection LOS: C
Intersection Capacity Utilization 78.4% — 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: 6: Booth & Raymond



Appendix G

Synchro Intersection Worksheets – 2030 Future Background Conditions

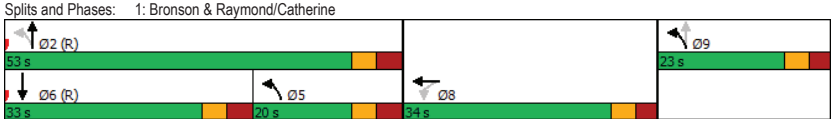
Lane Group	WBL	WBT	NBL	NBT	SBT	Ø5	Ø9
Lane Configurations							
Traffic Volume (vph)	554	540	551	1102	468		
Future Volume (vph)	554	540	551	1102	468		
Lane Group Flow (vph)	366	1074	551	1102	586		
Turn Type	Perm	NA	pm+pt	NA	NA		
Protected Phases		8	5 9	2	6	5	9
Permitted Phases	8		2	9			
Detector Phase	8	8	5 9	2	6		
Switch Phase							
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	5.0
Minimum Split (s)	28.3	28.3		24.8	24.8	11.8	11.8
Total Split (s)	34.0	34.0		53.0	33.0	20.0	23.0
Total Split (%)	30.9%	30.9%		48.2%	30.0%	18%	21%
Maximum Green (s)	27.7	27.7		46.2	26.2	13.2	16.8
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0		3.5	3.5	3.5	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.3	6.3		6.8	6.8		
Lead/Lag					Lead	Lag	
Lead-Lag Optimize?					Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Recall Mode	Max	Max		C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	15.0	15.0		10.0	10.0		
Pedestrian Calls (#/hr)	40	40		45	26		
Act Effct Green (s)	27.7	27.7	62.4	69.2	26.2		
Actuated g/C Ratio	0.25	0.25	0.57	0.63	0.24		
v/c Ratio	1.04	0.99	0.93	0.53	0.79		
Control Delay	99.8	62.0	42.2	12.5	43.7		
Queue Delay	0.0	0.0	0.0	0.0	12.9		
Total Delay	99.8	62.0	42.2	12.5	56.6		
LOS	F	E	D	B	E		
Approach Delay		71.6		22.4	56.6		
Approach LOS		E		C	E		
Queue Length 50th (m)	~98.9	83.0	60.7	63.8	60.1		
Queue Length 95th (m)	#164.0	#115.8	#122.5	80.0	80.6		
Internal Link Dist (m)		247.5		81.5	56.5		
Turn Bay Length (m)	110.0		45.0				
Base Capacity (vph)	352	1090	594	2086	741		
Starvation Cap Reductn	0	0	0	0	142		
Spillback Cap Reductn	0	0	0	40	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	1.04	0.99	0.93	0.54	0.98		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 38 (35%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 100

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 47.1 Intersection LOS: D
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.

Splits and Phases: 1: Bronson & Raymond/Catherine



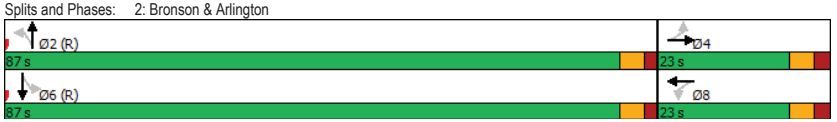
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	9	4	8	2	13	1449	2	562
Future Volume (vph)	9	4	8	2	13	1449	2	562
Lane Group Flow (vph)	0	37	0	21	0	1468	0	578
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	87.0	87.0	87.0	87.0
Total Split (%)	20.9%	20.9%	20.9%	20.9%	79.1%	79.1%	79.1%	79.1%
Maximum Green (s)	17.4	17.4	17.4	17.4	81.8	81.8	81.8	81.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	23	23	19	19	21	21	27	27
Act Effct Green (s)		12.8		12.8		90.6		90.6
Actuated g/C Ratio		0.12		0.12		0.82		0.82
v/c Ratio		0.20		0.13		0.57		0.23
Control Delay		24.3		29.0		4.4		3.3
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		24.3		29.0		4.4		3.4
LOS		C		C		A		A
Approach Delay		24.3		29.0		4.4		3.4
Approach LOS		C		C		A		A
Queue Length 50th (m)		2.6		2.0		28.4		11.6
Queue Length 95th (m)		11.7		9.0		m44.6		22.9
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		242		211		2559		2463
Starvation Cap Reductn		0		0		96		0
Spillback Cap Reductn		2		1		0		400
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.15		0.10		0.60		0.28

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 11 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 4.7 Intersection LOS: A
Intersection Capacity Utilization 72.6% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



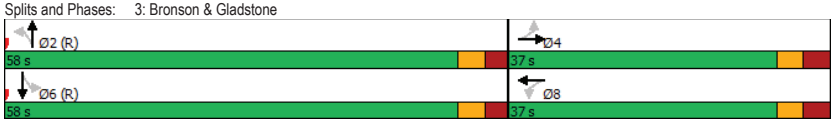
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	46	354	83	191	123	1142	13	420
Future Volume (vph)	46	354	83	191	123	1142	13	420
Lane Group Flow (vph)	46	443	83	209	123	1292	13	459
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	37.0	37.0	37.0	37.0	58.0	58.0	58.0	58.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	85	85	36	36	36	36	31	31
Act Effct Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.55	0.55	0.55	0.55
v/c Ratio	0.15	0.84	0.58	0.39	0.28	0.74	0.11	0.27
Control Delay	24.4	46.0	45.8	27.6	13.7	19.6	13.2	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	46.0	45.8	27.6	13.7	19.6	13.2	11.9
LOS	C	D	D	C	B	B	B	B
Approach Delay		44.0		32.7		19.1		11.9
Approach LOS		D		C		B		B
Queue Length 50th (m)	5.9	74.9	12.6	29.4	11.4	89.3	1.1	22.1
Queue Length 95th (m)	14.3	#125.4	#33.2	48.8	22.6	115.1	4.5	31.0
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	317	527	143	534	437	1745	118	1725
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.84	0.58	0.39	0.28	0.74	0.11	0.27

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 42 (44%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 23.9 Intersection LOS: C
Intersection Capacity Utilization 102.2% 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.

Splits and Phases: 3: Bronson & Gladstone



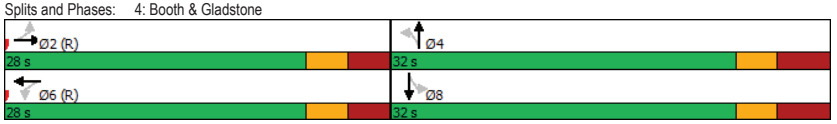
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	428	42	283	51	372	38	142
Future Volume (vph)	26	428	42	283	51	372	38	142
Lane Group Flow (vph)	26	499	42	314	51	449	38	162
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Maximum Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	43	43	28	28	29	29	0	0
Act Effct Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.42	0.42	0.42	0.42
v/c Ratio	0.08	0.83	0.23	0.51	0.11	0.63	0.13	0.22
Control Delay	13.5	31.6	17.4	18.1	10.0	13.3	12.3	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	31.6	17.4	18.1	10.0	13.3	12.3	11.2
LOS	B	C	B	B	A	B	B	B
Approach Delay		30.7		18.0		12.9		11.4
Approach LOS		C		B		B		B
Queue Length 50th (m)	1.8	47.0	3.1	25.3	2.0	17.0	2.5	9.8
Queue Length 95th (m)	6.2	#95.5	9.9	45.5	m6.0	36.8	7.6	20.2
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	312	601	181	610	475	713	291	721
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.83	0.23	0.51	0.11	0.63	0.13	0.22

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 16 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 19.8 Intersection LOS: B
Intersection Capacity Utilization 87.8% 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: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	30	542	361	0
Future Volume (vph)	30	542	361	0
Lane Group Flow (vph)	0	573	375	36
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	8
Permitted Phases	2			
Detector Phase	2	2	6	8
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	23.2
Total Split (s)	31.8	31.8	31.8	23.2
Total Split (%)	57.8%	57.8%	57.8%	42.2%
Maximum Green (s)	26.3	26.3	26.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	None
Walk Time (s)	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	84	84	44	35
Act Effct Green (s)		42.0	42.0	13.2
Actuated g/C Ratio		0.75	0.75	0.23
v/c Ratio		0.46	0.30	0.09
Control Delay		9.0	6.9	4.5
Queue Delay		0.0	0.0	0.0
Total Delay		9.0	6.9	4.5
LOS		A	A	A
Approach Delay		9.0	6.9	4.5
Approach LOS		A	A	A
Queue Length 50th (m)		27.2	14.7	0.0
Queue Length 95th (m)		74.0	40.8	3.7
Internal Link Dist (m)		246.0	139.3	183.9
Turn Bay Length (m)				
Base Capacity (vph)		1249	1256	519
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.46	0.30	0.07

Intersection Summary
Cycle Length: 55
Actuated Cycle Length: 56.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 76.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	218	108	38	426	222
Future Volume (vph)	218	108	38	426	222
Lane Group Flow (vph)	340	108	38	426	256
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	34.5	34.5	34.5
Total Split (%)	42.5%	42.5%	57.5%	57.5%	57.5%
Maximum Green (s)	20.0	20.0	29.3	29.3	29.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	15	15	48	48	38
Act Effct Green (s)	20.0	20.0	29.3	29.3	29.3
Actuated g/C Ratio	0.33	0.33	0.49	0.49	0.49
v/c Ratio	0.62	0.20	0.08	0.50	0.31
Control Delay	22.7	4.7	8.7	13.0	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	4.7	8.7	13.0	14.6
LOS	C	A	A	B	B
Approach Delay	18.4			12.6	14.6
Approach LOS	B			B	B
Queue Length 50th (m)	30.8	0.0	2.1	29.5	15.8
Queue Length 95th (m)	54.3	8.4	6.1	50.2	m25.7
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	549	533	502	852	835
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	0.62	0.20	0.08	0.50	0.31

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 15.3 — Intersection LOS: B
Intersection Capacity Utilization 64.2% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Booth & Raymond

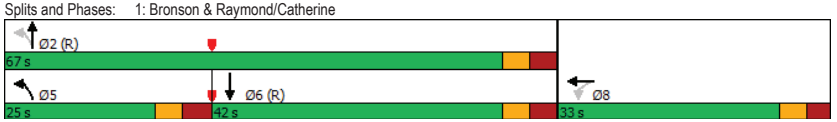
Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	690	573	319	833	850
Future Volume (vph)	690	573	319	833	850
Lane Group Flow (vph)	386	1147	319	833	1015
Turn Type	Perm	NA	pm+pt	NA	NA
Protected Phases		8	5	2	6
Permitted Phases	8		2		
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	28.3	28.3	11.8	24.8	24.8
Total Split (s)	33.0	33.0	25.0	67.0	42.0
Total Split (%)	33.0%	33.0%	25.0%	67.0%	42.0%
Maximum Green (s)	26.7	26.7	18.2	60.2	35.2
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.8	6.8	6.8
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	15.0	15.0		10.0	10.0
Pedestrian Calls (#/hr)	24	24		29	41
Act Effct Green (s)	26.7	26.7	60.2	60.2	36.7
Actuated g/C Ratio	0.27	0.27	0.60	0.60	0.37
v/c Ratio	1.02	0.98	0.90	0.42	0.85
Control Delay	88.2	56.2	51.7	11.4	23.5
Queue Delay	0.0	0.0	0.0	0.0	5.5
Total Delay	88.2	56.2	51.7	11.4	29.0
LOS	F	E	D	B	C
Approach Delay		64.2		22.5	29.0
Approach LOS		E		C	C
Queue Length 50th (m)	~89.1	80.8	42.7	41.7	67.1
Queue Length 95th (m)	#156.3	#113.2	#88.2	54.2	#131.6
Internal Link Dist (m)		247.5		81.5	56.5
Turn Bay Length (m)	110.0		45.0		
Base Capacity (vph)	380	1173	377	1996	1188
Starvation Cap Reductn	0	0	0	0	128
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.02	0.98	0.85	0.42	0.96

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 60 (60%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 41.6 Intersection LOS: D
Intersection Capacity Utilization 91.2% 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.

Splits and Phases: 1: Bronson & Raymond/Catherine



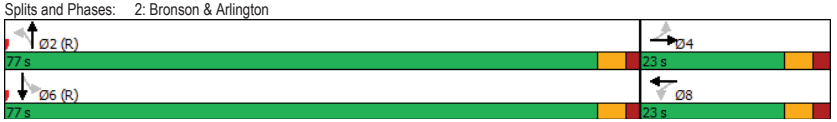
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	11	2	2	0	24	1089	3	970
Future Volume (vph)	11	2	2	0	24	1089	3	970
Lane Group Flow (vph)	0	63	0	14	0	1125	0	989
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	77.0	77.0	77.0	77.0
Total Split (%)	23.0%	23.0%	23.0%	23.0%	77.0%	77.0%	77.0%	77.0%
Maximum Green (s)	17.4	17.4	17.4	17.4	71.8	71.8	71.8	71.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	19	19	20	20	29	29	39	39
Act Effct Green (s)		12.8		12.8		80.6		80.6
Actuated g/C Ratio		0.13		0.13		0.81		0.81
v/c Ratio		0.28		0.07		0.46		0.39
Control Delay		17.7		9.4		2.9		1.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		17.7		9.4		2.9		1.9
LOS		B		A		A		A
Approach Delay		17.7		9.4		2.9		1.9
Approach LOS		B		A		A		A
Queue Length 50th (m)		2.3		0.0		13.8		12.3
Queue Length 95th (m)		13.3		3.7		m30.0		15.2
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		284		253		2420		2507
Starvation Cap Reductn		0		0		175		0
Spillback Cap Reductn		3		0		0		230
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.22		0.06		0.50		0.43

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 29 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 2.9 Intersection LOS: A
Intersection Capacity Utilization 70.5% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



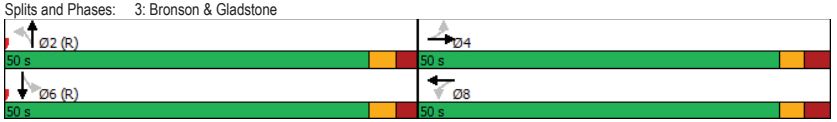
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	46	358	137	314	96	832	49	805
Future Volume (vph)	46	358	137	314	96	832	49	805
Lane Group Flow (vph)	46	430	137	331	96	969	49	889
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	69	69	68	68	44	44	47	47
Act Effct Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.13	0.60	0.49	0.45	0.58	0.70	0.35	0.63
Control Delay	18.2	25.7	27.8	22.1	26.9	16.0	27.3	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	25.7	27.8	22.1	26.9	16.0	27.3	24.1
LOS	B	C	C	C	C	B	C	C
Approach Delay		25.0		23.8		17.0		24.3
Approach LOS		C		C		B		C
Queue Length 50th (m)	5.2	61.8	18.5	43.6	9.2	52.6	6.1	68.3
Queue Length 95th (m)	12.4	93.0	37.8	67.1	#37.4	34.2	16.7	88.4
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	346	719	277	740	165	1377	141	1419
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.60	0.49	0.45	0.58	0.70	0.35	0.63

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 40 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 21.7 Intersection LOS: C
Intersection Capacity Utilization 91.7% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Bronson & Gladstone



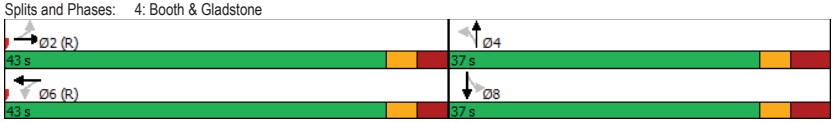
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	37	353	138	615	99	386	47	368
Future Volume (vph)	37	353	138	615	99	386	47	368
Lane Group Flow (vph)	37	395	138	655	99	460	47	388
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	43.0	43.0	43.0	43.0	37.0	37.0	37.0	37.0
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.3%	46.3%	46.3%	46.3%
Maximum Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	46	46	41	41	27	27	27	27
Act Effct Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.38	0.38	0.38	0.38
v/c Ratio	0.22	0.51	0.41	0.83	0.37	0.72	0.22	0.60
Control Delay	17.3	17.6	29.5	39.2	23.0	28.3	20.5	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	17.6	29.5	39.2	23.0	28.3	20.5	24.5
LOS	B	B	C	D	C	C	C	C
Approach Delay		17.6		37.5		27.4		24.1
Approach LOS		B		D		C		C
Queue Length 50th (m)	3.2	39.3	22.0	108.5	10.7	56.8	4.8	45.9
Queue Length 95th (m)	10.0	63.5	39.9	#150.1	23.6	90.5	12.8	73.3
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	166	776	337	793	270	640	211	651
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.51	0.41	0.83	0.37	0.72	0.22	0.60

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 51 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 28.4 Intersection LOS: C
Intersection Capacity Utilization 101.9% 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.

Splits and Phases: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBL	WBT	SBT
Lane Configurations					
Traffic Volume (vph)	31	525	1	711	1
Future Volume (vph)	31	525	1	711	1
Lane Group Flow (vph)	0	562	0	721	68
Turn Type	Perm	NA	Perm	NA	NA
Protected Phases		2		6	8
Permitted Phases	2		6		
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	23.2
Total Split (s)	56.8	56.8	56.8	56.8	23.2
Total Split (%)	71.0%	71.0%	71.0%	71.0%	29.0%
Maximum Green (s)	51.3	51.3	51.3	51.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None
Walk Time (s)	19.0	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	75	75	59	59	45
Act Effct Green (s)		58.6		58.6	14.8
Actuated g/C Ratio		0.73		0.73	0.18
v/c Ratio		0.47		0.57	0.23
Control Delay		6.0		9.5	12.3
Queue Delay		0.0		0.3	0.0
Total Delay		6.0		9.8	12.3
LOS		A		A	B
Approach Delay		6.0		9.8	12.3
Approach LOS		A		A	B
Queue Length 50th (m)		21.0		58.9	1.7
Queue Length 95th (m)		31.6		92.5	11.3
Internal Link Dist (m)		246.0		139.3	183.9
Turn Bay Length (m)					
Base Capacity (vph)		1204		1274	348
Starvation Cap Reductn		0		164	0
Spillback Cap Reductn		0		0	0
Storage Cap Reductn		0		0	0
Reduced v/c Ratio		0.47		0.65	0.20

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 65 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 8.3 — Intersection LOS: A
Intersection Capacity Utilization 79.1% — ICU Level of Service D
Analysis Period (min) 15

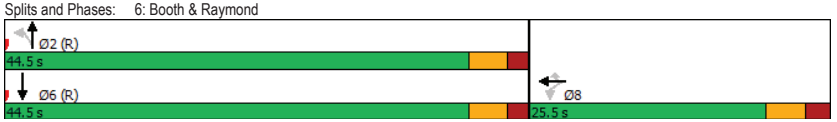
Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	331	194	31	363	527
Future Volume (vph)	331	194	31	363	527
Lane Group Flow (vph)	508	194	31	363	617
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	44.5	44.5	44.5
Total Split (%)	36.4%	36.4%	63.6%	63.6%	63.6%
Maximum Green (s)	20.0	20.0	39.3	39.3	39.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	14	14	47	47	32
Act Effct Green (s)	20.0	20.0	39.3	39.3	39.3
Actuated g/C Ratio	0.29	0.29	0.56	0.56	0.56
v/c Ratio	1.06	0.36	0.11	0.37	0.64
Control Delay	86.0	5.5	8.3	9.9	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	86.0	5.5	8.3	9.9	14.1
LOS	F	A	A	A	B
Approach Delay	63.8			9.8	14.1
Approach LOS	E			A	B
Queue Length 50th (m)	~74.8	0.0	1.7	24.0	48.7
Queue Length 95th (m)	#127.5	13.1	5.4	39.6	80.4
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	479	542	294	979	957
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	1.06	0.36	0.11	0.37	0.64

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 39 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 33.5 Intersection LOS: C
Intersection Capacity Utilization 79.8% 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: 6: Booth & Raymond



Appendix H

TDM Checklists

CGH TRANSPORTATION

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 Development Design and Infrastructure Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

	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)	☐

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	☐

		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	☑
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	☐

Appendix I

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation Inc.**	**Project**	**2021-015**
Scenario	**Existing/Future**	**Date**	**2021-05-19**
Comments			

SEGMENTS			Bell Street	Louisa Street	Arlington Avenue
Pedestrian	Sidewalk Width Boulevard Width		1.5 m 0.5 - 2 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		> 30 to 50 km/h yes	> 30 to 50 km/h yes	> 30 to 50 km/h yes
	Exposure to Traffic PLoS		**C**	**E**	**E**
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		**A**	**A**	**A**
	Level of Service		**C**	**E**	**E**
Bicycle	Type of Cycling Facility		Mixed Traffic	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)
	Operating Speed		>40 to <50 km/h	>40 to <50 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		**B**	**B**	**B**
	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		**B**	**B**	**B**
Transit	Facility Type				
	Friction or Ratio Transit:Posted Speed				
	Level of Service		**-**	**-**	**-**
Truck	Truck Lane Width				
	Travel Lanes per Direction				
	Level of Service		**-**	**-**	**-**

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation Inc.**	**Project**	**2021-015**
Scenario	**Existing/Future**	**Date**	**2021-11-04**
Comments			

	INTERSECTIONS	Bronson Ave @ Catherine St/Raymond St (Existing)				Bronson Ave @ Arlington Ave				Bronson Ave @ Gladstone Ave			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	5		5	5	4	4	0 - 2	0 - 2	5	5	4	4
	Median	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	No left turn / Prohib.		No left turn / Prohib.	Protected/ Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control		No right turn	Permissive or yield control	Permissive or yield control	Permissive or yield control	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 allowed	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited
	Ped Signal Leading Interval?	No		No	No	No	No	No	No	Yes	Yes	Yes	Yes
	Right Turn Channel	No Channel		No Right Turn	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	5-10m		10-15m	0-3m	3-5m	3-5m	3-5m	3-5m	3-5m	5-10m	5-10m	3-5m
	Crosswalk Type	Std transverse markings		Std transverse markings	Std transverse markings	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement
	PETSI Score	**46**		**54**	**43**	**58**	**58**	**90**	**90**	**47**	**46**	**62**	**63**
	Ped. Exposure to Traffic LoS	**D**	**-**	**D**	**E**	**D**	**D**	**A**	**A**	**D**	**D**	**C**	**C**
	Cycle Length												
	Effective Walk Time												
	Average Pedestrian Delay												
	Pedestrian Delay LoS	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Level of Service	**D**	**-**	**D**	**E**	**D**	**D**	**A**	**A**	**D**	**D**	**C**	**C**
		E				**D**				**D**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach												
	Right Turn Lane Configuration												
	Right Turning Speed												
	Cyclist relative to RT motorists	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Separated or Mixed Traffic	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Left Turn Approach		One lane crossed	One lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed	One lane crossed	One lane crossed	No lane crossed	No lane crossed
	Operating Speed		> 50 to < 60 km/h	> 50 to < 60 km/h		> 50 to < 60 km/h	> 50 to < 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**-**	**E**	**E**	**-**	**C**	**C**	**B**	**B**	**E**	**E**	**C**	**C**
	Level of Service	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		-				**-**				**-**			
Transit	Average Signal Delay	> 40 sec	≤ 20 sec	> 40 sec		≤ 10 sec	≤ 10 sec			≤ 30 sec	≤ 20 sec	> 40 sec	> 40 sec
	Level of Service	**F**	**C**	**F**	**-**	**B**	**B**	**-**	**-**	**D**	**C**	**F**	**F**
		F				**B**				**F**			
Truck	Effective Corner Radius	10 - 15 m		< 10 m						< 10 m	< 10 m		< 10 m
	Number of Receiving Lanes on Departure from Intersection	≥ 2		≥ 2						1	1		≥ 2
	Level of Service	**B**	**-**	**D**	**-**	**-**	**-**	**-**	**-**	**F**	**F**	**-**	**D**
		D				**-**				**F**			
Auto	Volume to Capacity Ratio	> 1.00				0.0 - 0.60				0.71 - 0.80			
	Level of Service	**F**				**A**				**C**			

Arthur St/Arthur Ln @ Gladstone Ave			
NORTH	SOUTH	EAST	WEST
0 - 2	0 - 2	3	3
No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
Permissive	Permissive	Permissive	No left turn / Prohib.
Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control
RTOR allowed	RTOR prohibited	RTOR allowed	RTOR allowed
No	No	No	No
No Channel	No Channel	No Right Turn	No Channel
3-5m	0-3m	0-3m	3-5m
Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
87	**91**	**82**	**80**
B	**A**	**B**	**B**
-	-	-	-
-	-	-	-
-	-	-	-
B	**A**	**B**	**B**
B			
NORTH	SOUTH	EAST	WEST
-	-	-	-
-	-	-	-
No lane crossed > 40 to ≤ 50 km/h	No lane crossed ≤ 40 km/h	No lane crossed > 50 to < 60 km/h	No lane crossed > 50 to < 60 km/h
B	**B**	**C**	**C**
-	-	-	-
-			
		≤ 10 sec	≤ 10 sec
-	-	**B**	**B**
B			
-	-	-	-
-			
0.0 - 0.60			
A			

Booth St @ Gladstone Ave			
NORTH	SOUTH	EAST	WEST
3	4	4	4
No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
Permissive	Permissive	Permissive	Permissive
Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
Yes	Yes	Yes	Yes
No Channel	Smart Channel	No Channel	No Channel
5-10m	5-10m	5-10m	5-10m
Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
76	**65**	**59**	**59**
B	**C**	**D**	**D**
-	-	-	-
-	-	-	-
-	-	-	-
B	**C**	**D**	**D**
D			
NORTH	SOUTH	EAST	WEST
-	-	-	-
-	-	-	-
No lane crossed > 50 to < 60 km/h	No lane crossed > 50 to < 60 km/h	No lane crossed > 50 to < 60 km/h	No lane crossed > 50 to < 60 km/h
C	**C**	**C**	**C**
-	-	-	-
-			
		≤ 40 sec	≤ 30 sec
-	-	**E**	**D**
E			
-	-	-	-
-			
> 1.00			
F			

Booth St @ Raymond St			
NORTH	SOUTH	EAST	WEST
3	4	0 - 2	3
No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
No left turn / Prohib.	Permissive	No left turn / Prohib.	Permissive
Permissive or yield control	No right turn	No right turn	Permissive or yield control
RTOR allowed	RTOR prohibited	RTOR allowed	RTOR prohibited
No	No	No	No
No Channel	No Channel	No Channel	No Channel
3-5m	3-5m	0-3m	5-10m
Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
80	**63**	**101**	**74**
B	**C**	**A**	**C**
-	-	-	-
-	-	-	-
-	-	-	-
B	**C**	**A**	**C**
C			
NORTH	SOUTH	EAST	WEST
-	-	-	-
-	-	-	-
	No lane crossed > 40 to ≤ 50 km/h	No lane crossed > 50 to < 60 km/h	
	B	**C**	
-	-	-	-
-			
-	-	-	-
-			
0.91 - 1.00			
E			

Bronson Ave @ Catherine St/Raymond St (Future)			
NORTH	SOUTH	EAST	WEST
5		5	5
No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m
No left turn / Prohib.		No left turn / Prohib.	Protected/ Permissive
Permissive or yield control		No right turn	Permissive or yield control
RTOR allowed		RTOR allowed	RTOR prohibited
No		No	No
No Channel		No Right Turn	No Channel
5-10m		10-15m	0-3m
Zebra stripe hi-vis markings		Zebra stripe hi-vis markings	Zebra stripe hi-vis markings
49		**57**	**46**
D	**-**	**D**	**D**
-	-	-	-
-	-	-	-
-	-	-	-
D	**-**	**D**	**D**
D			
NORTH	SOUTH	EAST	WEST
-	-	-	-
-	-	-	-
	One lane crossed > 50 to < 60 km/h	One lane crossed > 50 to < 60 km/h	
	E	**E**	
-	-	-	-
-			
> 40 sec	≤ 20 sec	> 40 sec	
F	**C**	**F**	**-**
F			
10 - 15 m ≥ 2		< 10 m ≥ 2	
B	**-**	**D**	**-**
D			
> 1.00			
F			

Appendix J

Synchro Intersection Worksheets – 2025 Future Total Conditions

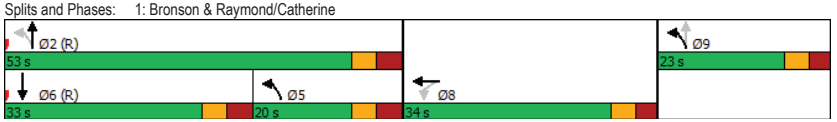
Lane Group	WBL	WBT	NBL	NBT	SBT	Ø5	Ø9
Lane Configurations							
Traffic Volume (vph)	527	516	538	1075	461		
Future Volume (vph)	527	516	538	1075	461		
Lane Group Flow (vph)	353	1036	538	1075	579		
Turn Type	Perm	NA	pm+pt	NA	NA		
Protected Phases		8	5 9	2	6	5	9
Permitted Phases	8		2	9			
Detector Phase	8	8	5 9	2	6		
Switch Phase							
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	5.0
Minimum Split (s)	28.3	28.3		24.8	24.8	11.8	11.8
Total Split (s)	34.0	34.0		53.0	33.0	20.0	23.0
Total Split (%)	30.9%	30.9%		48.2%	30.0%	18%	21%
Maximum Green (s)	27.7	27.7		46.2	26.2	13.2	16.8
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0		3.5	3.5	3.5	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.3	6.3		6.8	6.8		
Lead/Lag					Lead	Lag	
Lead-Lag Optimize?					Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Recall Mode	Max	Max		C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	15.0	15.0		10.0	10.0		
Pedestrian Calls (#/hr)	43	43		48	31		
Act Effct Green (s)	27.7	27.7	62.4	69.2	26.2		
Actuated g/C Ratio	0.25	0.25	0.57	0.63	0.24		
v/c Ratio	1.00	0.95	0.90	0.52	0.78		
Control Delay	90.9	55.0	38.0	12.3	43.0		
Queue Delay	0.0	0.0	0.0	0.0	10.3		
Total Delay	90.9	55.0	38.0	12.3	53.4		
LOS	F	D	D	B	D		
Approach Delay		64.1		20.9	53.4		
Approach LOS		E		C	D		
Queue Length 50th (m)	~88.8	78.6	58.6	61.5	59.0		
Queue Length 95th (m)	#156.7	#108.7	#112.8	77.2	79.7		
Internal Link Dist (m)		247.5		81.5	56.5		
Turn Bay Length (m)	110.0		45.0				
Base Capacity (vph)	352	1090	596	2086	739		
Starvation Cap Reductn	0	0	0	0	137		
Spillback Cap Reductn	0	0	0	75	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	1.00	0.95	0.90	0.53	0.96		

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 38 (35%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 42.9 Intersection LOS: D
Intersection Capacity Utilization 89.4% 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: Bronson & Raymond/Catherine



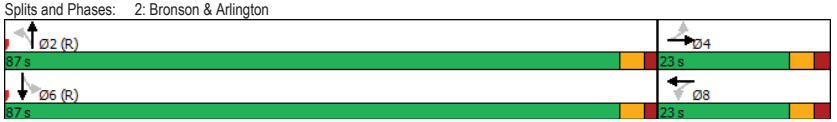
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	4	8	2	13	1413	2	542
Future Volume (vph)	10	4	8	2	13	1413	2	542
Lane Group Flow (vph)	0	48	0	21	0	1432	0	560
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	87.0	87.0	87.0	87.0
Total Split (%)	20.9%	20.9%	20.9%	20.9%	79.1%	79.1%	79.1%	79.1%
Maximum Green (s)	17.4	17.4	17.4	17.4	81.8	81.8	81.8	81.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	26	26	22	22	21	21	28	28
Act Effct Green (s)		14.2		14.2		89.2		89.2
Actuated g/C Ratio		0.13		0.13		0.81		0.81
v/c Ratio		0.23		0.12		0.57		0.23
Control Delay		21.6		28.1		4.8		3.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		21.7		28.1		4.9		3.7
LOS		C		C		A		A
Approach Delay		21.7		28.1		4.9		3.7
Approach LOS		C		C		A		A
Queue Length 50th (m)		2.6		1.9		40.0		16.4
Queue Length 95th (m)		13.1		9.0		m44.5		22.0
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		250		211		2520		2424
Starvation Cap Reductn		0		0		78		0
Spillback Cap Reductn		4		0		0		378
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.20		0.10		0.59		0.27

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 11 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 5.2 Intersection LOS: A
Intersection Capacity Utilization 71.8% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



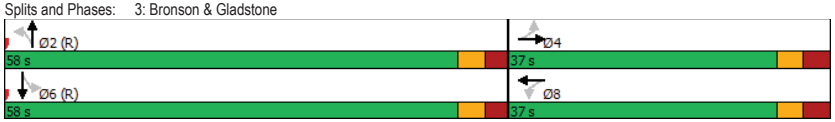
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	307	84	175	123	1115	13	407
Future Volume (vph)	50	307	84	175	123	1115	13	407
Lane Group Flow (vph)	50	396	84	193	123	1265	13	446
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	37.0	37.0	37.0	37.0	58.0	58.0	58.0	58.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	96	96	39	39	41	41	34	34
Act Effct Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.55	0.55	0.55	0.55
v/c Ratio	0.15	0.76	0.49	0.36	0.28	0.73	0.10	0.26
Control Delay	24.5	39.9	37.1	27.0	13.6	19.3	12.9	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	39.9	37.1	27.0	13.6	19.3	12.9	11.8
LOS	C	D	D	C	B	B	B	B
Approach Delay		38.2		30.1		18.8		11.9
Approach LOS		D		C		B		B
Queue Length 50th (m)	6.5	64.6	12.2	26.9	11.3	86.5	1.1	21.3
Queue Length 95th (m)	15.2	#106.6	27.8	45.3	22.5	111.5	4.4	30.0
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	328	521	173	533	442	1740	125	1723
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.76	0.49	0.36	0.28	0.73	0.10	0.26

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 42 (44%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 22.1 Intersection LOS: C
Intersection Capacity Utilization 99.1% ICU Level of Service F
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Bronson & Gladstone



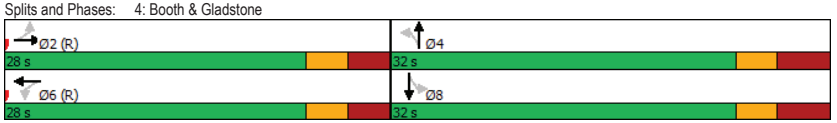
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	369	42	260	51	356	39	137
Future Volume (vph)	26	369	42	260	51	356	39	137
Lane Group Flow (vph)	26	440	42	291	51	433	39	157
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Maximum Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	53	53	32	32	36	36	6	6
Act Effct Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.42	0.42	0.42	0.42
v/c Ratio	0.08	0.74	0.19	0.48	0.11	0.61	0.13	0.22
Control Delay	13.4	25.2	15.8	17.3	9.6	12.7	12.2	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	25.2	15.8	17.3	9.6	12.7	12.2	11.1
LOS	B	C	B	B	A	B	B	B
Approach Delay		24.5		17.1		12.4		11.3
Approach LOS		C		B		B		B
Queue Length 50th (m)	1.8	39.1	3.1	22.9	2.0	16.4	2.5	9.5
Queue Length 95th (m)	6.1	#78.6	9.5	41.6	m6.0	34.1	7.7	19.6
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	328	598	221	609	476	711	301	721
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.74	0.19	0.48	0.11	0.61	0.13	0.22

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 16 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 50

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 17.1 Intersection LOS: B
Intersection Capacity Utilization 87.0% 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: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	30	473	331	0
Future Volume (vph)	30	473	331	0
Lane Group Flow (vph)	0	504	345	36
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	8
Permitted Phases	2			
Detector Phase	2	2	6	8
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	23.2
Total Split (s)	31.8	31.8	31.8	23.2
Total Split (%)	57.8%	57.8%	57.8%	42.2%
Maximum Green (s)	26.3	26.3	26.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	None
Walk Time (s)	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	92	92	49	43
Act Effct Green (s)		42.0	42.0	13.2
Actuated g/C Ratio		0.75	0.75	0.23
v/c Ratio		0.40	0.27	0.09
Control Delay		8.1	6.7	4.5
Queue Delay		0.0	0.0	0.0
Total Delay		8.1	6.7	4.5
LOS		A	A	A
Approach Delay		8.1	6.7	4.5
Approach LOS		A	A	A
Queue Length 50th (m)		22.4	13.3	0.0
Queue Length 95th (m)		61.1	36.9	3.7
Internal Link Dist (m)		246.0	139.3	183.9
Turn Bay Length (m)				
Base Capacity (vph)		1246	1255	513
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.40	0.27	0.07

Intersection Summary
Cycle Length: 55
Actuated Cycle Length: 56.2
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 7.4	Intersection LOS: A
Intersection Capacity Utilization 73.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	220	108	38	407	215
Future Volume (vph)	220	108	38	407	215
Lane Group Flow (vph)	342	108	38	407	250
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	34.5	34.5	34.5
Total Split (%)	42.5%	42.5%	57.5%	57.5%	57.5%
Maximum Green (s)	20.0	20.0	29.3	29.3	29.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	16	16	51	51	41
Act Effct Green (s)	20.0	20.0	29.3	29.3	29.3
Actuated g/C Ratio	0.33	0.33	0.49	0.49	0.49
v/c Ratio	0.62	0.20	0.08	0.48	0.30
Control Delay	22.9	4.7	8.7	12.6	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	4.7	8.7	12.6	14.3
LOS	C	A	A	B	B
Approach Delay	18.5			12.3	14.3
Approach LOS	B			B	B
Queue Length 50th (m)	31.0	0.0	2.1	27.7	15.2
Queue Length 95th (m)	54.6	8.4	6.1	47.5	m25.2
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	548	532	498	852	834
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	0.62	0.20	0.08	0.48	0.30

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 15.2 — Intersection LOS: B
Intersection Capacity Utilization 64.3% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Booth & Raymond

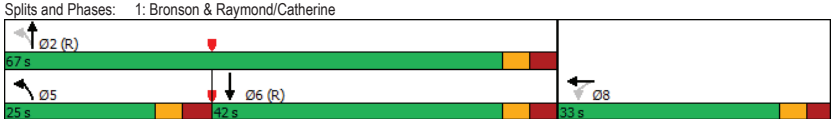
Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	690	579	310	803	834
Future Volume (vph)	690	579	310	803	834
Lane Group Flow (vph)	386	1153	310	803	999
Turn Type	Perm	NA	pm+pt	NA	NA
Protected Phases		8	5	2	6
Permitted Phases	8		2		
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	28.3	28.3	11.8	24.8	24.8
Total Split (s)	33.0	33.0	25.0	67.0	42.0
Total Split (%)	33.0%	33.0%	25.0%	67.0%	42.0%
Maximum Green (s)	26.7	26.7	18.2	60.2	35.2
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.8	6.8	6.8
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	15.0	15.0		10.0	10.0
Pedestrian Calls (#/hr)	27	27		32	47
Act Effct Green (s)	26.7	26.7	60.2	60.2	37.1
Actuated g/C Ratio	0.27	0.27	0.60	0.60	0.37
v/c Ratio	1.02	0.98	0.87	0.40	0.84
Control Delay	88.2	57.7	46.0	11.2	22.5
Queue Delay	0.0	0.0	0.0	0.0	4.5
Total Delay	88.2	57.7	46.0	11.2	27.0
LOS	F	E	D	B	C
Approach Delay		65.4		20.9	27.0
Approach LOS		E		C	C
Queue Length 50th (m)	~89.1	81.5	39.1	39.8	67.5
Queue Length 95th (m)	#156.3	#114.4	#81.5	51.8	#129.7
Internal Link Dist (m)		247.5		81.5	56.5
Turn Bay Length (m)	110.0		45.0		
Base Capacity (vph)	380	1171	383	1996	1195
Starvation Cap Reductn	0	0	0	0	136
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.02	0.98	0.81	0.40	0.94

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 60 (60%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 41.3 Intersection LOS: D
Intersection Capacity Utilization 90.4% 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: Bronson & Raymond/Catherine



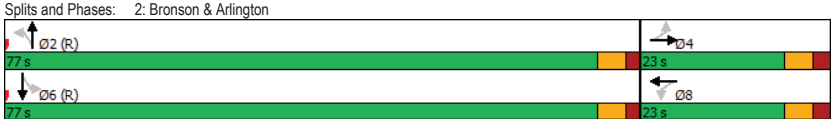
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	12	2	2	0	24	1049	3	946
Future Volume (vph)	12	2	2	0	24	1049	3	946
Lane Group Flow (vph)	0	69	0	14	0	1085	0	971
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	77.0	77.0	77.0	77.0
Total Split (%)	23.0%	23.0%	23.0%	23.0%	77.0%	77.0%	77.0%	77.0%
Maximum Green (s)	17.4	17.4	17.4	17.4	71.8	71.8	71.8	71.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	22	22	23	23	29	29	40	40
Act Effct Green (s)		12.8		12.8		80.6		80.6
Actuated g/C Ratio		0.13		0.13		0.81		0.81
v/c Ratio		0.31		0.07		0.45		0.39
Control Delay		17.6		9.4		2.8		2.0
Queue Delay		0.0		0.0		0.1		0.0
Total Delay		17.6		9.4		2.9		2.0
LOS		B		A		A		A
Approach Delay		17.6		9.4		2.9		2.0
Approach LOS		B		A		A		A
Queue Length 50th (m)		2.5		0.0		13.4		13.4
Queue Length 95th (m)		14.0		3.7		m29.4		16.3
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		286		252		2419		2502
Starvation Cap Reductn		0		0		239		0
Spillback Cap Reductn		3		0		0		229
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.24		0.06		0.50		0.43

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 29 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.45
Intersection Signal Delay: 3.0 Intersection LOS: A
Intersection Capacity Utilization 69.6% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



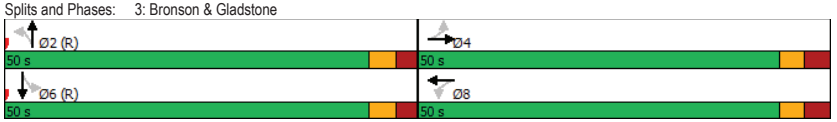
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	48	330	139	271	96	803	49	789
Future Volume (vph)	48	330	139	271	96	803	49	789
Lane Group Flow (vph)	48	402	139	288	96	940	49	873
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	81	81	71	71	50	50	50	50
Act Effct Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.13	0.56	0.47	0.39	0.56	0.69	0.33	0.62
Control Delay	18.0	24.8	26.5	21.0	25.4	15.6	26.1	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	24.8	26.5	21.0	25.4	15.6	26.1	23.9
LOS	B	C	C	C	C	B	C	C
Approach Delay		24.0		22.8		16.5		24.0
Approach LOS		C		C		B		C
Queue Length 50th (m)	5.4	56.6	18.6	36.8	9.2	50.8	6.0	66.5
Queue Length 95th (m)	12.5	85.6	37.0	57.4	#36.5	33.5	16.3	86.4
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	376	714	295	738	170	1372	149	1417
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.56	0.47	0.39	0.56	0.69	0.33	0.62

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 40 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 21.1 Intersection LOS: C
Intersection Capacity Utilization 89.5% 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: 3: Bronson & Gladstone



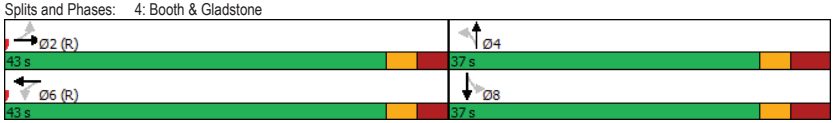
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	37	324	138	530	99	373	49	351
Future Volume (vph)	37	324	138	530	99	373	49	351
Lane Group Flow (vph)	37	366	138	570	99	447	49	371
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	43.0	43.0	43.0	43.0	37.0	37.0	37.0	37.0
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.3%	46.3%	46.3%	46.3%
Maximum Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	57	57	45	45	34	34	29	29
Act Effct Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.38	0.38	0.38	0.38
v/c Ratio	0.17	0.47	0.39	0.72	0.36	0.70	0.22	0.57
Control Delay	15.1	16.9	29.1	34.0	22.7	27.6	20.4	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	16.9	29.1	34.0	22.7	27.6	20.4	23.8
LOS	B	B	C	C	C	C	C	C
Approach Delay		16.8		33.1		26.7		23.4
Approach LOS		B		C		C		C
Queue Length 50th (m)	3.2	35.4	21.5	93.2	10.6	54.6	5.0	43.3
Queue Length 95th (m)	9.2	57.7	39.2	124.5	23.4	87.2	13.0	69.6
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	219	772	351	791	276	637	218	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.47	0.39	0.72	0.36	0.70	0.22	0.57

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 51 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 26.3 — Intersection LOS: C
Intersection Capacity Utilization 96.6% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBL	WBT	SBT
Lane Configurations					
Traffic Volume (vph)	31	484	1	614	1
Future Volume (vph)	31	484	1	614	1
Lane Group Flow (vph)	0	521	0	624	68
Turn Type	Perm	NA	Perm	NA	NA
Protected Phases		2		6	8
Permitted Phases	2		6		
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	23.2
Total Split (s)	56.8	56.8	56.8	56.8	23.2
Total Split (%)	71.0%	71.0%	71.0%	71.0%	29.0%
Maximum Green (s)	51.3	51.3	51.3	51.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None
Walk Time (s)	19.0	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	86	86	67	67	56
Act Effct Green (s)		58.6		58.6	14.8
Actuated g/C Ratio		0.73		0.73	0.18
v/c Ratio		0.43		0.49	0.23
Control Delay		5.9		8.3	12.4
Queue Delay		0.0		0.3	0.0
Total Delay		5.9		8.5	12.4
LOS		A		A	B
Approach Delay		5.9		8.5	12.4
Approach LOS		A		A	B
Queue Length 50th (m)		20.3		46.6	1.7
Queue Length 95th (m)		31.0		72.5	11.3
Internal Link Dist (m)		246.0		139.3	183.9
Turn Bay Length (m)					
Base Capacity (vph)		1206		1274	341
Starvation Cap Reductn		0		182	0
Spillback Cap Reductn		0		0	0
Storage Cap Reductn		0		0	0
Reduced v/c Ratio		0.43		0.57	0.20

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 65 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 7.6 Intersection LOS: A
Intersection Capacity Utilization 76.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	332	194	31	354	503
Future Volume (vph)	332	194	31	354	503
Lane Group Flow (vph)	509	194	31	354	594
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	44.5	44.5	44.5
Total Split (%)	36.4%	36.4%	63.6%	63.6%	63.6%
Maximum Green (s)	20.0	20.0	39.3	39.3	39.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	15	15	50	50	35
Act Effct Green (s)	20.0	20.0	39.3	39.3	39.3
Actuated g/C Ratio	0.29	0.29	0.56	0.56	0.56
v/c Ratio	1.06	0.36	0.10	0.36	0.62
Control Delay	86.7	5.5	8.2	9.8	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	86.7	5.5	8.2	9.8	13.5
LOS	F	A	A	A	B
Approach Delay	64.3			9.6	13.5
Approach LOS	E			A	B
Queue Length 50th (m)	~75.2	0.0	1.7	23.2	45.9
Queue Length 95th (m)	#127.8	13.1	5.4	38.5	75.8
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	479	542	306	979	955
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	1.06	0.36	0.10	0.36	0.62

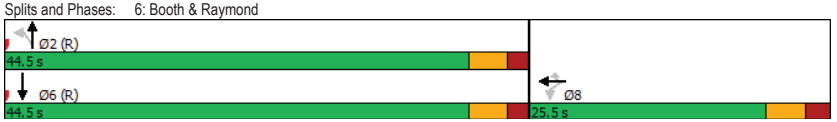
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 39 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 33.8 — Intersection LOS: C
Intersection Capacity Utilization 78.6% — 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: 6: Booth & Raymond



Appendix K

Synchro Intersection Worksheets – 2030 Future Total Conditions

CGH TRANSPORTATION

Lane Group	WBL	WBT	NBL	NBT	SBT	Ø5	Ø9
Lane Configurations							
Traffic Volume (vph)	554	542	552	1102	478		
Future Volume (vph)	554	542	552	1102	478		
Lane Group Flow (vph)	366	1076	552	1102	596		
Turn Type	Perm	NA	pm+pt	NA	NA		
Protected Phases		8	5 9	2	6	5	9
Permitted Phases	8		2	9			
Detector Phase	8	8	5 9	2	6		
Switch Phase							
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	5.0
Minimum Split (s)	28.3	28.3		24.8	24.8	11.8	11.8
Total Split (s)	34.0	34.0		53.0	33.0	20.0	23.0
Total Split (%)	30.9%	30.9%		48.2%	30.0%	18%	21%
Maximum Green (s)	27.7	27.7		46.2	26.2	13.2	16.8
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0		3.5	3.5	3.5	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.3	6.3		6.8	6.8		
Lead/Lag					Lead	Lag	
Lead-Lag Optimize?					Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Recall Mode	Max	Max		C-Max	C-Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		
Flash Dont Walk (s)	15.0	15.0		10.0	10.0		
Pedestrian Calls (#/hr)	43	43		48	31		
Act Effct Green (s)	27.7	27.7	62.4	69.2	26.2		
Actuated g/C Ratio	0.25	0.25	0.57	0.63	0.24		
v/c Ratio	1.04	0.99	0.94	0.53	0.81		
Control Delay	99.8	62.9	43.7	12.5	44.5		
Queue Delay	0.0	0.0	0.0	0.0	13.5		
Total Delay	99.8	62.9	43.7	12.5	58.0		
LOS	F	E	D	B	E		
Approach Delay		72.3		22.9	58.0		
Approach LOS		E		C	E		
Queue Length 50th (m)	~98.9	83.4	60.9	63.8	61.5		
Queue Length 95th (m)	#164.0	#116.6	#124.3	80.0	#83.0		
Internal Link Dist (m)		247.5		81.5	56.5		
Turn Bay Length (m)	110.0		45.0				
Base Capacity (vph)	352	1088	590	2086	739		
Starvation Cap Reductn	0	0	0	0	133		
Spillback Cap Reductn	0	0	0	80	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	1.04	0.99	0.94	0.55	0.98		

Intersection Summary

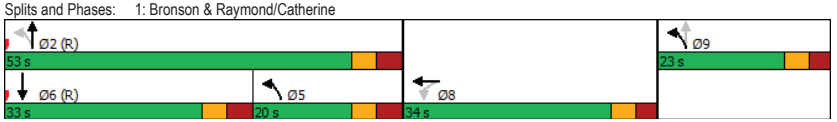
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 38 (35%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 47.9 — Intersection LOS: D
Intersection Capacity Utilization 91.5% — 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.

Splits and Phases: 1: Bronson & Raymond/Catherine



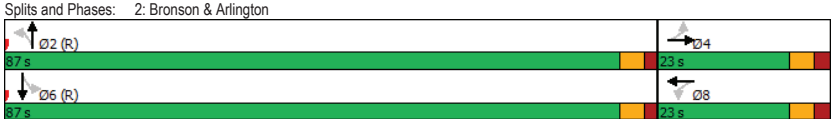
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	4	8	2	13	1449	2	562
Future Volume (vph)	10	4	8	2	13	1449	2	562
Lane Group Flow (vph)	0	48	0	21	0	1468	0	580
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	87.0	87.0	87.0	87.0
Total Split (%)	20.9%	20.9%	20.9%	20.9%	79.1%	79.1%	79.1%	79.1%
Maximum Green (s)	17.4	17.4	17.4	17.4	81.8	81.8	81.8	81.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	26	26	22	22	21	21	28	28
Act Effct Green (s)		14.2		14.2		89.2		89.2
Actuated g/C Ratio		0.13		0.13		0.81		0.81
v/c Ratio		0.23		0.12		0.58		0.24
Control Delay		21.6		28.1		4.9		3.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		21.7		28.1		4.9		3.8
LOS		C		C		A		A
Approach Delay		21.7		28.1		4.9		3.8
Approach LOS		C		C		A		A
Queue Length 50th (m)		2.6		1.9		40.6		17.2
Queue Length 95th (m)		13.1		9.0		m44.6		23.0
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		250		211		2520		2424
Starvation Cap Reductn		0		0		78		0
Spillback Cap Reductn		4		1		0		437
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.20		0.10		0.60		0.29

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 11 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 5.2 Intersection LOS: A
Intersection Capacity Utilization 72.8% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



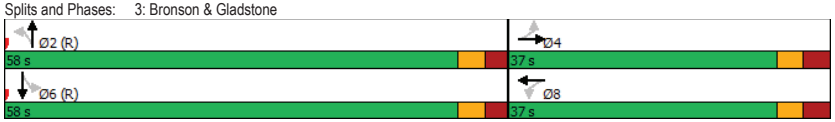
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	50	356	84	191	123	1143	13	422
Future Volume (vph)	50	356	84	191	123	1143	13	422
Lane Group Flow (vph)	50	445	84	209	123	1293	13	461
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	37.0	37.0	37.0	37.0	58.0	58.0	58.0	58.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Maximum Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	96	96	39	39	41	41	34	34
Act Effct Green (s)	30.8	30.8	30.8	30.8	52.0	52.0	52.0	52.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.55	0.55	0.55	0.55
v/c Ratio	0.16	0.85	0.60	0.39	0.28	0.74	0.11	0.27
Control Delay	24.6	46.8	47.3	27.6	13.7	19.7	13.2	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.6	46.8	47.3	27.6	13.7	19.7	13.2	11.9
LOS	C	D	D	C	B	B	B	B
Approach Delay		44.5		33.2		19.2		11.9
Approach LOS		D		C		B		B
Queue Length 50th (m)	6.5	75.4	12.8	29.4	11.4	89.5	1.1	22.2
Queue Length 95th (m)	15.2	#126.9	#34.0	48.8	22.6	115.3	4.5	31.1
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	316	525	141	534	435	1742	118	1724
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.85	0.60	0.39	0.28	0.74	0.11	0.27

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 42 (44%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 24.1 Intersection LOS: C
Intersection Capacity Utilization 102.5% 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.

Splits and Phases: 3: Bronson & Gladstone



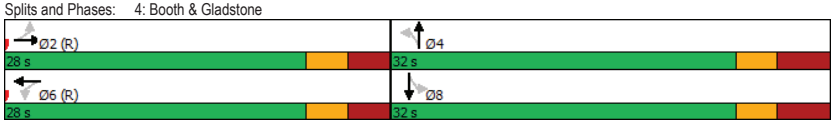
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	428	42	283	51	374	39	142
Future Volume (vph)	26	428	42	283	51	374	39	142
Lane Group Flow (vph)	26	499	42	314	51	451	39	162
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	28.0	28.0	28.0	28.0	32.0	32.0	32.0	32.0
Total Split (%)	46.7%	46.7%	46.7%	46.7%	53.3%	53.3%	53.3%	53.3%
Maximum Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	53	53	32	32	36	36	6	6
Act Effct Green (s)	21.9	21.9	21.9	21.9	25.1	25.1	25.1	25.1
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.42	0.42	0.42	0.42
v/c Ratio	0.08	0.83	0.23	0.52	0.11	0.63	0.14	0.22
Control Delay	13.5	31.8	17.4	18.1	10.0	13.4	12.3	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	31.8	17.4	18.1	10.0	13.4	12.3	11.2
LOS	B	C	B	B	B	B	B	B
Approach Delay		30.9		18.0		13.0		11.4
Approach LOS		C		B		B		B
Queue Length 50th (m)	1.8	47.0	3.1	25.3	2.0	17.1	2.5	9.8
Queue Length 95th (m)	6.2	#95.7	9.9	45.5	m6.0	37.2	7.7	20.2
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	310	600	180	609	474	712	288	721
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.83	0.23	0.52	0.11	0.63	0.14	0.22

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 16 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 19.8 Intersection LOS: B
Intersection Capacity Utilization 88.0% 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: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBT	SBT
Lane Configurations				
Traffic Volume (vph)	30	548	361	0
Future Volume (vph)	30	548	361	0
Lane Group Flow (vph)	0	579	375	36
Turn Type	Perm	NA	NA	NA
Protected Phases		2	6	8
Permitted Phases	2			
Detector Phase	2	2	6	8
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	23.2
Total Split (s)	31.8	31.8	31.8	23.2
Total Split (%)	57.8%	57.8%	57.8%	42.2%
Maximum Green (s)	26.3	26.3	26.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0	0.0	0.0
Total Lost Time (s)		5.5	5.5	5.2
Lead/Lag				
Lead-Lag Optimize?				
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	None
Walk Time (s)	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	92	92	49	43
Act Effct Green (s)		42.0	42.0	13.2
Actuated g/C Ratio		0.75	0.75	0.23
v/c Ratio		0.46	0.30	0.09
Control Delay		9.1	6.9	4.5
Queue Delay		0.0	0.0	0.0
Total Delay		9.1	6.9	4.5
LOS		A	A	A
Approach Delay		9.1	6.9	4.5
Approach LOS		A	A	A
Queue Length 50th (m)		27.6	14.7	0.0
Queue Length 95th (m)		#75.3	40.8	3.7
Internal Link Dist (m)		246.0	139.3	183.9
Turn Bay Length (m)				
Base Capacity (vph)		1251	1256	513
Starvation Cap Reductn		0	0	0
Spillback Cap Reductn		0	0	0
Storage Cap Reductn		0	0	0
Reduced v/c Ratio		0.46	0.30	0.07

Intersection Summary
Cycle Length: 55
Actuated Cycle Length: 56.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 77.7%	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: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	220	108	38	428	223
Future Volume (vph)	220	108	38	428	223
Lane Group Flow (vph)	342	108	38	428	258
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	34.5	34.5	34.5
Total Split (%)	42.5%	42.5%	57.5%	57.5%	57.5%
Maximum Green (s)	20.0	20.0	29.3	29.3	29.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	16	16	51	51	41
Act Effct Green (s)	20.0	20.0	29.3	29.3	29.3
Actuated g/C Ratio	0.33	0.33	0.49	0.49	0.49
v/c Ratio	0.62	0.20	0.08	0.50	0.31
Control Delay	22.9	4.7	8.7	13.0	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	4.7	8.7	13.0	14.6
LOS	C	A	A	B	B
Approach Delay	18.5			12.6	14.6
Approach LOS	B			B	B
Queue Length 50th (m)	31.0	0.0	2.1	29.6	16.4
Queue Length 95th (m)	54.6	8.4	6.1	50.6	m0.0
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	548	532	500	852	835
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	0.62	0.20	0.08	0.50	0.31

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 15.3 — Intersection LOS: B
Intersection Capacity Utilization 64.3% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Booth & Raymond

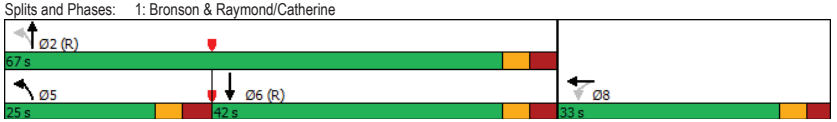
Lane Group	WBL	WBT	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	690	579	321	833	855
Future Volume (vph)	690	579	321	833	855
Lane Group Flow (vph)	386	1153	321	833	1020
Turn Type	Perm	NA	pm+pt	NA	NA
Protected Phases		8	5	2	6
Permitted Phases	8		2		
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	28.3	28.3	11.8	24.8	24.8
Total Split (s)	33.0	33.0	25.0	67.0	42.0
Total Split (%)	33.0%	33.0%	25.0%	67.0%	42.0%
Maximum Green (s)	26.7	26.7	18.2	60.2	35.2
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.8	6.8	6.8
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	15.0	15.0		10.0	10.0
Pedestrian Calls (#/hr)	27	27		32	47
Act Effct Green (s)	26.7	26.7	60.2	60.2	36.7
Actuated g/C Ratio	0.27	0.27	0.60	0.60	0.37
v/c Ratio	1.02	0.98	0.90	0.42	0.86
Control Delay	88.2	57.7	53.0	11.4	24.1
Queue Delay	0.0	0.0	0.0	0.0	6.1
Total Delay	88.2	57.7	53.0	11.4	30.2
LOS	F	E	D	B	C
Approach Delay		65.4		22.9	30.2
Approach LOS		E		C	C
Queue Length 50th (m)	~89.1	81.5	43.5	41.7	70.8
Queue Length 95th (m)	#156.3	#114.4	#89.5	54.2	#132.5
Internal Link Dist (m)		247.5		81.5	56.5
Turn Bay Length (m)	110.0		45.0		
Base Capacity (vph)	380	1171	376	1996	1184
Starvation Cap Reductn	0	0	0	0	126
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.02	0.98	0.85	0.42	0.96

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 60 (60%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 90

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 42.5 Intersection LOS: D
Intersection Capacity Utilization 91.6% 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.

Splits and Phases: 1: Bronson & Raymond/Catherine



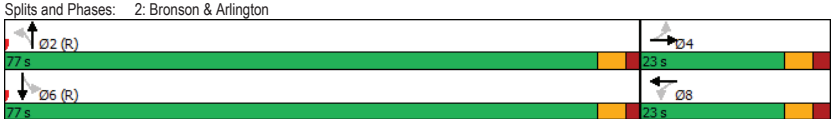
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	12	2	2	0	24	1089	3	970
Future Volume (vph)	12	2	2	0	24	1089	3	970
Lane Group Flow (vph)	0	69	0	14	0	1125	0	995
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
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)	22.6	22.6	22.6	22.6	17.2	17.2	17.2	17.2
Total Split (s)	23.0	23.0	23.0	23.0	77.0	77.0	77.0	77.0
Total Split (%)	23.0%	23.0%	23.0%	23.0%	77.0%	77.0%	77.0%	77.0%
Maximum Green (s)	17.4	17.4	17.4	17.4	71.8	71.8	71.8	71.8
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.3	2.3	2.3	2.3	1.9	1.9	1.9	1.9
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.6		5.6		5.2		5.2
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	22	22	23	23	29	29	40	40
Act Effct Green (s)		12.8		12.8		80.6		80.6
Actuated g/C Ratio		0.13		0.13		0.81		0.81
v/c Ratio		0.31		0.07		0.47		0.40
Control Delay		17.6		9.4		2.9		1.9
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		17.6		9.4		2.9		1.9
LOS		B		A		A		A
Approach Delay		17.6		9.4		2.9		1.9
Approach LOS		B		A		A		A
Queue Length 50th (m)		2.5		0.0		13.7		12.2
Queue Length 95th (m)		14.0		3.7		m30.0		15.0
Internal Link Dist (m)		0.1		230.9		56.5		207.2
Turn Bay Length (m)								
Base Capacity (vph)		286		252		2419		2502
Starvation Cap Reductn		0		0		174		0
Spillback Cap Reductn		3		0		0		232
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.24		0.06		0.50		0.44

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 29 (29%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 2.9 Intersection LOS: A
Intersection Capacity Utilization 70.8% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Bronson & Arlington



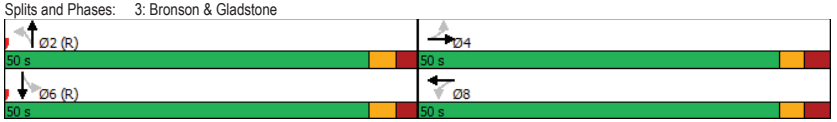
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	48	359	139	314	96	833	49	809
Future Volume (vph)	48	359	139	314	96	833	49	809
Lane Group Flow (vph)	48	431	139	331	96	970	49	893
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted 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)	28.2	28.2	28.2	28.2	25.0	25.0	25.0	25.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0	6.0	6.0	6.0
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	12.0	12.0	12.0	12.0
Pedestrian Calls (#/hr)	81	81	71	71	50	50	50	50
Act Effct Green (s)	43.8	43.8	43.8	43.8	44.0	44.0	44.0	44.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.14	0.60	0.51	0.45	0.59	0.71	0.35	0.63
Control Delay	18.3	25.8	28.3	22.1	27.7	16.1	27.5	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	25.8	28.3	22.1	27.7	16.1	27.5	24.2
LOS	B	C	C	C	C	B	C	C
Approach Delay		25.1		23.9		17.1		24.3
Approach LOS		C		C		B		C
Queue Length 50th (m)	5.4	62.0	18.9	43.6	9.3	52.6	6.1	68.6
Queue Length 95th (m)	12.7	93.2	38.5	67.1	#37.9	34.6	16.8	88.8
Internal Link Dist (m)		139.3		203.3		207.2		176.5
Turn Bay Length (m)	20.0		20.0		35.0		45.0	
Base Capacity (vph)	346	717	275	740	163	1374	140	1418
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.60	0.51	0.45	0.59	0.71	0.35	0.63

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 40 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 21.8 Intersection LOS: C
Intersection Capacity Utilization 91.9% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Bronson & Gladstone



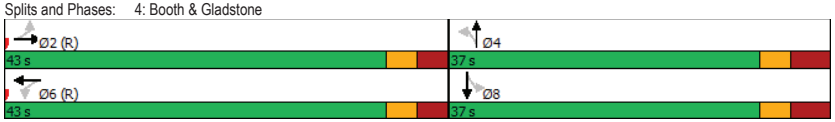
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	37	353	138	615	99	387	49	368
Future Volume (vph)	37	353	138	615	99	387	49	368
Lane Group Flow (vph)	37	395	138	655	99	461	49	388
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.1	22.1	22.1	22.1	23.9	23.9	23.9	23.9
Total Split (s)	43.0	43.0	43.0	43.0	37.0	37.0	37.0	37.0
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.3%	46.3%	46.3%	46.3%
Maximum Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.9	6.9	6.9	6.9
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	9.0	9.0	10.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)	57	57	45	45	34	34	29	29
Act Effct Green (s)	36.9	36.9	36.9	36.9	30.1	30.1	30.1	30.1
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.38	0.38	0.38	0.38
v/c Ratio	0.22	0.51	0.42	0.83	0.37	0.72	0.23	0.60
Control Delay	17.3	17.7	29.7	39.2	23.0	28.5	20.8	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	17.7	29.7	39.2	23.0	28.5	20.8	24.5
LOS	B	B	C	D	C	C	C	C
Approach Delay		17.6		37.6		27.5		24.1
Approach LOS		B		D		C		C
Queue Length 50th (m)	3.2	39.3	22.0	108.5	10.7	56.9	5.0	45.9
Queue Length 95th (m)	10.0	63.5	39.9	#150.0	23.6	90.9	13.2	73.3
Internal Link Dist (m)		79.0		246.0		206.0		98.4
Turn Bay Length (m)	40.0		25.0		8.0		8.0	
Base Capacity (vph)	166	774	332	793	270	638	209	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.51	0.42	0.83	0.37	0.72	0.23	0.60

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 51 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 28.5 — Intersection LOS: C
Intersection Capacity Utilization 102.0% — 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.

Splits and Phases: 4: Booth & Gladstone



Lane Group	EBL	EBT	WBL	WBT	SBT
Lane Configurations					
Traffic Volume (vph)	31	528	1	711	1
Future Volume (vph)	31	528	1	711	1
Lane Group Flow (vph)	0	565	0	721	68
Turn Type	Perm	NA	Perm	NA	NA
Protected Phases		2		6	8
Permitted Phases	2		6		
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.5	29.5	29.5	29.5	23.2
Total Split (s)	56.8	56.8	56.8	56.8	23.2
Total Split (%)	71.0%	71.0%	71.0%	71.0%	29.0%
Maximum Green (s)	51.3	51.3	51.3	51.3	18.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2
Lost Time Adjust (s)		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None
Walk Time (s)	19.0	19.0	19.0	19.0	10.0
Flash Dont Walk (s)	5.0	5.0	5.0	5.0	8.0
Pedestrian Calls (#/hr)	86	86	67	67	56
Act Effct Green (s)		58.6		58.6	14.8
Actuated g/C Ratio		0.73		0.73	0.18
v/c Ratio		0.47		0.57	0.23
Control Delay		6.1		9.5	12.4
Queue Delay		0.0		0.3	0.0
Total Delay		6.1		9.8	12.4
LOS		A		A	B
Approach Delay		6.1		9.8	12.4
Approach LOS		A		A	B
Queue Length 50th (m)		21.5		58.9	1.7
Queue Length 95th (m)		32.0		92.5	11.3
Internal Link Dist (m)		246.0		139.3	183.9
Turn Bay Length (m)					
Base Capacity (vph)		1203		1274	341
Starvation Cap Reductn		0		164	0
Spillback Cap Reductn		0		0	0
Storage Cap Reductn		0		0	0
Reduced v/c Ratio		0.47		0.65	0.20

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 65 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 8.4 Intersection LOS: A
Intersection Capacity Utilization 79.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: Arthur & Gladstone

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	332	194	31	367	528
Future Volume (vph)	332	194	31	367	528
Lane Group Flow (vph)	509	194	31	367	619
Turn Type	NA	Perm	Perm	NA	NA
Protected Phases	8			2	6
Permitted Phases		8	2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.5	25.5	25.2	25.2	25.2
Total Split (s)	25.5	25.5	44.5	44.5	44.5
Total Split (%)	36.4%	36.4%	63.6%	63.6%	63.6%
Maximum Green (s)	20.0	20.0	39.3	39.3	39.3
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.2	5.2	5.2
Lead/Lag					
Lead-Lag Optimize?					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	C-Max	C-Max	C-Max
Walk Time (s)	11.0	11.0	15.0	15.0	15.0
Flash Dont Walk (s)	9.0	9.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	15	15	50	50	35
Act Effct Green (s)	20.0	20.0	39.3	39.3	39.3
Actuated g/C Ratio	0.29	0.29	0.56	0.56	0.56
v/c Ratio	1.06	0.36	0.11	0.37	0.65
Control Delay	86.7	5.5	8.4	9.9	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	86.7	5.5	8.4	9.9	14.2
LOS	F	A	A	A	B
Approach Delay	64.3			9.8	14.2
Approach LOS	E			A	B
Queue Length 50th (m)	~75.2	0.0	1.7	24.2	49.1
Queue Length 95th (m)	#127.8	13.1	5.4	40.2	81.2
Internal Link Dist (m)	302.1			65.0	206.0
Turn Bay Length (m)		75.0	25.0		
Base Capacity (vph)	479	542	293	979	956
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	1.06	0.36	0.11	0.37	0.65

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 39 (56%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 33.6 — Intersection LOS: C
Intersection Capacity Utilization 80.0% — 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: 6: Booth & Raymond